PROCEEDINGS

ONE HUNDRED AND THIRTEENTH ANNUAL MEETING

of the

UNITED STATES ANIMAL HEALTH ASSOCIATION

P.O. BOX 8805
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Town and Country Resort and Convention Center
San Diego, California
ABOUT USAHA

USAHA’s Mission…
The United States Animal Health Association is a forum for communication and coordination among State and Federal governments, universities, industry, and other concerned groups for consideration of issues of animal health and disease control, animal welfare, food safety and public health. It is a clearinghouse for new information and methods, which may be incorporated into laws, regulations, policy, and programs. It develops solutions of animal health-related issues based on science, new information and methods, public policy, risk/benefit analysis and the ability to develop a consensus for changing laws, regulations, policies, and programs.

USAHA MEMBERSHIP
State Official Agency Members (49)
Alabama  Indiana  Nevada  South Dakota
Alaska   Iowa    New Hampshire  Tennessee
Arizona  Kansas  New Jersey   Texas
Arkansas Kentucky New Mexico Utah
California Maine New York  Vermont
Colorado Maryland North Carolina Virginia
Connecticut Massachusetts North Dakota Washington
Delaware Michigan Ohio  West Virginia
Florida  Minnesota Oklahoma Wisconsin
Georgia  Mississippi Oregon Wyoming
Hawaii   Missouri Pennsylvania
Idaho    Montana Rhode Island
Illinois Nebraska South Carolina

Federal Official Agency Members (11)
USDA, APHIS, Veterinary Services  USDHS, Science and Technology Directorate
USDA, Agriculture Research Service  USDHS, Office of Health Affairs
USDA, Cooperative State Research,  USDA, U.S. Fish and Wildlife Service
  Education and Extension Service  USDA, National Park Service
USDA, APHIS, Wildlife Services  USDI, USGS, National Wildlife Health Center
USDHHS, Centers for Disease Control  USDOE, Lawrence Livermore National
  and Prevention  Laboratory

Territory and Sovereign Agency Members (2)
North Mariana Island
Navajo Nation

International Animal Health Agencies (4)
Australia
Canada
Mexico
New Zealand
ABOUT USAHA (continued)

**Allied Industry Organizations (34)**
- Alpaca Owners & Breeders Association
- American Association of Avian Pathologists
- American Association of Bovine Veterinarians
- American Association of Small Ruminant Practitioners
- American Association of Swine Veterinarians
- American Association of Veterinary Laboratory Diagnosticians
- American Association of Wildlife Veterinarians
- American Association of Zoo Veterinarians
- American Farm Bureau Federation
- American Horse Council
- American Sheep Industry Association
- American Veterinary Medical Association
- Association of American Veterinary Medical Colleges
- Association of Fish & Wildlife Agencies
- Battelle
- Exotic Wildlife Association
- Holstein Friesian Association USA, Inc.
- International Lama Registry
- Livestock Exporters Association, USA
- Livestock Marketing Association
- National Aquaculture Association
- National Bison Association
- National Cattlemen’s Beef Association
- National Chicken Council
- National Dairy Herd Improvement Association, Inc.
- National Institute for Animal Agriculture
- National Milk Producers Federation
- National Pork Board
- National Pork Producers Council
- National Renderers Association
- National Turkey Federation
- North American Deer Farmers Association
- North American Elk Breeders Association
- U.S. Poultry & Egg Association

**District Delegates**
- Northeast: J. Enck; E. Zirkle

**Individual Members:** 803  
**Life Members:** 135  
**Student Members:** 4

North Central: V. Green; J. Hawley  
South: L. O. Lollis; A. G. Rosales  
West: W. Sauble; H.M. Richards
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C. Committees
I. 2009 Officers, Directors and Committees

A. Officers

2008-2009 Executive Committee
Seated, from left: James Leafstedt, Immediate Past President; Donald Hoenig, President; Richard Breitmeyer, President Elect.
Standing, from left: David Meeker, Third Vice President; William Hartmann, Treasurer; Steven Halstead, First Vice President; David Marshall, Second Vice President.
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USAHA Board of Directors, 2009 (continued)

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<td>Robert</td>
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<td>Walter</td>
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<tr>
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II. 2009 Annual Meeting Proceedings
A. USAHA/AAVLD President’s Reception and Dinner
B. USAHA/AAVLD Scientific Session
C. USAHA Scientific Papers, Posters and Abstracts
D. USAHA Membership Meetings
E. Committee Reports
F. Other Reports
II. 2009 Annual Meeting Proceedings

SUNDAY, October 11, 2009

A. USAHA/AAVLD President’s Reception and Dinner

Invocation
Steven Halstead

Memorial Service
Richard Breitmeyer

As organizations, both at USAHA and AAVLD, our strength truly lies in our members, each of us sharing our experience, expertise, vision, and willingness to serve – for the benefit our greater purpose. As we come together this evening, it is incumbent upon us to remember those members we have lost during the past year. Please take a moment and reflect on these individuals as I read their names:

From USAHA:

Dr. Joseph Templeton, from the state of Texas
Dr. Calvin W.S. Lum, from the state of Hawaii
Dr. John F. Hudelson, from the state of Colorado
Mr. Thomas R. Mickle, from the state of Georgia
Dr. Nels Konnerup, from the state of Washington

From AAVLD:

Dr. Richard Walker, from the state of California

While we are saddened each time one of our own is lost, we can take comfort and joy in the contributions each has made, and to the many memories they leave with us. Please join me in a moment of silent prayer. May the Lord be with us this evening and give peace and comfort to the families and friends of our dearly departed, Amen.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Welcome to California
A.G. Kawamura
Secretary, California Department of Food and Agriculture

It is my pleasure to join you this evening in San Diego. California is an important and diverse agriculture state, and I welcome you.

For the past 6 years I have spent more time defending California farms against pests and diseases than anything else. And yet the greatest threat to our food and fiber system appears to be a different kind of pest. In defense of food and the agricultural system that provides it, I thought I’d share some thoughts about the way we might look at Agriculture in the 21st century.

Last March, I was able to participate in the 2009 Delhi Sustainable Development Summit in India. The focus of the summit was to bring international leaders together to discuss the issues surrounding global climate change in preparation for the upcoming deliberations in Copenhagen this month. My reason for attending was to voice a continuing concern that agriculture has been missing from this important dialogue.

The pressing new revelations of climate change complicate an already challenging outlook for world agriculture. Current demographic projections show that we will need to have a 70% increase in agricultural output by 2050 to meet the nutrition needs of approximately 9.4 billion people. This is no small task. And yet, when 24,000 children die each day of starvation and sanitation related diseases, the questions must be asked: Where are our priorities? Just how many people will die from global warming? And if they do die, isn’t it more than likely that the majority of preventable deaths will come from some failure of the food system, either to deliver or produce a sustaining food supply? Can the ethic of food security for all humans then be linked to the common cause of addressing global climate change? In the world of agriculture, we can no longer work in parallel silos of good
intention. We must respond to the impacts and the need for adaptation, mitigation and innovation. The significant and complex threats that confront all dimensions of agriculture must be revealed and understood in the context of a Copenhagen outcome.

While there are plenty of reasons to worry about the projections of sea level rise and heat waves in mega-cities, there is very little discussion in the media about the fate of agriculture. The simple and uncomfortable truth that has caught the attention of agriculturists around the planet is that unpredictable weather means unpredictable harvest. Along with this comes the observation that climate change does not discriminate between countries or farmers. It is a stark and sobering reality.

In the developed world, the luxury of abundance gives us the privilege to choose how our food supply might be produced: Organic/conventional; GMO/heirloom; fast/slow; local/imported; processed/farm fresh; 365 day availability/seasonal only. In California, we are fortunate to not only argue about what's for dinner, but literally to fight over how it should get on a plate. A quarter of the earth’s human population would just like something on the plate everyday. In California we have responded to a demanding worldwide consumer and now produce over 400 different commodities through a myriad of production methods and philosophies.

Having so many choices describes an unprecedented kind of agricultural abundance. It also gives rise to an insidious kind of complacency. Certainly we did not dream up the current California cornucopia in a vacuum. It was created upon a foundation of fundamental principles that no “surviving” civilization has ever forgotten. And perhaps that is my greatest concern: History is littered with fallen societies that somehow developed chronic amnesia, manifested as irresponsibility and ultimately, negligence when it came to investing in their food security infrastructure. The backbone of agricultural success depends on invasive pest and disease management, applied scientific research, water development, transportation, post harvest storage and processing. All of these become the pillars of a stable platform for production. And yet there is an insidious decay in the support for these critical components, an undermining of principles across many nations. In the U.S., when less than 2 percent of the population produces the entire domestic food supply, the voice of agriculture becomes muted by the chewing sounds from those who consume but do not produce. In the absence of understanding comes a parade of demagogues -- masquerading as well-intentioned authorities -- who see agriculture as part of the problem and not as a leading force and source of the solution.

When people speak about the collapse of agriculture without context, they stand the risk of being accused of crying wolf. I am enormously concerned about the future of farming -- but we do have options. Adaptation is mankind’s middle name. Look at where agriculture exists today, and so many of the “arable” regions of California are in places that previously were considered inhospitable...the San Joaquin and
Sacramento Valleys were swamps, the Coachella and Imperial Valleys were barren desert! The lesson here is that we need to truly understand the potentiality of where food and fiber can be produced and the infrastructural foundation that needs to be in place for it to progress. In the 21st century it will mean protecting prime farm lands; looking to the oceans for additional water and minerals; enabling biomass and other renewable energy; landscaping an edible urban forest of cities; pursuing home permaculture greenhouse and backyard production sites. We will see local food and energy sheds develop in response to regional security goals and demands. Agriculture will be big and small, technical and simple. It will need to be dynamic.

In California, decisive leaders began to build an amazing water infrastructure over 100 years ago that anticipated and envisioned significant population and agricultural growth. It was designed in part to rely on an abundant snow pack as a water storage component. Now with the threat of climate change we find that we will need to adapt this remarkable system. The procrastination and failure to build upon and maintain this critical infrastructure has left California vulnerable to system collapse. The urgent question today is can we be wise enough to take proactive measures to head off the predictable demise of our state’s vital water system? Three years into our California drought, we hope to learn from the crisis of others.

In Australia, a 2-year drought has galvanized the government to respond to its emergency with unprecedented regulatory haste as they re-tool and re-think their critical infrastructure in the face of explosive wild fires, dust storms and agricultural and rural community collapse. They are fortunate to have access to quite an effective toolbox of technologies and proven actions that can be adopted, funded and built now that the public fully realizes they are stakeholders in a positive or negative outcome. The bad news is that their agricultural output is down by some estimates as much as 50 percent with some specific industries like rice, virtually eliminated (down almost 98 percent). Whether this predictable outcome could have been averted becomes a topic for debate but the real challenge now is mitigation in the face of catastrophic impacts.

Conversely, in the Netherlands, the Dutch have taken preventative adaptation to climatic pressures to the highest level anywhere on the planet. Centuries of hard learned lessons have taught them that the best way to protect against periodic but fully predictable floods was to build a better system of levees and sea walls. For a country whose land mass is 60 percent below sea level, their national commitment to self-preservation serves as a remarkable lesson. What other nation rallies the collective resolve and resources of its citizenry and builds sea walls that can withstand a one in ten thousand year storm surge? It happens only when a civilization truly grasps the reality of living versus survival.

We can “survive” global warming, but is simply surviving our goal? How can it be that California is one of the largest agricultural economies in
the world, or, that the Netherlands is not under water? In part it is because of the blessings of resources, the borrowing and creation of new science and technologies…and in part it is because of the ingenuity, vision and leadership of those who could see a different reality for their countries. Mankind has the capacity to bring together the wisdom of the past with the accumulated technologies of today and create a sustainable path upon which humans can finally emerge and leave the shackles of survival and enter an age of living. The specter of collapse or the promise of renewal in the face of global climate change should be an easy choice for us to make. I believe that through a convergence of our incredible human resources towards a vision of a sustainable living world, we can build a wellness strategy that embraces as one of several pillars, an agricultural renaissance that will teach us to thrive.

Invitation to Minnesota
William Hartmann
Minnesota State Veterinarian

Thank you Secretary Kawamura for your hospitality and welcoming us to San Diego.
As in years past, San Diego has proven to be a great location for our joint meeting.
We are privileged to be guests in your State.
I am honored to announce that in 2010 Minnesota will be hosting this prestigious meeting.
I would like to take a moment to extend an invitation to all members and guests to attend the 53rd Annual Meeting of the AAVLD and the 114th Annual Meeting of the United States Animal Health Association.
We invite you to join us at the Hilton Hotel in downtown Minneapolis to
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

explore the Twin Cities of Minneapolis and St. Paul.

Fall is a beautiful season in the Twin Cities- the vibrant colors and crisp fall weather makes it a perfect time to visit. Even though I would admit it's going to be hard to follow the weather we've had here in San Diego.

A history rich city situated on the banks of the Mississippi, Minneapolis offers visitors a wide variety of activities from museums, music performances, sporting events and shopping.

Minneapolis is the largest city in Minnesota and the Twin Cities is the 16th largest metropolitan area in the country.

The Twin Cities is a fantastic destination and I am sure that you will enjoy your stay. I hope you will all join us next year in Minneapolis as we are so honored to once again host this prestigious meeting.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Sponsor’s Recognition
Bill Goodspeed
IDEXX Laboratories

Deputy Undersecretary’s Remarks
John Ferrell
Deputy Under Secretary, Marketing and Regulatory Programs
USDA
I always said when this opportunity presents itself I would be brief so ..

An infamous actor Woody Allen is credited with saying “There are three groups of people in the world. “Those who make things happen, those that watch things happen and those who sit and wonder what happened? “

As I look around the room tonight, I see a group of scientists who make things happen.

The U.S. Animal Health Association brings together leaders that develop policy and implement the programs that protect public health, protect the economic viability of livestock industry.

The American Association of Veterinary Laboratory Diagnosticians brings together scientist that:
1) Provide critical disease surveillance
2) That identify emerging diseases and
3) And that advance the discipline of diagnostic medicine.

The sponsors and industry representatives present tonight contribute to the advancement of science by expanding knowledge and sharing technologies. I want to thank them not only for support of our meeting but also for their support on a more continuous level, in our labs throughout the year.

The partnerships between AAVLD, USAHA, USDA, serve the public interest and I encourage each of you to continue as difference makers.

Value this commitment and never underestimate your potential to contribute; and the extent and value reaped thru application of our collective knowledge

I want to thank Dr. John Clifford and USDA Staff for their commitment to diagnostic medicine.
II.A. USAHA/AAVLD PRESIDENT’S RECEIPTION AND DINNER

From the perspective of the presidency it has become exceptionally clear that the engines for progress, the “difference makers,” are you the members. Whether by volunteering on committees, serving as a chair, initiating actions within committees or by sharing diagnostic science you are making things happen. Continue to seize the opportunities.

Thank you and keep up the good work!

USAHA President’s Remarks
Donald Hoenig

I know I’ve said this before but I always like to keep in mind President Franklin Delano Roosevelt’s admonition on making speeches when I need to give remarks at an event such as this: Be brief, be sincere, be seated.

Thanks you all for coming this evening. In a few moments we’ll be recognizing several of our colleagues and peers with some well-deserved awards but before we do, I’d just like to reflect a bit on the past year and my involvement in the USAHA. Many of you know that I’m a runner and one of the reasons I love to run is the time that it gives me away from all other distractions- no one can call me, I don’t need to listen to the radio or watch the TV, I can get away from e-mail and voice mail for a little while, I don’t have to talk to anyone and the only thing I have to do is put one foot in front of the other and make sure I don’t get hit by a car or truck, which is sometimes a challenge. But what I am able to do on these runs is think, uninterruptedly, for a period of time. So the other day when I was out for one of my long runs, I was thinking about what I’d say this evening and I started to wonder, if I was challenged to come up with one word to describe the U.S. Animal Health Association, what would that word be? Quite a number of words came immediately to mind: oldest (I believe we are the nation’s longest serving animal health organization); forum (this certainly describes a significant part fo what the USAHA does);
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

science-based (can’t go wrong here, fortunately, it always comes back to science with us doesn’t it? That’s how we ground ourselves); volunteer (the overwhelming majority of our work is carried out by our volunteers- committee chairs, Board of Directors members, Executive Committee members, committee members and so forth); non-profit (always have, always will, I assume); financially sound (that’s two words but I’m sure no one can argue that point); unique (true but unique does not always have a good connotation- you could be uniquely bad, I suppose).

So without keeping you in suspense anymore, the word that kept coming to mind was multi-talented. I realize that’s a hyphenated word but it’s still one word, so all you frustrated English teachers, don’t give me a hard time! Look around yourself tonight and take stock of the talent that’s in this room. Nowhere else in the world could you find a greater collection of knowledge, skills and expertise in livestock and poultry health than right here. You all are and always will be the strength of this association. And we’re all here with one goal: the betterment of animal health and agriculture through science-based deliberations, collaborative interactions and creative problem-solving and that’s what makes us unique- uniquely good! And the partnership and collaboration that we’ve had over many decades with our colleagues in the AAVLD is also a uniquely good thing and we hope and anticipate that that relationship will continue many more years into the future.

In closing, I’d just like to thank our multi-talented staff- Ben Richey, Linda, Ragland and Kelly Janicek and others for all the work they put into the USAHA and into planning this meeting. I’d like to also say that for me the past five years on the Executive Committee have been the most challenging, humbling, inspiring, educational, at times frustrating and infuriating (but not that often!) and fabulous time in my career. I highly recommend it and thank you for all you do!
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Recognition of USAHA and AAVLD Sponsors

Applied BioSystems Animal Health
AthoGen
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Integrated Nano Technologies
Merial
Merrick and Company
Prionics, USA
Reindeer Owners and Breeders Association
Safe Supply of Affordable Food Everywhere
TREK Diagnostic Systems
Ventana Medical Systems, Inc.

Thank you for your support.
The USAHA Medal of Distinction is awarded annually to recognize one or more distinguished USAHA members who have demonstrated outstanding leadership, provided exemplary service and have made significant contributions to the advancement of the association. It is the highest award for a USAHA member. The Executive Committee reviewed the applications for this year and has elected a most deserving candidate. We are honored to have the 2009 Medal of Distinction Award winner join us the evening. On behalf of the US Animal Health Association, I am honored to present this award to someone whom you all know well and respect tremendously, Dr. Bret Marsh, the State Veterinarian for Indiana and 2006 President of this association.

Dr. Marsh is a 1984 graduate of Purdue University School of Veterinary Medicine. Prior to becoming State Veterinarian for the Indiana Board of Animal Health in 1994, Dr. Marsh served as the Swine Division Director with primary responsibility for the state’s Pseudorabies Program. Dr. Marsh is a past president of the Indiana Veterinary Medical Association, the Purdue Veterinary Alumni Association, and, as previously mentioned, the United States Animal Health Association, to name a few of his leadership positions.

Dr. Marsh is currently the Treasurer for the American Veterinary Medical Association, and is a past recipient of the National Assembly Award.

While Dr. Marsh’s tenure within this association is not as lengthy as some of the past recipients of this award, he has made good use of his time with the organization. Or perhaps the organization has made good use of his time for him. Marsh was appointed to the USAHA Executive Committee as Third Vice President in 2001 in Hershey, Pennsylvania. He also chaired the USAHA Special Committee on Brucellosis in the Greater Yellowstone Area (GYA), which was responsible for enhancing brucellosis vaccines, vaccine delivery, and surveillance diagnostics for elk and bison in the Greater Yellowstone Area in 2004 as well as being a previous chair of the Committee on Epizootic Attack. Last year when we asked him to remain as the chair of the Committee on Nominations and Resolutions for an additional year, he graciously agreed to do so. Committees on which he is currently also a member include: Tuberculosis, Transmissible Diseases of Swine, Livestock Identification, International Standards, Foreign and Emerging Diseases, Food and Feed Safety, Diagnostic Laboratory and Workforce Development and Brucellosis.

In the fall of 2005 when the Board of Directors approved a motion for the Executive Committee to hire an Executive Director, the Board also elected Dr. Marsh as the President who would lead us through this historic process. Throughout the term of his presidency, Dr. Marsh’s quiet but forceful leadership guided us through an exhaustive selection process
and interview process involving dozens of qualified candidates. This culminated in a final EC meeting in the fall of 2006 in Chicago when the EC selected our current outstanding Executive Director, Ben Richey.

My first real memory of Bret Marsh goes back several winters ago to a Government Relations Committee dinner at the Sir Walter Raleigh Inn with all the GRC members and a number of USDA folks in attendance. At the conclusion of the dinner, Bret stood back at the podium and indicated that he wished to make a few parting remarks. He then proceeded to recite, from memory mind you, the poem, “Take Care of Your Friends”, by Baxter Black, Cowboy Poet and former large animal veterinarian. I think all who attended that dinner were moved. I know I was.

Since that time, I’ve come to know and respect Bret even more as I’ve had time to serve with him on the Executive Committee and observe (and take good notes on) his leadership style. He led this association during a time of significant challenges and momentous change. He did so with his consummate grace, good humor and quiet diplomacy (when Dr. Marsh talks, people listen). I fully expect that Bret will someday represent the good state of Indiana in Congress as Senator Bret Marsh.

In closing, I’ll recite one stanza of Baxter Black’s poem that seems quite pertinent tonight:

“A hug or a shake, whichever seems right
Is the high point of giving, I’ll tell you tonight,
All worldly riches and tributes of men,
Can’t hold a candle to the worth of a friend”.

I’m proud to count Bret Marsh as one of my friends.

Please join me once again in congratulating Dr. Marsh as this year’s USAHA Medal of Distinction honoree.
Thank you. I am very pleased to join you all this evening to present the APHIS Administrator’s Award for 2009.

The past recipients of this award—program directors and developers…regulators and researchers…educators and advisors—all have made noteworthy contributions to protecting or improving the health of agricultural animals. Tonight, I am honored to present the Administrator’s Award to a gentleman who has labored for many years on these fronts and has served this organization with great distinction—most recently, as president. But I am especially pleased to be presenting this award to a man who has earned his living the hard way…as a pork, beef, and crop producer.

As many of you may know, James Leafstedt, although now retired, is a fourth-generation pork producer. The Leafstedt farm in Alcester, South Dakota, has been owned and operated by his family for about 135 years. His daughter and son-in-law are now carrying on the family tradition.

Back in 1976, Jim incurred heavy losses when his purebred swine operation was struck with pseudorabies virus, which has affected U.S. swine herds for at least the past 150 years. However, rather than lament his misfortune, that experience spurred Jim on to become one of the most active producer-leaders in the national pseudorabies eradication program.

As a result of his dedication and hard work on the pseudorabies campaign, Jim is now a household name in the animal health community. He began representing the National Pork Board at USAHA meetings in 1985, serving as a member on the Committee on Pseudorabies, of which he eventually became vice-chair.

Because of the voluntary nature of the pseudorabies eradication program, producers play a very significant part in surveillance, herd monitoring, and herd cleanup activities. Jim’s background as a pork producer, along with his leadership skills, enabled him to play a major role in reducing his home State’s pseudorabies infection rate to zero by 2000.

Jim was also a staunch advocate for providing sufficient funding for the program and continuing surveillance measures to locate the last remaining infected commercial herds. As a member of the Pseudorabies Control Board and chair of NIAA’s Pseudorabies Eradication Task Force, Jim led efforts to develop post-eradication plans.

At the October 2004 meeting of the USAHA Committee on Pseudorabies, the National Pseudorabies Control Board had the great pleasure of announcing that all 50 States had achieved “Stage V” status for pseudorabies. This announcement marked the first time in history that commercial swine herds throughout the entire United States were free of pseudorabies—a truly monumental achievement. I think we can all agree that—without Jim Leafstedt’s commitment and tireless efforts—it probably
would have taken much longer for us to reach this milestone.

Jim’s energetic and effective leadership as a producer working within a regulatory program provides an outstanding model to us all about what can be achieved through cooperation and partnership. However, his contributions to animal health didn’t stop with pseudorabies eradication. Jim has also been an influential and active voice in issues such as animal identification, disease surveillance, and interstate movement of swine.

At one time or another, Jim Leafstedt also has been the chair, vice-chair, or active member of just about a third of USAHA’s many committees. And, Jim has also generously given his time to his local community, in addition to raising two children with his wife Melva.

Over the past year, despite his retirement, Jim has continued to actively participate in the swine health committees of the National Pork Board and the South Dakota Pork Producers Council.

Jim, I want to thank you for your unremitting hard work and dedication over so many years to improve the health of our Nation’s livestock. Your steadfast efforts on the pseudorabies eradication campaign, and your many contributions to USAHA and to American agriculture overall, have provided an example for us all to follow.

Please now join me in congratulating James W. Leafstedt—the 2009 winner of the APHIS Administrator’s Award.

John Ferrell, Deputy Under Secretary for Agriculture and Marketing Programs; Dr. John Clifford, VS Deputy Administrator; James Leafstedt, 2009 APHIS Administrator Award Recipient; Melva Leafstedt.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

AAVLD Awards
Grant Maxie
AAVLD Past President

2009 Awardees

Distinguished Service Award
Barbara Martin, NAHLN coordinator

Trek Microbiology Award
Dr. Hailu Kinde

Pioneer in Virology Award
Dr. Charles Kanitz

Walker Bacteriology Award
Dr. Ailam Lim
  *Differential Gene Expression Study of bTB-Positive Cattle and bTB Test- False Positive Cattle in Michigan*
  *Ailam Lim, Steve Bolin*

Best Oral Presentation
Jonathan Arzt
  *The Early Pathogenesis of Foot-and-Mouth Disease in Cattle after Aerosol Inoculation*
  *Jonathan Arzt, Juan Pacheco, Luis Rodriguez*

Best Poster
Lifang Yan
  *Application of a Real-Time Reverse Transcriptase Polymerase Chain Reaction and an Antigen Capture Enzyme-Linked Immunosorbent Assay to Detect Animals Infected with Bovine Viral Diarrhea Virus*
  *Lifang Yan, Shuping Zhang, Lanny Pace, Floyd Wilson, Michael Zhang*

Trainee Travel Awards:
Dr. Ellen Binder – VA-MD
  *Phalaris spp. Grass Staggers in Beef Cattle*
Dr. ZhengChun Lu – U KY
  *Development and Evaluation of One-Step TaqMan® Real-Time Reverse Transcription-PCR Assays Targeting NP, M and HA Genes of Equine Influenza Virus*
Dr. Christie Mayo - UC Davis
  *Epidemiology of Bluetongue Virus and Infection Among Ruminants in California*
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Dr. Danielle Nelson - WSU

CD8+/perforin+/WC1- gammapdelta T, CD4+/perforin- alphabeta T, and B Lymphocytes Infiltrate Vasculitis Lesions of American bison (Bison bison) with Experimentally-Induced Sheep-Associated Malignant Catarrhal Fever

Dr. Aline Reis – U GA
Poster: Detection of Avian Influenza (AI) Viruses in Experimentally Infected Poultry Litter

Dr. Abby Durkes - Purdue
(AAVLD Awards Committee-Pathology Committee Award)
Poster: Does Asinine Herpesvirus-5 cause Renal Disease in Miniature Donkeys?

Dr. Janildo Reis – U GA
(AAVLD/ACVP Diagnostic Pathology Resident/Graduate Student Award)
In Situ Kinetics and Distribution of the Vesicular Stomatitis Virus during Early Infection in Cattle Inoculated via Scarification and Black Flies

Best JVDI Full Manuscript

Best JVDI Brief Communication

2009 Lifetime Members
Sharon Hietala, CA
Ron Lewis, BC, Canada
Gary Osweiler, IA
The E. P. Pope Memorial Award is presented in memory of Dr. Edward P. Pope who was one of the founders of the American Association of Veterinary Laboratory Diagnosticians (AAVLD), and who served with distinction as its Secretary-Treasurer from 1950 to 1972. The award was established in his honor in 1974.

The Pope Award is the highest award given by the Association and is presented to an individual who has made noteworthy and significant contributions to the Association in regard to implementing and advancing the recognition of the specialty of veterinary diagnostic laboratory medicine.

The 2009 E. P. Pope Memorial Award was presented to Dr. Sharon K. Hietala during the 52nd Annual Meeting of the AAVLD in San Diego, California. Dr. Hietala has been an active member of the AAVLD since 1989. She earned a Bachelor’s degree in Bacteriology in 1976 and worked as a research associate for several years before returning to the University of California, School of Veterinary Medicine to earn her PhD in Comparative Pathology in 1987. She joined the faculty at UC Davis in 1988 and has continued since that time in a joint appointment at the California Animal Health and Food Safety Laboratory System (CAHFS) and the School of Veterinary Medicine Department of Medicine and Epidemiology. Dr. Hietala is a Professor of Clinical Diagnostic Immunology at the CAHFS, where she serves as the section head of the laboratory system’s immunology and biotechnology services. Her interests have focused on development and validation of approaches to improve laboratory diagnosis and response capabilities, which include development or implementation of new tests and approaches such as high-throughput real-time polymerase chain reaction (PCR) or use of armored RNA as a PCR training sample, improving interpretation of serologic test information through use of statistical approaches, and evaluating alternate approaches to routine sampling and testing including environmental air-sampling for pathogens, multiplex PCR for lookalike disease surveillance, and molecular epidemiology for outbreak investigation. Dr. Hietala has published over 100 refereed journal articles, has 97 published abstracts, and has co-authored 7 book chapters, primarily on the topic of diagnostic medicine. Her first presentation to the AAVLD was in 1993; since then she has made 2 plenary session presentations as well as scientific session presentations for all but 2 years through 2009.

Dr. Hietala is quick to note that AAVLD has been an ongoing motivation and critical component of her career. She has served on several AAVLD committees; including the Interpretive Serology Committee (Chair 1997–2000), Diagnostic Virology, Epidemiology, Foundation, Program, House of Delegates, and Accreditation committees. Dr. Hietala has passionately supported training and implementation of quality
practices; examples, in addition to serving as an AAVLD site-visit auditor, include organization of the 1999 AAVLD symposia on Serology Quality Assurance, participation in the AAVLD workshop on assay validation in 2000, and serving as a technical coordinator for 1994 and 2005 avian serology training videos sponsored by the National Poultry Improvement Plan and internationally distributed. Dr. Hietala has spoken extensively on the laboratory lessons learned from the 2002–2003 exotic Newcastle disease (END) outbreak and was formally acknowledged in 2003 for her role in the END eradication effort. Dr. Hietala served on the AAVLD Executive Committee as the AAVLD Secretary-Treasurer from 2007–2009. She has additionally represented the AAVLD and laboratory diagnostics on the United States Department of Agriculture (USDA) Safeguarding Review Panel in 2001, on the USDA National Surveillance Unit Advisory Committee since 2004, and on the National Academy of Sciences 2003–2005 Panel on Assessing the Nation’s Framework for Animal Diseases. Dr. Hietala has actively participated in National Animal Health Laboratory Network activities since its inception, is involved in the Centers for Disease Control and Prevention Laboratory Response Network, and is engaged in international diagnostic medicine and laboratory development efforts. For the past 5 years, Dr. Hietala has worked with the international Joint IAEA-FAO Project on Early Warning Tools and Avian Influenza Preparedness.

When asked how she spends her time when not in the laboratory, Sharon happily reports on a husband of 27 years, 4 white-water kayaks, her own weight in rock-climbing gear, and a blissfully well-traveled and worn passport.

Grant Maxie (r) presents Sharon Hietala with the prestigious AAVLD E.P. Pope Award.
I would like to present the National Assembly award to Mr. John Adams, of the Commonwealth of Virginia. We recognize Mr. Adams for distinguished service promoting animal health in the livestock industries of the United States.

Mr. Adams has served the livestock industries of the United States for over 30 years, many spent with the National Milk Producers Federation. During the 1970s he became involved with the U.S. Animal Health Association, Committee on Tuberculosis. There he was among the first to recognize the importance of the tuberculosis eradication program to the beef industry in addition to its longstanding role in the dairy sector. Mr. Adams worked tirelessly to promote the whole herd concept for tuberculosis control and spent time in Washington, DC working to secure a funding stream for the tuberculosis program. Subsequently, he played an important role in bringing the dairy and beef cattle producers together to work on a united effort to develop a plan for animal identification and traceability. Mr. Adams co-chaired the Cattle Working Group for the US Animal Identification Plan that contributed to the current National Animal Identification System. His efforts to establish the National Johne’s Disease Working Group, led to the National Voluntary Johne’s Disease Plan, a model for cooperative efforts between the federal government, states and producers.

Mr. Adams continues to contribute to the solution of animal health problems as a private consultant and through service on the Board of Directors of the National Institute for Animal Agriculture.

Mr. Adams is unable to be with us this evening, but sends his gratitude to the National Assembly for this honor.
II.B. USAHA/AAVLD Joint Scientific Session

Emerging Vector Borne Diseases: What’s the Risk?
Monday, October 12, 2009

Climate Change and Emerging Diseases: A Search for Patterns and Predictions in a Changing World - E. P. Gibbs

Impact of Bluetongue in Europe: A Recent Example of an Emerging Disease – V. Caporale

Emergence of Bluetongue and Related Orbiviruses in the United States – D. Stallknecht

Unique Challenges to North America Posed by Emerging Diseases – T. McElwain

USDA Perspectives – J. Clifford
The Intergovernmental Panel on Climate Change (IPCC) in its most recent report (Report IPCC , 2007) concluded that the earth was warming and that we could expect to see a minimum rise in average temperature of 2°C and possibly greater within the lifetime of the average citizen. When, and at what temperature level, the peak will be reached will depend upon the effectiveness of governments around the world in limiting the production of greenhouse gases. While the burning of fossil fuels for energy contributes the majority of the greenhouse gases (predominantly CO$_2$), ruminant animals produce significant quantities of methane, a potent greenhouse gas. It is estimated that ruminants produce more greenhouse gases than the entire global transport system.

Climate change brings with it a range of other effects beyond increasing temperatures. Among these, the IPPC lists increased rainfall in some regions of the world with, conversely, drought in others. The cattle ranges of the western states of the USA, which are already under water stress can expect to become more arid. Melting of the world’s glaciers, particularly those in Greenland, will lead to increased sea levels which, under worse case scenarios, could be as much as 1 meter by 2090.

The IPCC also identified that climate change would affect the prevalence and geographical distribution of disease. The IPCC and other organizations predict that the effects of climate change will be most evident with arthropod-borne diseases, such as malaria, which is likely to become a greater problem and spread further north and south from the tropics. Similarly, arthropod-borne diseases of animals will arguably become more important.

Assessing the effect of climate change on other emerging diseases is far more difficult. Various reports, such as those from the Institute of Medicine in the USA and Foresight in the UK, have concluded that there are many “drivers” promoting the emergence of diseases and that climate change is only one. For most diseases, climate change is currently a minor component driving emergence, but as climate influences, albeit to varying degrees, many human activities, ecosystems, and agricultural systems, the effects can be difficult to discern. Cumulatively, the effect might become significant if the production of greenhouse gases continues at current levels.

While it is difficult to find robust scientific evidence that links climate
change to the prevalence and geographical spread of disease, there are two examples that can be found in Alaska. Both are in wildlife species.

Icthyophonosis is a systemic fungal disease affecting salmonids. Being poikilotherms, the temperature of the surrounding water increases the metabolism of the fish, but also the growth of the fungus. The number of Chinook salmon that reach the upper tributaries of the Yukon river to spawn is now declining due to greater death rates in the lower reaches of the river attributable to icthyophonosis. The temperature of the Yukon River in June is now 2°C warmer than in the 1970’s. To investigate whether these observations are related, Dr James Winton and colleagues of the USGS studied infected trout in the laboratory (trout are also salmonids, susceptible to icthyophonosis, and thus a laboratory model). By measuring the swimming stamina of infected and non-infected trout in water of different temperatures, they demonstrated that icthyophonosis had a greater effect on stamina when infected trout swam in water of higher temperatures. This they concluded would explain why a greater number of salmon are now dying before they reach their spawning grounds (Kocan et al., 2009).

The other example relates to the Northern Sea Otter. Canine distemper is caused by a morbillivirus and diseases similar to canine distemper have been recognized for several years in several species of seals in the seas around Europe and in the Atlantic Ocean off the eastern seaboard of North America. The virus has been characterized as a separate member of the morbillivirus group and named phocid morbillivirus. However, until recent reports of disease in Northern Sea Otters attributable to phocid morbillivirus, this virus had not been recognized in the Pacific Ocean. The evidence strongly indicates that climate change facilitated the introduction of this virus into the Pacific. For most of the last century, the polar ice cap prevented the migration of seals from the Atlantic Ocean to the Pacific Ocean. Since 2000, climate change has led to the retraction of the summer ice cap which, in turn, has created open water allowing the marine mammal populations of the two Oceans to comingle. Molecular characterization of the virus identified in the Northern Sea Otters strongly supports the theory that the virus was recently introduced to the Pacific. RNA viruses readily mutate, and at a fairly constant rate, such that one can identify when a virus split away from its progenitor. The sequence data for the virus identified in the Northern Sea Otter indicate that it is virtually identical with viruses found in the Atlantic Ocean dispelling any consideration that this virus had been present in the Pacific for many years prior to its discovery (Epstein et al., 2009).

An analysis of the effects of climate change on several diseases within a matrix focused on the routes of transmission is presented in Table 1. This indicates that the effects of climate change on several important diseases, such as foot-and-mouth disease and avian influenza, are likely to be subtle; other drivers are likely to be more
important, such as those discussed by Gibbs (2005). The strongest
evidence for the effect of climate change on the geographical distribution
of disease can be found by examining the spread of bluetongue into
Southern Europe. This arthropod-borne disease (it is spread by
*Culicoides* species) is now present in Southern Europe because the area
is warmer, which has allowed the African vector of bluetongue virus,
*Culicoides imicola* to become established and breed (see subsequent
presentation by Dr. Vincenzo Caporale for further information).

**Conclusions**

- Science and society agree that climate change (global warming)
is occurring.
- A temperature increase of ~2°C is inevitable in this century; it
  may be higher.
- The control of the greenhouse effect that is responsible for
  climate change is dependent upon political courage and action.
- Climate change will inevitably have an effect on disease
  occurrence and distribution, but it is difficult to predict and it is
  only one of myriad drivers of emerging disease. Each disease
  is unique. The effect of climate change is most easily/quickly
  observed with vector-borne diseases, but weather events need
  to be “teased out” of the analysis.
- Many tools are available to study climate change, but the
  science is sophisticated and the interpretation difficult. Disease
  surveillance is key to recognizing the effects of climate change.

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interconnected global community.

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Author’s Note: The PowerPoint presentation that accompanies this
abstract may be found at http://www.usaha.org/meetings/2009/
2009Presentations.shtml
**Table 1**  
An Analysis of the Impact of Climate Change on Several Emerging Viral Diseases

<table>
<thead>
<tr>
<th>Viral Disease</th>
<th>Transmission Route</th>
<th>Mechanism for Expansion of Range (not exhaustive)</th>
<th>Prediction of Impact of Climate Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot-and-Mouth Disease</td>
<td>Food/Aerosol/Contact</td>
<td>Increase in humidity and cloud cover aids aerosol dispersal New areas of profitable farming</td>
<td>Subtle</td>
</tr>
<tr>
<td>Highly Pathogenic Avian Influenza (HPAI H5N1)</td>
<td>Food/Droplet Dispersal/Contact with migratory birds</td>
<td>Different feeding/breeding sites for migratory birds New wetland areas e.g. profitable rice farming</td>
<td>Subtle, but also short term influence through weather events</td>
</tr>
<tr>
<td>Bluetongue</td>
<td>Culicoides</td>
<td>Suitable environment for vectors to travel further N/S from subtropics</td>
<td>Compelling</td>
</tr>
<tr>
<td>Equine encephalitis (WN, EEE, VEE)</td>
<td>Mosquitoes</td>
<td>Suitable environment for vectors to travel further N/S from subtropics New wetland areas for vector breeding e.g. profitable rice farming</td>
<td>Considered important, but prediction dependent upon knowledge of complex vector biology</td>
</tr>
<tr>
<td>Rift Valley Fever</td>
<td>Mosquitoes</td>
<td>Suitable environment for vectors to travel further N/S from subtropics</td>
<td>As above. Remote sensing aids forecasting but primarily a weather event</td>
</tr>
</tbody>
</table>

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IMPACT OF BLUETONGUE IN EUROPE:
A RECENT EXAMPLE OF AN EMERGING DISEASE

Vincenzo Caporale
President, Biological Standards Commission
World Organization for Animal Health (OIE)

The following is a summary of lessons learned in Europe regarding Bluetongue, as presented by Dr. Vincenzo Caporale. A full presentation can be found at: http://www.usaha.org/meetings/2009/2009Presentations.shtml.

The control of bluetongue virus (BTV) in the European Union (EU) is divided into three phased approaches by the EU: eradication, limiting spread and endemization.

Phase 1 (Pre-2000): Eradication
- Stand still
- Stamping out
- Movement control
- Emergency vaccination (mainly the so-called vaccination to kill)

Phase 2 (2000-2006): Limiting the spread of BTV.
- Surveillance
- Strict movement control
- Compulsory vaccination [only in zone recognized as infected (sic!)]

Phase 3 (2006-Present): Endemization
- Surveillance
- Vaccination
- Movement with individual testing w/o mitigating measures

The European Union was caught unprepared, focusing on three areas of interest:
- Culture
- Science and techniques
- Legislation

Bluetongue - as most other “foreign animal diseases” - was considered an unlikely event and surveillance was minimal. Changes brought about by free trade agreements and massive translocation of human have not been analyzed properly and acted upon in relation to the prevention of animal diseases. Ideology, bad science and bad communication have contributed to create great confusion and massive damage.

BT demonstrated that the classical EU approach against animal diseases, based on the eradication strategies and stamping out policies, was not viable.
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Massive stamping out has become politically unacceptable and is useless in controlling vector born diseases.

In modern democracies veterinary regulations imposing severe limitations in particular if applied upon prolonged periods are "not accepted" and their enforcement is very difficult. Enforcement of severe measures in case of diseases considered "minor" by stakeholders – including veterinarians – are virtually impossible. BT is considered as 'minor' because causes little if any symptoms in cattle - with almost all BTV serotypes - or a mild disease in the sheep - with many serotypes.

Today, there is temptation to attribute the occurrence of foreign animal diseases – BT included - to concurrent climatic changes (and wild animal populations). This is because BT was already present in the Mediterranean basin, and the similarity of the ecology of the two hemispheres is often underrated.

This might be conducive to underrating the significance of other factors whose effect can be controlled, including:

- vanishing of effective historic barriers;
- mass dislocation of humans;
- acceleration of animal movements; and
- animal smuggling.

The use of vaccination was the most problematic issue. There was difficulty of procurement of good quality vaccines in the quantities required and "in time" is the issue when dealing with foreign animal diseases and BT was no exception. The debate on modified live viruses (MLV) often characterized by ideology and vested interests is very worrying. There are theoretical scientific assumptions have been considered more pertinent than the history of success in the control of both BT and other human and animal diseases.

The EU policy of compensation of direct losses with compensation of indirect losses created further problems. This can be attributed to:

- increase the declaration of direct losses attributing to BT all the possibilities;
- induced cattle owners to escape the veterinary controls; and
- exposed the veterinary services to the strong pressures of farmer associations and politicians continuously requesting for a relaxation of the control measures.

Any effective strategy to prevent and to control incursions of foreign animal diseases in Europe - including the incursion of other BTV serotypes – should include:

- regional surveillance network extended to all the Countries bordering the whole Mediterranean Basin and Eastern Europe; and
- availability of effective vaccines.

The OIE should play a leading role in promoting and coordinating efforts in the implementation of foreign animal diseases control at the international level, given the global implication of present animal and
animal products movement and consequent diseases spread patterns. A strategy based on animal immunization and the implementation of an intensive surveillance system appears the most effective. This strategy includes:

- to allow low-risk movement of animals from BT infected zones; and
- to reduce both direct & indirect losses

Additionally, effective risk communication involving directly farmers, other stakeholders and politicians is an essential tool to prevent & control animal diseases.

As usual, BTV has been very efficient in finding the Culicoides species with the best competence and capacity to sustain its survival. The risk definition depends on the precision of entomological surveillance. Spread of infection demonstrated by wind and unvaccinated animal movement.

Basic innovations include the use of vaccination in all domestic ruminants to assure safe animal movement and the use of surveillance to facilitate trade pin-pointing the extension of infected zones.

The spread of BTV-8 in northern Europe indirectly confirms the validity of the strategy applied in France (Corsica), Italy, Spain and Portugal, based on a vaccination policy coupled by the strict movement control and the establishment of effective serological and entomological surveillance systems.

BTV-8 introduced in the Netherlands - in a yet unexplained manner - after 15 months spread across 11 countries and over 750,000 km². BTV-8, in 1.5 years, has infected an area larger than the sum of the areas infected in eight years by all the other five BTV types, affecting the four countries of southern Europe.

The use of insecticides and repellents alone cannot assure protection against a Culicoides attack. Individual animal testing cannot assure the safety of animals from zones were the virus circulate UNLESS presence antibody against ALL virus types is proven.

There are additional elements to be taken into account in BT prevention and control, primarily monitoring of BTV8 transplacental transmission to verify its true relevance in relation to BTV epidemiology spread.
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EMERGENCE OF BLUETONGUE AND RELATED ORBIVIRUSES IN NORTH AMERICA

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Bluetongue viruses (BTV) and epizootic hemorrhagic disease viruses (EHDV) have recently been associated with range expansions into new areas and with disease in atypical hosts. Such events have occurred with bluetongue in Europe(1) and epizootic hemorrhagic diseases in Israel(2), Morocco, Algeria, and Turkey(3). Previously unrecognized serotypes of BTV and EHDV also have been identified in the United States(4,5). Between 1999 and the present, exotic BTV have been detected by the National Veterinary Services Laboratories (NVSL) and Southeastern Cooperative Wildlife Disease Study (SCWDS) in Arkansas (BTV-), Florida (BTV-3, -5, -6, -9, -14, -19, -22, -24), Louisiana (BTV-), Mississippi (BTV-3), Oklahoma (BTV-3), and Texas (BTV-12). Exotic EHDV (all EHDV-6) has been detected in Illinois, Indiana, Kansas, Michigan, Missouri, and Texas. EHDV-6 has been detected every year since 2006 when first discovered in the United States. This rapid geographic expansion of both BTV and EHDV is not understood but it is clear that we need to answer, or perhaps re-examine, some very fundamental questions to begin to understand why they occurred.

In 2006 and 2007, BTV-8 was associated with an outbreak in northern Europe. During 2006, sheep and cattle on over 2,000 farms in the Netherlands, Belgium, France, Germany, and Luxembourg were affected. During 2007, the virus “re-emerged” and its range within Europe expanded(6). This outbreak was significant not only because of its scale but also because of its spatial distribution and abnormal disease impacts; BTV infections are not normally associated with clinical disease in cattle. Northern Europe is not an area historically associated with bluetongue outbreaks and is not an area where the recognized vector for bluetongue in southern Europe and northern Africa, (Culicoides imicola), is known to exist. This ongoing example of range expansion does not stand alone. Since 1999, BTV-2, -4, -9, and -16 have been observed in Bulgaria, Croatia, Macedonia, Kosovo, and Yugoslavia, all of which are located north and west of the historic range where BTV is known to be established. These events challenge our existing knowledge of bluetongue epidemiology especially related to the identification of vector
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competent *Culicoides* species and our understanding of how climatic conditions can potentially affect vector range, movement, and replication in competent vectors. The fact that BTV-8 has been detected every year since its initial discovery in Europe also highlights our failure to understand how these viruses survive over winter.

Concurrent with the BTV-8 outbreak in Europe in 2006, EHDV-7 was associated with disease in cattle in Israel\(^2\) and a similar outbreak of EHDV-6 was reported in northern Africa (Morocco, Algeria) and Turkey\(^3\). These were the first reports of EHDV-related disease in cattle since 1959. The 1959 event in Japan involved Ibaraki virus which currently is recognized as a strain of EHDV-2\(^6\). It is well established that EHDV can infect cattle, but these viruses are generally not associated with disease in this or other domestic animals hosts. These recent events challenge our understanding of EHDV pathogenesis, the potential impacts of this disease, and the distribution of these viruses worldwide. With regard to the latter, the minimal connection between EHDV and livestock disease has led to a situation where reference viruses, representative field isolates, and sequence data for most of the recognized EHDV subtypes are either not available or very limited. With EHDV, we should not be complacent in the United States. Both EHDV-1 and EHDV-2 have been responsible for major mortality events in wild ungulates, especially white-tailed deer\(^7\). During 2002 and 2007, major outbreaks occurred in the eastern United States. Similar to outbreaks of BTV-8 in Europe and EHDV-7 in Israel, the 2007 EHDV-2 outbreak occurred in several northern areas where deer are rarely infected. There also is circumstantial evidence that many cattle herds were affected during this outbreak. This is not the first time where EHDV-2, concurrent with outbreaks in white-tailed deer, has been suggested as a cause of cattle disease in the United States. However, due to limited research, disease in cattle has never been experimentally demonstrated with EHDV-2 or any other EHDV subtypes other than the Ibaraki strain\(^8\); for most of the EHDV subtypes no challenge studies have been done.

The detection of EHDV-6 in white-tailed deer in Illinois and Indiana during 2006 and Missouri in 2007 highlights additional problems in dealing with these viruses. The first relates to diagnostics and the second relates to surveillance. In the case of diagnostics, serogroup-based polymerase chain reaction (PCR) protocols are routinely used for detecting both BTV and EHDV in clinical samples. These techniques, however, should supplement rather than replace traditional virus isolation and serotype-specific identification protocols. Serogroup-based PCR-based diagnostics provided a rapid and reliable method for identifying EHDV as the cause of death in these EHDV-6 cases; however, without additional serotype-specific diagnostics, the presence of this exotic serotype in the United States would have gone undetected. A second issue relates to surveillance sensitivity which at present is unknown. To put this potential problem into perspective, the single isolation of EHDV-6 in Missouri
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in 2007, which was needed to fully understand if this new serotype is established in the United States, was only possible to achieve with close to 300 successful orbivirus isolations from white-tailed deer. Generally, in a single year, there are less than 100 combined BTV and EHDV isolated from both domestic and wild animals from the entire United States.

The detection of exotic BTV in the United States underscores all of the questions, problems, and limitations discussed above with EHDV-6. The factors driving these recent isolations of non-indigenous BTV and EHDV may involve the introduction of new viruses, genetic changes in existing viruses, reassortment between exotic and indigenous viruses, the introduction of new vectors, range expansion by existing vectors (*Culicoides insignis*), transmission by established but currently unrecognized vectors, and all of the climatic and land use factors that can influence vector/host relationships. Our understanding of the current situation also is inhibited by limited surveillance for these viruses as described for EHDV-6 and ironically by the fact all of these exotic BTV (within the United States) are regulated as Select Agents. Although this designation was made to protect livestock and wildlife health, it also has served to restrict research and limit diagnostic and surveillance capabilities.

Our ability to understand and possibly prevent these “new” events has been impacted by our accepted concept of the diseases caused by these viruses. Bluetongue is clearly recognized as a significant disease of sheep, but one that can be controlled through vaccination. In cattle, bluetongue has been viewed primarily as a trade barrier rather than an important animal health issue. Epizootic hemorrhagic disease viruses have been only associated with problems in wild ungulates in North America, not cattle. It was also widely accepted that the primary vectors for BTV are clearly identified and that they predictably regulated the distribution of these viruses. Although these generalized concepts are supported by the scientific literature, their complete acceptance limits research opportunities and the surveillance needed to detect and fully understand the potential for change. In light of the current BTV and EHDV situation, perhaps the first question that we need to answer about these viruses and the diseases they cause is “Do we know as much as we think we know?”

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Introduction

Early detection of emerging diseases is critical to limiting spread, economic impact, and animal and human morbidity and mortality. For the plenary presentation, I was asked to focus on the unique challenges to North America posed by emerging diseases. I will attempt to do so. But we would be remiss in North America if we fail to consider the global challenges posed by emerging diseases. There is no doubt that diseases emerging in other countries, other parts of the globe, other ecosystems, and other political environments have an impact on North America. Some of the greatest impacts we have seen in North America have come from disease outbreaks in other parts of the world. We have only to look at the recent impact of novel H1N1 pandemic influenza on the swine industry to recognize that we must be prepared for emerging diseases whether they first emerge in India or Mexico, New York State or Papua New Guinea, Madagascar or Florida, the United Kingdom or Washington State. I had the opportunity to serve on a recent study conducted by the Natural Resource Council and Institute of Medicine of the National Academy of Sciences. The report was recently released (Sustaining Global Surveillance and Response to Emerging Zoonotic Diseases), and made recommendations related to establishing a surveillance system for emerging zoonotic diseases. To put some perspective on the significance of the problem, the committee attempted to evaluate the impact of emerging diseases globally. A conservative estimate of greater than $25B loss could be attributed to only six of the emergent diseases identified over the past decade (SARS, BSE, plague, Nipah virus, West Nile Virus, and HPAI).

Most ecosystems globally have a closely related counterpart in the United States. As was heard in other plenary presentations, climate change has the potential to create ecosystems in the United States more conducive to some, and less to other, disease reservoirs and vectors. Couple that with other factors that contribute to global spread of disease – trade in animal products, wildlife importation, both legal and illegal, movement of people around the globe, urbanization, development of livestock production in low income countries to meet the increasing demand for protein, and others – and we can predict that emerging diseases will occur in North America, and with some certainly, how they will be introduced. One current example may be the combination of changes in habitat, land use, climate, and animal movement leading to
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the potential emergence of cattle tick fever in Texas due to vector tick incursions over the past few years.

So the problem is large, and the challenge is great. But the enormity of the challenge should not deter us. Instead, that challenge should motivate us to move forward in establishing broad based, coordinated disease surveillance in the United States. We have made great strides in establishing the National Animal Health Laboratory Network, and we can build on this start to develop a surveillance system second to none across the globe.

Principles and components of emerging disease surveillance

No one discipline can tackle the challenge alone. Clinicians, epidemiologists, laboratorians, and informaticists are among the team members necessary to generate, bring together, analyze and make available surveillance data that is useful for making decisions. Ground truth is essential, and is obtained through practicing animal health professionals, epidemiologists, livestock operators, and others with firsthand knowledge of animal populations. Surveillance must be “smart” – surveillance for the sake of surveillance is resource wasteful. Informed science can target surveillance for emerging diseases to populations most likely to be first affected. Understanding the steps which an infectious agent must take to establish disease in a new species or broaden its impact, and understanding the drivers of disease emergence such as wildlife trade, trade in animal products, movement of people, and development of livestock production in new areas can focus surveillance efforts. Communication must be rapid, confidential and accurate. Laboratories must have adequate capability and capacity. And finally, surveillance must be integrated among all partners, including domestic animal health, wildlife health, and public health.

Building laboratory capacity and capability must also be based on sound principles of laboratory network operation. Multiple laboratory disciplines (for example, microbiology, pathology, parasitology, immunology, and molecular diagnostics) are necessary, particularly for detection of the truly new agent or variant. Personnel must be trained and proficiency tested, assays must be validated and harmonized whenever possible, equipment should be standardized, and facilities must have appropriate biocontainment. Finally, wrapping all these principles into a reliable package is a quality assurance program with outside assessment. Straying from any of these principles can compromise the validity of laboratory data used to make strategic decisions for disease control.

Are we prepared in North America?

The recent National Academy of Sciences report Sustaining Global Surveillance and Response to Emerging Zoonotic Diseases assessed the global capacity of reference laboratories officially identified by the
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OIE, FAO, WHO, and DOD. A mismatch was identified between the location of the laboratories and the geographic areas where disease emergence is predicted to be most likely (so called “hotspots”). Further, broad zoonotic disease diagnostic capability of these laboratories was limited, as they tended to have agent specific expertise. Efforts to better coordinate these laboratories into a comprehensive disease surveillance network have increased in recent years, with understandable focus on a single disease such as influenza or foot and mouth disease. Underlying principles of laboratory network function have been inconsistently applied.

The United States has played a leadership role in animal health laboratory network development. The National Animal Health Laboratory Network was founded and operates on sound principles of network function. The partnership between USDA and State animal health laboratories has resulted in surveillance capability and capacity that has facilitated rapid and reliable implementation of surveillance programs nationwide for emerging diseases such as H5N1 and pH1N1 influenza. The NAHLN provides a solid laboratory foundation for expanded disease surveillance necessary to meet the challenge. But much remains to be done. Emerging disease and broad zoonotic disease surveillance in multiple animal species is a new context for network and laboratory operations and procedures, and requires a nimble flexibility not commonly associated with large networks or laboratories. Sound decisions cannot be made without reliance on all partners and the best subject matter experts available, whether located in federal or state labs, in universities, in the United States or abroad.

Are we prepared in North America? Our response in quickly establishing animal health laboratory capability and capacity in the United States for pandemic H1N1 surveillance is a wonderful example of how federal and state partners can rapidly prepare and deploy a new program. And the precedent of utilizing the NAHLN for companion animal pH1N1 testing was recently established – a giant step toward coordinated zoonotic disease surveillance in the United States established with adherence to the best principles of laboratory network operation.

What is the challenge for North America?

We have made great strides in North America in establishing emerging disease surveillance capability and capacity. As a nation, we have the resources. Our challenges now are to strategically address zoonotic and emerging diseases in addition to foreign animal diseases, always staying attuned to early disease detection of the newly emergent agent. We should build this capacity onto the existing network, create a surveillance network that involves all stakeholders and partners (public or private), and never compromise the founding principles of laboratory and network function. It will be impossible to have a coordinated and adequately funded system without a nationally centered organizational
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structure as currently exists. But all partners must have a valued role in making decisions. Finally, we all must think creatively to identify funding sources, basing those in part on drivers of disease emergence.

We have a legacy in veterinary medicine and animal health to uphold. Vector borne protozoa, retroviruses, viral induced cancers, transmissible spongiform encephalopathies, rotaviruses, papillomaviruses, coronaviruses, and the ehrlichia are examples of infectious disease agents first identified in veterinary medical studies. It is our responsibility in a global society to uphold that legacy, and to pass it along to the next generation of animal health professionals.
Introduction: The recent resurgence, emergence, and spread of vector-borne diseases (VBDs) present serious issues for animal health specialists, as well as for public health, wildlife health, and environmental health specialists. These diseases impact the human and animal populations of the United States and other countries and could impact anyone of us. For example, I was included in a cluster of malaria cases in Virginia in 2002.

The Institutes of Medicine reports of 2003 and 2007 pointed out the many factors relating to the emergence of VBDs, including microbial adaptation; climate change; land use; international travel and commerce; loss of pesticides; and the lack of models to predict, prevent, and control VBDs. Developing a model of any VBD is complicated by the variability and relationships of the components—host, vector, environment, and pathogenicity—and by the knowledge gaps in these areas. Therefore, USDA's VBD objectives include filling the gaps through research, planning, and responding.

The Agricultural Research Service (ARS) conducts research to solve agricultural problems and provide information. The National Institute of Food and Agriculture (NIFA) supports research, education, and extension programs in the Land-Grant University System and other partner organizations. These two agencies conduct research to better understand disease pathogenesis and vector competence and to fill knowledge gaps related to pest management and animal protection. Some of their research projects include a surveillance component. The Animal and Plant Health Inspection Service (APHIS) conducts surveillance in its role of protecting American agriculture. For VBDs, surveillance objectives include identifying threats through global surveillance, rapidly detecting outbreaks, swiftly implementing mitigation measures, and communicating epidemiological patterns.

Our goal is to develop plans for specific diseases before an outbreak. Our plans will consider animal, public, and environmental health, as well as the political and trade aspects of the disease. Our recommended actions may include no action, vaccination, control, or eradication. We will need science-based information and tools to help us reach those decisions. Also, to develop effective response plans for VBDs, we must have public, wildlife (including zoo animal), and environmental health specialists at the table with us. The importance of research, surveillance, response planning, and collaboration are illustrated by three diseases.
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**West Nile Virus:** West Nile virus (WNV) as an exotic pathogen of concern was not high on threat lists before the 1999 outbreak. As the response to the outbreak continued, findings such as the high mortality in corvids and other wild birds and the virus’ adaptation to a variety of *Culex* and *Aedes* species surprised us. The spread of the virus from coast to coast in just 3 years was also unexpected. Because the virus seems to be here to stay, any activity toward eradicating WNV would be a long-term commitment. The alternative to eradication, as our plant pest and disease colleagues have experienced, is to adapt to living with the pathogen.

ARS continues to research WNV, including projects on reducing the risk of human and domesticated animal infection. NIFA has sponsored publications and Web conferences on WNV. APHIS collaborates with the Centers for Disease Control and Prevention’s (CDC’s) ArboNET to share information among domestic animal and zoo veterinarians and public health practitioners; maintains the National Animal Health Surveillance System Web site (http:///wwwaphis.usda.gov/vs/nahss/equine/index.htm) for reporting equine arbovirus information; and currently licenses 16 WNV products.

The detection, surveillance, and response to WNV involved several agencies with public health, animal health, and veterinary public health implications. A report from the U.S. Government Accountability Office in 2000 recognized that links between public and animal health are becoming more important and concluded that the time taken to connect the bird and human outbreaks showed a need for better coordination among responsible agencies. It also recommended that attention be given to ensure adequate networks between public health and other types of diagnostic laboratories.

**Bluetongue Virus:** Serotypes 2, 10, 11, 13, and 17 of bluetongue virus (BTV) are considered endemic to the United States. These endemic BTVs usually do not cause widespread disease outbreaks. An exception was the 2007 BTV-7 outbreak in Montana and Wyoming that clinically affected sheep, deer, pronghorn, and elk. Since 1999, 10 nonendemic serotypes have been identified in the United States. BTV-3 was found in 1999 and several years thereafter. Some of the nonendemic serotypes are known to be endemic to the Caribbean, and all of them are endemic to Africa. The nonendemic serotypes have not caused widespread disease outbreaks. However, we lack information about possible mechanisms of introducing exotic BTV strains and their prevalence in the United States (e.g., there is no systematic surveillance for BTV), so it is difficult for APHIS to develop an appropriate response plan when one or more exotic virus strains are detected.

Since 1998, six BTV serotypes have been newly detected in Europe. Our previous understanding of the specific association of serotype, vector, and geographical area was challenged. Vector control in a large outbreak was problematic, but preemptive vaccination of susceptible
animals proved effective. Although BTV-8 differs from other serotypes in how it infects cattle, its transmission, etc., we do not know if BTV-8 would behave the same in U.S. animals because U.S. animals are not BTV naïve as the European animals were.

Examples of current ARS research include working with Colorado State University and APHIS Wildlife Services to study BTV-8 in white-tailed deer and developing a multiplex RT-PCR assay for BTV and epizootic hemorrhagic disease. APHIS activities include serotyping isolates from exports and any nonendemic isolates from the Southeast Cooperative Wildlife Disease Survey (SCWDS), providing funding for SCWDS Culicoides surveillance, and monitoring European BTV-8 vaccine production.

The European response to BTV-8 and other serotype incursions demonstrated the value of having policies and strategic plans in place to deal with a BTV epidemic. In 2008, APHIS hosted a BTV-8 / Orbivirus symposium that was attended by academic researchers, APHIS and ARS scientists, biologics industry representatives, and state animal health officials. Recommendations were made in the areas of research, surveillance, diagnostics, vaccines, policy, and collaboration. Activities consistent with a number of the recommendations are being undertaken by USDA as resources allow.

**Rift Valley Fever:** Rift Valley fever (RVF) is number 3 of 17 the prioritized National Veterinary Stockpile (NVS) most dangerous animal disease threats. It is a lethal zoonotic and potential bioterrorism agent. The chain of command and individual agency roles will be complex for this zoonotic pathogen that is also a select agent. Its range has expanded, and the United States has competent vectors. The U.S. Army Medical Research Institute for Infectious Diseases identified U.S. species of floodwater Aedes and common farm Culex mosquitoes as competent. No vaccines for humans, livestock, or wildlife are currently licensed in the United States. Ultimately, vaccines would differentiate infected from vaccinated animals (DIVA), but that capability is farther off in development. The unavailability of a vaccine for human workers or low-containment reagents has delayed research and validation of important tools. There is no budget to specifically stockpile RVF diagnostic reagents. The potential role of North American wild ruminants remains unknown. We have a variety of pathways for RVF introduction, including container vessels, passenger ships, and airplanes, as well as Saharan dust blowing across the Atlantic to the Caribbean and Florida, possibly carrying African insects. However, outbreaks in the endemic zones can be predicted through global and localized climate models, allowing intensified global surveillance when RVF virus is active.

ARS is currently addressing some gaps in our RVF efforts. Projects include countermeasures to control and eradicate RVF, DIVA-compatible and operator-safe diagnostics development, expansion of the Kenyan RVF veterinary surveillance program, and collaboration with NASA to...
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develop early warning climate models for East Africa. In 2009, APHIS identified RVF research needs for an interagency and interdepartmental process on topics such as diagnostics, sequence information, immunodiagnostics, immune response, DIVA vaccines, biotherapeutics, mosquito control documentation, U.S. vector competence, modeling and surveillance plans, wildlife as a reservoir, biocontainment facilities, pathogenesis, depopulation, carcass disposal, and disinfection. APHIS is involved in RVF planning and preparedness activities. APHIS participated in the Florida RVF exercise and a CDC outbreak investigation in Kenya. The NVS is preparing for a Southern Agriculture and Animal Disaster Response Alliance exercise in April 2010.

Response planning for a zoonotic disease such as RVF requires collaboration among animal health and public health officials, as well as several other disciplines. In the summer of 2009, we developed valuable relationships with our public health partners while preparing for a potential finding of the novel H1N1 virus in swine. We will build on those relationships as we move forward with our planning for other zoonotic diseases.

**General Response Capabilities and Activities:** APHIS has several tools to respond to a VBD outbreak and any other foreign animal disease. An emergency response would be put into operation within the National Incident Management System and National Response Framework, including emergency support functions, multiagency coordination, and joint command. Other practiced tools would include preestablished response plans, NVS equipment and supplies, 3-D contractors, rapid availability of U.S. or approved foreign vaccine, national and National Animal Health Laboratory Network laboratories, and the National Animal Health Emergency Response Corps.

In addition to the activities noted, USDA participates in other VBD initiatives. At the Department level, these include working groups on RVF and tropical bont tick, international surveillance, the National Invasive Species Council, climate change strategies, and modeling. APHIS is involved in working groups on vesicular stomatitis and equine piroplasmiosis, foreign animal disease diagnostician training, partnering with the Food and Drug Administration on genetically engineered insect vector regulation, and prioritization of VBD research gaps for partner funding. Current examples of ARS projects include vector competence, surveillance, monitoring, repellents, physical barriers, chemical control, and protection methods for livestock and wildlife. NIFA recently initiated a multistate research and graduate education project on the biology, ecology, and management of emerging disease vectors for diseases of agriculture and public health significance.

The APHIS Veterinary Services (VS) 2015 initiative will help address the challenges of VBDs. Indeed, VS 2015 was created to address emerging and zoonotic diseases, new technologies, and the continued need for rapid responses to disease emergencies. The primary
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focus areas are One Health, Surveillance for Action, Movement and Marketability, and Agriculture Emergency Management Preparedness and Response Planning. When developing strategies, working groups will consider regulatory, budget, and information technology implications.

The USDA Perspective: VBDs are an increasing and complex threat. Recent examples challenge our knowledge and our surveillance and response capacity. Research, experience, and planning will need to be leveraged from one VBD to other VBDs. Our response must address the disease impact, and we must develop science-based plans in partnership with our public, wildlife, and environmental health colleagues at the state, national, and international levels. USDA recognizes the importance of increased collaboration in preparing for these disease threats.
II. C. USAHA Scientific Papers, Posters and Abstracts

A BioPortal System for Global Surveillance of Animal Diseases
- Andres Perez, Preben Willeberg, Mike Ascher, Zachary Whedbee, Mark Thurmond

Application of the IDEXX MAP ELISA for the Diagnosis of Both Johne’s Disease and Caseous Lymphadenitis Disease in Sheep and Goats - Beth Mamer, Wayne Ayers, Marie Bulgin

BVDV in Calves in US Beef Cow-Calf Herds - Michael Sanderson, David Dargatz, Bruce Wagner

Development of PARACHEK® 2 for High-Throughput Detection of Johne’s Disease in Milk and Serum Samples - Pascal Schacher, Angela Zurfluh, Daniel Zwald, Pascal Weniger, Alex Raeber.

Effect of Movement Controls and Biosecurity on Transmission of Disease by Indirect Contact in the Control of Foot-and-Mouth Disease in Livestock Production Systems in the Central United States - Michael Sanderson, Kim Forde-Folle, Aaron Reeves


Novel H1N1 Influenza A Virus in an Alberta Swine Herd - Jim Clark

Response of Sensitized Elk to Single Cervical Tuberculin (SCT) and Comparative Cervical Tuberculin (CCT) Tests - Shylo Johnson, Pauline Nol, Robert Meyer, Mike Dunbar, Jack Rhyan

Swine Teschovirus Encephalomyelitis in Haiti – Ming Deng, Max Millien, Keith Flanagan, Alexa Bracht, Consuelo Carrillo, Leo Koster, Andrew Fabian, Rodney Jacques-Simon, Fawzi Mohamed, Karen Moran, Melinda Jenkins-Moore, Bruce Thomsen

Turkey Cellulitis: Descriptive Epidemiology and Molecular Characterization of Potential Etiological Agents - Matheus Costa, Simone Oliveira, Scott Wells, Morgan Hennessey, Rob Porter, Andre Ziegler, Srinand Sreevatsan
A BIOPORTAL SYSTEM FOR GLOBAL SURVEILLANCE OF ANIMAL DISEASES

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Establishment of a global animal disease surveillance program will be critically important before success can be achieved toward world-wide control and eradication of infectious animal diseases with high social and economic impact, such as foot-and-mouth disease (FMD) or avian influenza (AI). A key prerequisite for formal, purposeful global surveillance will be an operational IT system capable of capturing surveillance-related data and information and of routing it in real time to decision makers for assessment and analysis.

The objective of this paper is to describe some of the attributes of a currently operational web-based information system for global surveillance of animal diseases, referred to as the BioPortal (https://fmdbioportal.ucdavis.edu). The BioPortal is a web-based system, developed as part of a multi-agency effort, that makes available in near real-time via the web animal disease-related global data. There is no fee or charge for its use. The BioPortal can integrate data in disparate formats with various analytical tools. Users can operate the program at different levels of security, in cases where restricted data are being considered.

Currently, the databases available in unrestricted access to the BioPortal have been made available for public use by various organizations and through public websites. Databases available at the FMD BioPortal include the FMD News database, FMD serotype data for samples submitted since 1957 to the World Reference Laboratory in Pirbright, England; the OIE WAHID FMD database, and GenBank FMDV sequence submissions. Since becoming operational in January 2007, 70 users from 46 countries or international organizations have subscribed to the FMD BioPortal. For the highly pathogenic AI (HPAI) BioPortal, surveillance data collected by Denmark between 2005 and 2007 and HPAI sequences from the GenBank are available. For users with the required permits that allow restricted access, selected databases are available. Users can search multiple databases, create tables and apply graphics, download selected records to Excel files, analyze data, align virus sequences, build and compare phylogenetic trees of virus isolates, and display temporal, spatial, and phylogenetic relationships among isolates.

Current initiatives involve the development of BioPortal prototypes for animal diseases other than FMD and HPAI. BioPortal prototypes were developed for vesicular stomatitis virus (VSV), low pathogenic AI (LPAI), and OIE-listed diseases through agreements with USDA-ARS, with the international reference laboratory for AI in Padova, Italy, and with the Food and Agriculture Organization (FAO) of the United Nations.
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This presentation will demonstrate operation of the BioPortal system using data collected from the VSV epidemic in the United States (2004-2006), from the LPAI epidemic in Italy in 2007, and by the OIE and the FAO on a global scale for >15 animal infectious diseases. Use of the BioPortal will enhance the ability of countries to prepare for and respond to animal disease epidemics.
APPLICATION OF THE IDEXX MAP ELISA FOR THE DIAGNOSIS OF BOTH JOHNE’S DISEASE AND CASEOUS LYMPHADENITIS DISEASE IN SHEEP AND GOATS

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Johne’s disease is caused by infection of mesenteric lymph nodes and intestines of ruminant species with *Mycobacterium avium* subspecies *paratuberculosis* (MAP). MAP bacteria are transmitted from adult to their young in utero or via colostrum, milk and fecal contamination. Caseous lymphadenitis disease (CLA) is caused by abscess formation in skin, lymph nodes and internal organs due to infection with the bacteria *Corynebacterium pseudotuberculosis*. CLA bacteria are transmitted from infected animals to non-infected animals or the environment by draining external abscesses from infected animals. Both of these cell-mediated bacterial diseases cause chronic infections that are difficult to eradicate from positive herds or flocks because infected animals are difficult to identify, and, infected animals will shed bacteria into the environment where the bacteria are infectious for at least a year. Because animals infected with these bacteria cannot be cured, control depends on detection and removal of positive animals to prevent infection of non-infected animals.

This diagnostic testing to identify CLA positive animals is part of a larger study to identify Johne’s-positive small ruminates. The majority of the flocks/herds we are testing for Johne’s disease are also infected with CLA. A serology ELISA test is not available to detect CLA positive animals.

Two ELISA tests for detecting MAP positive animals are compared with culture and histopathology to detect CLA-positive animals:

- Two bovine serology MAP ELISA tests were compared: IDEXX Herdchek using 0.250 S/P cutoff on sheep and goat serum, plasma and milk samples; and, IDEXX Pourquier using 0.300 S/P cutoff.
- *culture* of feces and tissues for MAP using increased sediment inoculum and time in culture with liquid culture media: BACTEC™ MGIT™ para TB liquid medium.
- *culture* of abscesses/tissues for CLA on Columbia Blood Agar.

We have assayed serum and milk samples from three producers that have both CLA and MAP positive animals with the two ELISA tests. One producer vaccinates all animals for CLA. Of 137 serum samples tested with both ELISA tests, IDEXX Herdchek identified 51 MAP antibody positive and IDEXX Pourquier identified 33, with 29 samples positive with both tests. The Herdchek S/P results were all 1.00 or higher for these 29
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serum samples both tests identified as positive. Eighteen serum samples assayed had positive results (S/P: 0.250-0.700) on the Herdchek test and were negative on the Pourquier test. Twenty-seven of these animals were MAP fecal culture positive. Ten animals were CLA and MAP culture positive. If animals were sampled January-June, and the serum sample was positive on both ELISA tests, the fecal samples from these animals (21) were MAP culture positive. Of 44 milk samples tested with both ELISA tests, Herdchek identified 14 Johne’s antibody positive milk samples, and Pourquier 11 positive milk samples, with agreement on seven samples. Ten animals tested by milk ELISA were fecal culture positive. Of the 40 serum samples tested from the CLA vaccinated flock, six were positive with the Herdchek ELISA (S/P: 0.515-2.259), two were positive with the Pourquier ELISA (S/P: 0.778-1.501). From this flock, three were CLA culture positive and six were MAP culture positive.

As we test serum and milk from thin animals with the IDEXX Herdchek MAP ELISA test and identify individual suspect CLA or MAP positive animals, owners donate these animals. The animal is eventually euthanized, necropsied, and sampled for culture and histopathology. If the initial serum and milk samples from these animals are both positive with the ELISA test with an S/P is greater than 0.700, the animal is MAP positive. If only the serum has a positive S/P reaction of 0.250-0.700, this animal can have either or both bacterial infections. We have recently identified a sheep flock that is CLA vaccinated and CLA culture positive, but is MAP negative. So far animals from this flock that have internal CLA lesions are ELISA positive, those with external CLA lesions are ELISA negative. The IDEXX Herdchek MAP ELISA will detect either CLA or MAP positive animals using the 0.250 S/P cutoff on serum samples.
Introduction:
One of the goals of the Beef 2007-08 study was to take an in-depth look at persistent infection (PI) with bovine viral diarrhea virus (BVDV) on U.S. beef cow-calf operations, since this agent can cause a variety of disease conditions affecting animal health (respiratory and digestive disease) and reproductive efficiency. The primary means that BVDV sustains itself on operations is through the creation of animals that are persistently infected (PI). These animals shed massive amounts of BVDV into their environment their entire lives. When other animals come in contact with the PI animals they can become infected with BVDV and develop clinical disease or, if they are pregnant animals, their calves can become the next generation of PI calves provided the exposure occurs at the right stage of gestation. Vaccination can increase resistance to BVDV infection and thus lower the frequency of BVDV PI calves. However, testing and elimination of PI animals is often necessary to effectively eliminate the risk of PI calves.

Materials and Methods:
The U.S. Department of Agriculture's National Animal Health Monitoring System (NAHMS) conducted the Beef 2007-08 study, which focused on beef cow-calf health and management practices in 24 States. These major beef cow-calf producing States represented 79.6 percent of U.S. operations with beef cows and 87.8 percent of U.S. beef cows. During the study, beef producers were offered the opportunity to collect ear notch samples to be tested for persistent infection (PI) with BVDV. Producers participating were encouraged to collect ear notches from their entire 2008 calf crop for testing.

Notches were collected and frozen dry until they were submitted for testing. At the laboratory the samples were tested using an antigen capture enzyme-linked immunosorbent assay (ELISA) test according to the manufacturer's instructions.

Results:
Overall, 205 operations collected ear notches from calves born between November 2007 and June 2008. The number of notches collected per operation ranged from 3 to more than 500. A total of 44,150 notches were collected and tested. The prevalence of positive samples among the tested notches was 0.2 percent (53/44,150). Within herds
the prevalence ranged from 0 to 16 percent. Among the operations that submitted ear notches 18 operations had 1 or more positive samples for a herd prevalence of 8.8 percent. Ten herds had only 1 positive sample and one herd had 10 positive samples. Prevalence of positive operations was similar across both herd size and region of the U.S and calf age. Approximately 1 in 7 producers believed that testing and removing BVDV PI calves from the herd would increase the value of the remaining calves. Almost one-half of producers were uncertain if the value of the remaining calves would change.

**Discussion/Conclusion**

The low prevalence of BVDV PI in beef calves from this study is consistent with other studies. Despite the low prevalence at the animal level, approximately **1 in 12 herds had at least 1 BVDV positive animal**, suggesting that many herds are likely to have BVDV circulating in their herds and potentially causing adverse health and reproductive effects. Producers should work with the veterinarian to determine their risk of having circulating BVDV in their herds and if warranted in developing a testing strategy to determine the PI status of their animals. **Many operations are uncertain about the value of testing their calves for persistent infection with BVDV.** More work is needed to document the economic effects of testing for and controlling persistent infection with BVDV on cow-calf operations.
Paratuberculosis, also known as Johne’s Disease, is caused by
the presence of *Myobacterium avium spp paratuberculosis* in the small
intestine of ruminants. It occurs worldwide and affects animal health of
beef and dairy herds. The PARACHEK® is the original Johne’s absorbed
ELISA and is a reliable and useful tool for effective detection, control and
management of paratuberculosis. The ELISA is able to detect antibodies
against *M. paratuberculosis* in serum and milk prior to the onset of clinical
signs. In order to simplify the use and increase throughput, we have
developed the PARACHEK® 2 which is more user-friendly and enables
automation. It contains a one component substrate and incubation
times were adapted for user-friendliness. To evaluate the performance
of PARACHEK® 2 and compare it to PARACHEK®, a set of negative
and positive cattle and sheep serum samples and a set of negative and
positive milk samples from cattle were tested. The samples derived from
animals with known fecal culture status for *M. paratuberculosis*. The
agreement is expressed by the Cohen’s Kappa coefficient and interpreted
using the Landis and Koch table. The agreement between PARACHEK®
2 and PARACHEK® is almost perfect with kappa values of 0.83 (ovine
serum), 0.92 (bovine serum) and 0.93 (bovine milk). The PARACHEK®
2 also has two options for detection, a kinetic protocol for a high plate to
plate reproducibility or an end-point protocol enabling high throughput and
automation. The PARACHEK® 2 was automated on a Beckman Coulter
Biomek® FXP Laboratory Automation Workstation equipped with a 96-well
plate washer and a plate reader which allows for a throughput of up to 16
plates in one working day (8.5 hours) starting from serum or milk samples.
The results of the fully automated system were compared to manual
processing of the samples. The agreement is almost perfect with a
kappa value of 0.96. These results demonstrate that the PARACHEK®
2 can be easily run on an automated system with the same excellent
performance as with manual processing of the samples using the
original PARACHEK® and thus enabling laboratories to save time
and freeing staff for other work.
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EFFECT OF MOVEMENT CONTROLS AND BIOSECURITY ON TRANSMISSION OF DISEASE BY INDIRECT CONTACT IN THE CONTROL OF FOOT AND MOUTH DISEASE IN LIVESTOCK PRODUCTION SYSTEMS IN THE CENTRAL UNITED STATES

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Introduction:
The potential impact of an introduction of Foot and Mouth Disease (FMD) in Kansas was assessed and the effects of control measures were compared by use of simulation modeling. Kansas has a large livestock population including cattle, swine, sheep and goats. Simulation models were developed using the North American Animal Disease Spread Model (NAADSM), a spatially explicit, stochastic model developed for evaluation of control measures for infectious foreign animal diseases.

Materials and Methods:
Based on data from the U.S. Department of Agriculture’s National Agricultural Statistic Service and Kansas Confined Animal Feeding Permit data, a simulated population of livestock operations was generated. The population included 60,778 herds defined by latitude and longitude, production type (Cow-calf, Large Feedlot, Small Feedlot, Dairy, Swine, Sheep, and Goats), and herd size. For simulation purposes, a single 242 head cow-calf herd in central Kansas was selected as the initial latently infected herd in an otherwise susceptible population.

Direct and indirect contact rates were estimated between each production type pair based on expert opinion. Direct contacts included the shipment of livestock between herds in either a latent, subclinical or clinical state. Herds detected as positive for FMD in the model, were quarantined preventing further direct transmission. Indirect contacts included veterinarians, feed truck deliveries, milk truck pick-ups, salesmen, nutritionists, AI technicians, hoof trimmers, employee contact, and neighbors. Three levels of reduction in indirect contact were modeled by implementing movement controls following the first detection (10%, 20% and 30% of baseline level) and three levels of probability of disease transmission following indirect contact were modeled (0%, 5%, and 20%), along with either no vaccination or a 10 kilometer vaccination ring around infected premises.
Results:
The majority of FMD transmission was due to indirect contact between herds. Given the assumptions made in developing these simulations, vaccination had little effect. Increasing the effectiveness of movement controls to decrease indirect contact and decreasing the probability of disease transmission following contact decreased the median number of herds and animals infected and destroyed, as well as the length of the outbreak.

Discussion/Conclusion
These results highlight the importance of biosecurity and movement restrictions and the need for further research in order to assess their proper role as well as the role of vaccination in an FMD outbreak affecting U.S. production systems. Movement controls may be disruptive to animal welfare and continued farm production, making optimal implementation essential during an outbreak. Accurate estimates of the probability of transmission following indirect contact and the effect of specific biosecurity practices in decreasing the probability of transmission in U.S. production systems are also needed. Effective biosecurity practices may control transmission and mitigate animal welfare concerns associated with increased movement controls, allowing continued production on non-affected farms. Because most disease spread was the result of indirect transmission over a distance, local vaccination around an infected premise did not decrease simulated disease spread.
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EVALUATION OF A SECOND GENERATION BOVIGAM® INTERFERON GAMMA (IFN-γ) ASSAY WITH ALTERNATIVE ANTIGENS FOR STIMULATION OF WHOLE BLOOD CULTURES

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BOVIGAM®, a rapid laboratory assay, measures gamma interferon (IFN-γ) production in whole blood samples after induction of a cell-mediated immune response (CMI) with M. bovis antigens. The test is widely used in the field and its excellent performance in TB eradication programs in many countries worldwide is well documented. Traditional use of Bovigam is based on measuring the difference in IFN-γ production between stimulation with bovine tuberculin and avian tuberculin. Recent advances in the use of Bovigam include the application of alternative antigens for stimulation. In this setting, absolute levels of IFN-γ are measured after stimulation with an antigen cocktail. We found that for the incorporation of the use with alternative antigens, the test can benefit from a higher range of the IFN-γ detection part of the assay. In this study, we present several improvements of the BOVIGAM resulting in a lower detection limit for IFN-γ, more flexibility with regard to incorporation of different reagents for stimulation (PPDs, alternative antigens) and improved ease-of-use. Inter- and intraplate variances could be reduced to < 5%. In combination with alternative antigen cocktails to be used for stimulation of the cell mediated immune response, a significant higher specificity and equivalent sensitivity in comparison with PPDs could be achieved. Furthermore, the second generation BOVIGAM assay uses a one component substrate and less washing
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steps and thus reduces time and cost and allows full automation for high throughput testing needs. In conclusion, the new IFN-γ assay can be used as an improved tool for the detection of TB infected cattle.
In March 2009, the world became aware of the existence of a novel H1N1 virus that was circulating in the human populations in Mexico and the southern USA. The genetics of that virus were determined to be those historically associated with a triple reassortant H1N1 swine influenza A virus that has occurred in the North American swine population since the late 1990’s with the addition of Eurasian swine genetics on the matrix and neuraminidase genes.

Questions related to the risks this novel virus represented for animal populations lead to widespread communication to the veterinary and swine production communities in Canada for the need for enhanced awareness and reporting in the swine industry. The Canadian Food Inspection Agency was advised in late April 2009 of a swine herd in Alberta with a history of influenza-like illness and contact with an individual with a travel history to Mexico and subsequent influenza like illness following his return to Canada. CFIA imposed a precautionary quarantine and investigated the herd. Initial testing of nasal swabs using rtPCR with a standard primer for the matrix gene produced negative results. Subsequent testing using conventional PCR primers obtained from the National Microbiology Laboratory indicated the presence of an influenza A. Sequencing methods demonstrated a H1 subtype with 99% homology to the matrix gene in the novel H1N1 strain. Sequencing of the neuraminidase gene indicated homology with the neuraminidase gene of the novel H1N1 virus. A novel H1N1 influenza A virus was isolated from the samples submitted from the swine herd. On May 15\textsuperscript{th}, the CFIA reported that the full sequence of the virus indicated that the virus found in the pigs was the same as the virus causing illness in humans around the world.

The CFIA developed a strategy/approach/plan to resolve the animal health issues associated with this farm, in line with the public health concerns. Public health and animal health authorities, nationally and internationally, were engaged in discussion. All groups and organizations supported the controlled marketing with no cull approach which the CFIA advocated. Crowding conditions in the barn forced a limited cull of approximately 500 mature hogs to alleviate animal welfare concerns and to allow a period of time to do testing in the herd. The hogs were euthanized using penetrating captive bolt pistols and transported to a rendering establishment. The rendered material was buried in landfill due to concerns about negative public perception of incorporating the end product into animal feeds.

Tests on samples collected on May 14 and May 25 showed evidence of continued virus presence.
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The preliminary results of research to determine the virulence of the novel H1N1 virus for animals and the associated risk indicates the novel virus produces clinical signs similar to the seasonal swine influenza A viruses. The initial risk management decisions in this herd were precautionary due to the lack of information to determine the risk to the swine and human populations of North America and suggested a virus negative test on the entire herd was needed to release movement restrictions. As additional information became available that provided insight to the risk this virus posed for the human and animal community, it became difficult to modify the initial precautionary approach for several reasons including low risk tolerance by public health authorities.

Slaughter facilities were unwilling to take the hogs from this location and therefore the producer was able to convince government of the need to provide him with financial assistance to destroy the herd and allow him to resume operation with a replacement herd.
RESPONSE OF SENSITIZED ELK TO SINGLE CERVICAL TUBERCULIN (SCT) AND COMPARATIVE CERVICAL TUBERCULIN (CCT) TESTS

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Elk, *Cervus elaphus*, are subject to the regulations concerning intradermal tuberculin testing under the USDA’s uniform methods and rules for the eradication of bovine tuberculosis. Though the single cervical tuberculin (SCT) and comparative cervical tuberculin (CCT) tests are approved methods of anti-mortem detection of *Mycobacterium bovis* infection, few studies quantify the response of elk to these tests. Furthermore, results are acquired after the injection sites are palpated and measured at 72 hours post injection requiring rehandling of the animals. Infrared thermography, the remote measure of surface temperature, may be able to reduce the time to results and eliminate the second handling of the animals by measuring temperature changes associated with inflammation at injection sites. Our objective was to examine the response of sensitized and non-sensitized elk to the tests by palpation, skin thickness measurement and IRT.

To this end, 10 elk were sensitized to *M. bovis*, 9 elk were sensitized to *M. avium* and 19 elk were not sensitized. The sensitized elk were tested 119 days after injection of 0.1 ml derivatives of the selected bacterium. The animals from the three different groups were randomly divided into two blocks; block 1 received 0.1 ml of 2 mg/ml of the purified protein derivative (PPD) and block 2 received 0.1 ml of 1 mg/ml of the PPD for the SCT test. Testing of block 1 was offset by one day from block 2 testing. The SCT and the CCT were conducted concurrently on each animal on the right side and left side of the neck, respectively. In addition to the PPD injections sites which were measured for skin thickness and palpated, two additional sites for the SCT and CCT were measure and palpated, a saline injection and a control site. IRT images were taken at 0, 0, 24, 48, and 72 hrs post injection of all sites.

No significant difference by palpation ($x^2=1.09$. $P=0.78$) for detecting a response occurred between the two different concentrations of the PPD for the SCT. Increase in skin thickness for the SCT ranged from 0.0 mm to 8.5 mm and the mean for sensitized animals at the PPD injection site
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was 3.0 mm (± 0.5 SE). Base on palpation results, 68.4% of the sensitized elk and 36.8% of the control elk had a response to the PPD injection on the SCT. For the CCT, skin thickness increased from 0.0 mm up to 10.0 mm. The mean at the bovine PPD site was 4.8 mm (± 1.3 SE) for *M. bovis* sensitized, 2.8 mm (± 0.1 SE) for *M. avium* sensitized, and 0.7 mm (± 0.2 SE) for the control elk. Ninety percent (9 of 10) of *M. bovis* sensitized were suspects or reactors. Of the 9 elk that had *M. avium* sensitogen and of the 19 elk that were controls, 26 plotted in the negative zone for *M. bovis* and 2 of the control elk plotted in the suspect zone for 92.9% specificity. Preliminary IRT analysis has not indicated any significant temperature changes associated with the different sites.

The changes due to the PPD injections are often small and changes in the concentration of the PPD for the SCT did not result in significant changes in detecting a response. The small changes, however, may mean less inflammation that could be masked by ambient conditions making IRT difficult to use on elk.
Teschovirus encephalomyelitis (previously Tesche/Talfan diseases, and later enterovirus encephalomyelitis) is an acute condition of pigs characterized by central nervous system (CNS) disorders. The causative agent of this disease is porcine teschovirus, genus *Teschovirus*, family *Picornaviridae*. Severe forms of teschovirus encephalomyelitis are now rare and are considered exotic to the United States.

In February and March 2009, approximately one thousand five hundred backyard pigs became sick and approximately seven hundred of them died or were sacrificed in the Lower Artibonite Valley of Haiti. Pigs of all ages were affected. The main clinical sign was posterior ataxia followed by paresis/paralysis on the second or third day of illness. Low or no fever was present. Few lesions were observed at postmortem examinations. The morbidity and mortality was about 60% and 40%, respectively.

Diagnostic samples (whole blood, brain, tonsil, lymph nodes, spleen, kidney, liver and lung) were submitted to Foreign Animal Disease Diagnostic Laboratory on Plum Island, New York, and the National Veterinary Services Laboratories in Ames, Iowa. These samples were negative for classical swine fever virus and African swine fever virus. A porcine teschovirus was detected by reverse transcription – polymerase chain reactions (RT-PCR) in brain samples. Results of virus isolation, electronic microscopic observation of virus particles, histopathological analysis and nucleic acid sequencing supported a conclusion that the swine disease in Haiti is teschovirus encephalomyelitis.

The Haitian government has started an information campaign on the
cause of the disease and methods of prevention. There are currently no vaccines commercially available for this disease in the world. The disease outbreak is ongoing in Haiti.

Acknowledgments: The work of sample submission and diagnosis for teschovirus encephalomyelitis in Haiti was a result of collaboration of several groups including Haitian animal health authority, the Institute of International Cooperation in Agriculture, APHIS-IS Central America and Caribbean Area Office and the NVSL. The authors thank Dr. David Pyburn of USDA-APHIS for providing some photos for this presentation. The authors also thank Tami Beach, Annette Olson, Linda Cox, Heather Petrowski and many others in USDA-APHIS-NVSL and the National Veterinary Diagnostic Laboratory of Haiti who were involved in sample collection and diagnosis.
Turkey cellulitis is a major disease across all geographic regions of the US. In 2006 and 2007 it ranked among the top five disease concerns. The infection shows a relatively low prevalence, although it can be devastating in the individual farms affected. It appears with high prevalence and with high mortality in heavy market-age birds, and is more common in males than females. Dead birds usually show “bubbly tail”, fluid filled blisters associated with root-broken feathers. In addition, there are cases where individuals will have an accumulation of gelatinous fluid under the skin, usually along the thighs (inguinal area) and breast.

Currently, the agent associated with the development of cellulitis in turkeys is unknown, with clostridia being the main suspect. This study aims to (1) characterize the descriptive epidemiology of turkey cellulitis, including evaluation of the time, place, and host characteristics of this disease in turkeys and (2) identity of the molecular characteristics of clostridia associated with turkey cellulitis. To achieve these goals, farms with high and low risk of having the disease were identified and are now being monitored. Live and dead birds showing clinical signs and/or lesions characteristic of cellulitis are submitted weekly to the University of Minnesota Veterinary Laboratory for testing. In the absence of clinical signs and lesions, randomly selected birds at the ages of 6, 8, 16 and 20 weeks from flock involved in the study are sent for diagnostic testing. Samples collected from each bird includes: liver and sub-cutis swabs, stool and litter from growing facilities. Samples are cultured and isolation of Clostridium sp. is attempted. Clostridium sp. isolates are further characterized by sequencing of the 16s RNA gene, allowing the identification to the species level. Clostridium perfringens and Clostridium septicum isolates are further characterized for the presence of toxin genes using a multiplex PCR and by multilocus sequence typing (MLST) to infer relatedness. Quantitative real-time assays are used to define the number of C. perfringens and C. septicum in fecal and litter samples. The first samples from the turkey flocks involved in this study were received in November of 2008. We have cultured samples from 159 healthy birds and 59 birds from cellulitis outbreaks. Our preliminary data indicates that Clostridium septicum is consistently isolated from clinical samples (subcutaneous swabs and liver) of birds affected by cellulitis. High numbers of C. perfringens and C. septicum are detected in the fecal samples of outbreak birds, but not in healthy birds. High numbers
II.C. USAHA SCIENTIFIC PAPERS

in the fecal samples is not translated into high numbers in the environment (litter samples). Preliminary MLST data suggests that \textit{C. septicum} isolates recovered from clinical cases are fairly clonal.

Relevance: This is the first study to comprehensively characterize the etiological agent of turkey cellulitis. New diagnostic techniques for detection and typing of \textit{C. septicum} were developed and validated and are now available for routine diagnostics of Clostridial dermatitis.
President Donald Hoenig called the meeting to order, welcoming members following lunch. Hoenig recognized Prionics for sponsoring the lunch. Dr. Marcus Moser provided a welcome and brief comments for the membership on behalf of Prionics.

State of the Association
Donald E. Hoenig

It's my pleasure as President to report to you today on the state of the association.

As President Jim Leafstedt reported at last year's membership luncheon, the financial condition of the U.S. Animal Health Association is and continues to be strong. We fulfilled a goal of a previous long range plan of having two years expenses in reserve. I remember that the last time we met in San Diego in 2003, we were extremely fortunate that the meeting preceded the catastrophic forest fires that year by about 10 days. Had that not been the case, we might not have had an annual meeting or perhaps would have adjourned early. That's one of the primary reasons for having our financial reserve.

As I said in my remarks last year after I was elected to be president of USAHA, my goal was to use the Long Range Plan as framework for moving the organization in the direction in which the members want it to move. This past year, I'm happy to report that we've made significant progress in fulfilling several of the goals outlined in that plan.

Realizing that committees are the lifeblood of this association, one of the goals identified was to improve committee effectiveness. To this
end, we have revised and improved the Handbook for Committee Chairs, held several committee chair conference calls prior to this meeting and prior to the Government Relations Committee meeting last winter in Washington and have strived to improve and enhance communications with our committee chairs through our Executive Committee liaisons. One of the challenges after our Greensboro meeting was to replace 11 retiring committee chairs. We were able to find some highly qualified and motivated individuals to fill these slots.

Another goal was to improve the visibility and recognition of the USAHA at a national level. I think we managed to take a big stride in moving this objective forward when we planned and hosted the TB Symposium in Denver in July (which simultaneously moved us ahead on another goal, that of exploring the possibility of hosting a topic-specific symposium!).

I continue to be impressed by the professionalism, competence and intelligence of our young and energetic Executive Director, Ben Richey, his charming and capable assistant, Kelly Janicek and as always, the hardworking and wonderful Linda Ragland. The management of our association is in fine hands. Together in April, Ben and Kelly supervised moving our office in St. Joseph, Missouri from a one cramped strip mall into a spacious business incubator affiliated with Missouri Western State University resulting in more office space at a comparable rent in more comfortable and professional surroundings. With their input and assistance, we continue to tweak the annual meeting to make it more efficient and effective.

As I’ve said repeatedly throughout this past year, serving as the President of the USAHA has been a real thrill for me and the reason is simple: it’s the people I’ve met and worked with along the way. This group of Executive Committee members and Ben, Kelly and Linda are as wonderful and as talented a group as I’ve ever met and I thank all of them and all of you for all you do for this multi-talented organization.

Treasurer’s Report
William L. Hartmann

The United States Animal Health Association (USAHA) continues to operate on a sound financial basis. The Association operated within the budget approved by the Executive Committee for fiscal year 2009. The Association’s income after expenses for FY 2009 was $92,014.

During fiscal year 2009 the Association placed an additional $40,000 in certificates of deposit and $30,000 in the money market. On July 1, 2008 the association had $997,678 invested in certificates of deposit and the money market account. Interest of $ 41,952 was earned during the fiscal year. The Associations net worth on June 30, 2009 was $1,173,185.

The audit committee met Sunday October 11, 2009, reviewed the fiscal year 2009 financial report and found that all financial affairs of the Association are in order.
II.D. USAHA MEMBERSHIP MEETINGS

The fiscal year 2009 financial statements will be provided to the Board of Directors at its first meeting Monday evening, October 12, 2009. Ben Richey, USAHA Executive Director, has a complete set of the monthly financial reports for fiscal year 2009. He will be glad to make these available for your review.

Are there questions concerning the Association fiscal year 2008-2009 Treasurer’s Report?

Whereas acceptance of this report was moved, seconded and approved by majority vote of the membership.

Report of the Committee on Nominations
James Leafstedt, Chair

The following is the slate of officers for 2009-2010.
PRESIDENT: Richard E. Breitmeyer, Sacramento, California
PRESIDENT-ELECT: Steven L. Halstead, Lansing, Michigan
FIRST VICE-PRESIDENT: David T. Marshall, Raleigh, North Carolina
SECOND VICE-PRESIDENT: David L. Meeker, Alexandria, Virginia
THIRD VICE-PRESIDENT: Stephen K. Crawford, Concord, New Hampshire
TREASURER: William L. Hartmann, St. Paul, Minnesota

The following are the nominees for each district’s delegates for 2009-2010.
NORTHEAST: J. I. Enck, Jr., Pennsylvania; E. W. Zirkle, New Jersey
NORTHCENTRAL: Velmar Green, Michigan; Jay Hawley, Indiana
SOUTH: Gene Lollis, Florida; A. Gregario Rosales, Alabama
WEST: Bill Sauble, New Mexico; H. M. Richards, Hawaii

The slate of officers for 2009-2010 will be posted on the bulletin board at registration and will be presented again for discussion and action during the next Membership Meeting on Wednesday, October 14, 2009 at 2:05 pm. At that time, members have an opportunity to amend the report by placing an individual’s name on the Committee on Nomination’s slate with another name. The Report of the Committee on Nominations is then amended and approved by a majority vote of the membership present at the USAHA Membership Meeting, followed by consideration at the Board of Director’s Meeting. Acceptance by the Board of Directors constitutes election.
II.D. USAHA MEMBERSHIP MEETINGS

WEDNESDAY, OCTOBER 14, 2009
USAHA Membership Meeting
Donald E. Hoenig, Presiding

President Donald Hoenig called the meeting to order, and provided a welcome to members.

Report of the Action of the Committee on Nominations
James Leafstedt, Chair

At 2:05 pm, Chair Leafstedt read the report of the Committee, as follows:

The slate of officers for 2009-2010 is:

PRESIDENT: Richard E. Breitmeyer, Sacramento, California
PRESIDENT-ELECT: Steven L. Halstead, Lansing, Michigan
FIRST VICE-PRESIDENT: David T. Marshall, Raleigh, North Carolina
SECOND VICE-PRESIDENT: David L. Meeker, Alexandria, Virginia
THIRD VICE-PRESIDENT: Stephen K. Crawford, Concord, New Hampshire
TREASURER: William L. Hartmann, St. Paul, Minnesota

The nominees for the USAHA District Delegates for 2009-2010 are:
NORTHEAST: J. I. Enck, Jr., Pennsylvania; E. W. Zirkle, New Jersey
NORTH CENTRAL: Velmar Green, Michigan; Jay Hawley, Indiana
SOUTH: Gene Lollis, Florida; A. Gregario Rosales, Alabama
WEST: Bill Sauble, New Mexico; H. M. Richards, Ill, Hawaii

Whereas acceptance of the report was properly moved and seconded. The motion was approved by majority vote.

Old Business

At the second session of the Membership Meeting in 2008, Resolution 37 was tabled for discussion. The Chair entertained a motion to remove this item from the table. No such motion was made, thus the resolution will not be considered.

Hoenig noted that the bylaws change approved by the Membership in 2007 was omitted from the Proceedings. Following discussion among the Executive Committee and previous officers, proper procedure did take place for the bylaws changes to remain in effect. This would serve as notice of the omission.
II.D. USAHA MEMBERSHIP MEETINGS

Passing the Presidential Gavel
Donald Hoenig

President Don Hoenig passes the ceremonious gavel to incoming president Dr. Richard Breitmeyer.

Incoming President’s Address
Richard Breitmeyer

It is truly an honor to accept this nomination to serve as your President this coming year. As I look into the audience, I see so many close friends and colleagues. Many of you I have know for years – even decades. Some of you I have only recently met, or hope to get to know you better in the coming year.

During this year’s meeting, as in so many in past years, we have proposed, discussed, debated, urged, argued, reached consensus, failed to reach consensus, come to conclusion and even agreed to disagree – but rarely did we give up or fail – and in fact, in most cases we respected, admired, supported and most importantly, listened to, worked with and trusted each other. For despite our differing opinions or disagreements, what we share is an intense desire to improve the health and welfare of this nation’s livestock and poultry, and improve the business climate for the farmers and ranchers we serve.

It is what makes this organization we call USAHA so great – distinct forums in each Committee, led by a chairperson with expertise and passion. And all attendees to our meeting – members and nonmembers – are welcome and encouraged to enter into discussion and provide their unique point of view – from perspectives of industry, academia, state and federal government agencies. Then, as necessary for priority issues, the Committee members are welcome to bring forward resolutions for the Committee to debate, and if supported and passed, to be considered by the general membership; and if passed, is then presented to the appropriate agency or target audience for consideration. A statement or resolution, carrying with it the backing and credibility of our organization,
II.D. USAHA MEMBERSHIP MEETINGS

not any single individual, but the collective body of the whole – of USAHA – carries the stature to drive policy and influence decision-makers.

In 2008, we drafted and approved our latest Strategic Operational Plan. Intended to be a long-range plan, some of the goals have now been achieved, and many are in progress. I have identified three goals from this plan that I hope to make significant progress in 2010.

First and foremost, is our goal to Improve Committee Effectiveness. As I previously stated, our committees are the core of our organization, and our committee leaders are the lynch pins. I want to give our committee chairs and vice chairs the support and tools they need to achieve the highest level of success. Over the next few weeks, I will appoint a Task Force, comprised of Executive Committee and Committee leadership representatives to lead this effort. I have asked our President-Elect, Steve Halstead and First-VP, Dave Marshall to co-chair this Task Force. Consistent with the goals of our Strategic Plan, their charge will be to review and make recommendations to improve our existing Committees, the Committee Chair manual, our resolution process and staffing support. Concurrent with this process, the Executive Committee will be examining the opportunities and feasibility to enhance staff support to Committees and determine the feasibility for assigning a dedicated staff member for that purpose.

Second, and very much related, will be for the Executive Committee to review and evaluate overall staffing needs of the organization. We now have an outstanding Executive Director in Ben Richey, and I have asked him to review workloads and priorities for 2010, and to provide to the Executive Committee by the end of the year, recommendations for staffing needs, including organizational structure, fiscal review and immediate vs. long-term needs.

Third, we will also consider the opportunity to again sponsor a topic-specific symposium in 2010. This past July, we sponsored a national symposium – The Future of the National TB Program, which was a great success, drawing nearly 150 attendees despite a tough economy; and we were especially pleased that half of the attendees were industry representatives, which speaks volumes for the interest and timeliness of the topic. This is also an area we need closer coordination with our Committee Chairs, so we can work together to identify the most pressing issues.

In closing, I would like to honor the memory of a good friend that some of you more “senior members” of USAHA will remember – Dr. Patton Smith, former State Veterinarian from California and USAHA President in 1991. In his corresponding remarks as incoming President, also here in San Diego, he said the following, which still rings true today:

“I plan to continue the past and present efforts to assure that USAHA enters the 1990s and the 21st century on a base that will assure an effective future. Historically, this has occurred and will reoccur. Let’s have a good time while we are in the process of doing business. Let’s not take
II.D. USAHA MEMBERSHIP MEETINGS

ourselves too seriously. We are about resolving serious issues; however, we need to lighten up, smile, laugh and enjoy doing that business. Thank you for the privilege of serving as the USAHA President for 1991.”

Pat was an important mentor to me early in my career. If you knew Pat, you knew he loved life, loved his family, loved his job, loved the people around him and loved this great organization we call USAHA. Tragically, his life was cut short by cancer shortly after he retired. So in honor of his memory, and to repeat his simple, yet sincere words, thank you for the privilege of serving as USAHA President for 2010.

Recognition of Immediate Past President
James Leafstedt

At this time, we recognized and thank the Immediate Past President of USAHA, Dr. Donald Hoenig. Thank you for your leadership, guidance and dedication to this organization, particularly over the last year. I must say that I am impressed with Don’s collegiality and positive attitude, two fine qualities. Today, we present you with your life membership and plaque as a token of our appreciation, on behalf of USAHA for your service.

James Leafstedt presents Don Hoenig with a plaque honoring him for his service as USAHA president.

Executive Director’s Report
Benjamin D. Richey

I would first like to express my appreciation and congratulations for all attendees and participants for all the work done here over the last week. Committee work is the core of USAHA, and it is my pleasure to serve each of you in the work that USAHA does.

Regarding this year’s meeting, we have more than 1050 registrants.
II.D. USAHA MEMBERSHIP MEETINGS

While this is down from previous years, it is a strong showing considering the budget challenges we all are facing. I think it speaks to the importance of this organization for the work that takes place here, impacting each of your day jobs.

I must express my thanks to the support of all staff that make this meeting run smoothly. Kelly, Linda, J Lee and Eleanor and Kim Sprout have all been tremendous assets for this organization. Tammy Hernandez, Lisa Quiroz, Andrea Alley, Johnny Tran and folks from the California Department of Agriculture have truly helped behind the scenes.

It is important that I pay gratitude to the Executive Committee, and President Hoenig in particular. It is a pleasure to work with each of you. I truly feel that I have the best job in the world, with the great leadership and dedication within this organization, not to mention each of the members that devoutly support this fine organization.

In the last year, we have moved to a new office, and implemented a new database system. It is my hope that these items will return benefits to each of the members and volunteers within this organization. If you are ever in or near St. Joseph, we would love to have you stop by.

As I prepared my thoughts for this meeting, I came across the following quote: “If everything seems under control, you’re just not going fast enough, “ by Mario Andretti. It seems this meeting has been well under control, but I’m not sure if there’s any more we could pack into these days. More so, however, I think that it speaks to USAHA as we look to continue to evolve and grow, and we push our capabilities beyond the norm.

I appreciate the opportunity to work with each of you. And as always, if there is anything that Kelly or I can do to help, please feel free to get a hold of us.

Report of the Committee on Resolutions
James Leafstedt

The Report of the Committee on Resolutions is approved by consent calendar. Chair Leafstedt reported a total of 46 resolutions submitted by Committees for 2009. The following resolutions were recommended to be combined by the Committee:

- Resolutions 5, 17, 24, 29, 37, 44 and 45
- Resolutions 6 and 18
- Resolutions 19 and 43
- Resolutions 20 and 26

A motion was made to combine these resolutions, seconded and was approved by the membership.

Leafstedt read each resolution providing an opportunity to remove from consent for individual review. The following resolutions were removed from the consent calendar:
• Resolutions 19, 20 and 38.
   The following resolutions were placed on the consent calendar, properly moved and seconded, and approved by majority vote of the membership.
• Resolutions 1-16, 21-23; 25; 27-28; 30-36; 39-42; 46.
   The membership held discussion regarding the language of resolutions requesting funding, of which it was agreed by the membership without objection that resolutions would be adjusted to match authority of the requested body.
   The following Resolutions were properly moved to approve and seconded, amended by majority vote, and approved by the membership:
• Resolutions 19, 20 and 38.

   A motion to adjourn was moved, seconded and approved by the membership.
II. E. Committee Reports

REPORT OF THE USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT

Co-Chairs: Marilyn M. Simunich, ID
Keith Roehr, CO

John B. Adams, VA; Bruce L. Akey, NY; Gary A. Anderson, KS; Joan M. Arnoldi, IL; Tammy R. Beckham, TX; Lisa Becton, IA; Gary L. Brickler, WA; Peggy K. Brinkman, IA; Shane A. Brookshire, GA; Suzanne L. Burnham, TX; Neville P. Clarke, TX; Matt H. Cochran, TX; Leslie E. Cole, OK; Thomas L. Cropper, TX; S. Peder Cuneo, AZ; Glenda S. Davis, AZ; Leah C. Dorman, OH; Bob Ehart, DC; Brigid N. Elchos, MS; Dee B. Ellis, TX; Francois C. Elvinger, VA; W. Kent Fowler, CA; Cyril G. Gay, MD; Lelve Gayle, TX; Jeffrey J. Hamer, NJ; Greg N. Hawkins, TX; Jan E. Hershenhouse, CA; Donald E. Hoenig, ME; Floyd P. Horn, MD; Pamela J. Hullinger, CA; Carla L. Huston, MS; Gregory P. Jillson, NM; Thomas R. Kasari, CO; Patrice N. Klein, MD; Anthony P. Knight, CO; Charlotte A. Krugler, SC; Elizabeth A. Lautner, IA; Randall L. Levings, IA; Martha A. Littlefield, LA; Barbara M. Martin, IA; Sarah J. Mason, NC; John Maulsby, CO; Thomas J. McGinn, III, DC; David L. Meeker, VA; Lee M. Myers, GA; Gene Nemechek, AR; Sandra K. Norman, IN; Kenneth E. Olson, IL; Kristy L. Pabilonia, CO; Boyd H. Parr, SC; Deidre A. Qual, ND; Jeanne M. Rankin, MT; Tom Ray, NC; Paul E. Rodgers, WV; James A. Roth, IA; John Rowden, CA; Mo D. Salman, CO; A. David Scarfe, IL; Gary B. Sherman, DC; Shari C. Silverman, NJ; Brian T. Smith, DC; Julia M. Smith, VT; Harry Snelson, NC; Nick J. Striegel, CO; George A. Teagarden, KS; Kerry Thompson, DC; Dave B. Tomkins, TX; Alfonso Torres, NY; Jesse L. Vollmer, ND; William Wagner, VA; Sherrilyn H. Wainwright, CO; Patrick Webb, IA; Stephen E. Weber, CO; Annette M. Whiteford, CA; Brad L. Williams, TX; John L. Williams, MD; Ellen M. Wilson, CA.

The Committee met on October 10, 2009 at the Town and Country Hotel, San Diego, Calif., from 8:00 a.m. to 5:00 p.m. There were 64 members and 83 guests present. In the combination session with National Assembly of State Animal Health Officials (NASAHO), an additional 40 guests were present. Therefore total attending joint session of the Committee and National Assembly was estimated at 175.

At the beginning of the Committee session, Dr. Roehr gave a quick review of the history and origin of the committee in 2004 from the National Animal Health Emergency Management System steering committee to a Joint AAVLD/USAHA committee. Dr. Simunich briefly reviewed the updated United States Department of Agriculture (USDA) responses to the 2008 resolutions, and reminded the meeting attendees of the combined meeting with NASAHO from 10:00 a.m. to 12:00 p.m. The group moved to
a larger room for the combined session to accommodate both groups.

**Toxicology in the NAHLN Update**

Stephen Hooser  
Purdue University Animal Diagnostic Laboratory Director  

The National Animal Health Laboratory Network (NAHLN) toxicology group sent out two surveys on analytical toxicology capacity and capabilities to laboratory directors. The first of these was presented at AAVLD last year. The follow-up survey was distributed last spring. Dr. Robert Poppenga has begun to prepare a manuscript of the results for publication.

Analytical toxicology sections of many veterinary diagnostic laboratories in the U.S. and Canada worked together to hold a small-scale round robin test. This was supported by the National Veterinary Services Laboratories (NVSL).

A strategic plan for toxicology in the NAHLN has been drafted. There will be a meeting of the NAHLN Toxicology Working Group on Friday morning.

**ALIRT Program**

Peder Cuneo  
University of Arizona Extension Veterinarian  

Arizona Livestock Incident Response Team (ALIRT) is a program developed by Arizona Department of Agriculture and University of Arizona Extension to respond to acute incidents of livestock loss. Risk factors (producer, veterinary medical) that lead to the development of the ALIRT program were discussed.

Private practice veterinarians are trained in foreign and domestic disease response as well as the Incident Command System. They respond to producer livestock losses along with toxic plant specialists and state regulatory officials by investigating at the premises and taking samples for diagnostic evaluation at Arizona Veterinary Diagnostic Laboratory within a short timeframe. A brief review of training, equipment and funding was presented.

**New Mexico-Animal Livestock Incident Response Team (NM–ALIRT)**

**Full Scale Rift Valley Fever Exercise Funded by Homeland Security in Southwest New Mexico**

John Wenzel  
New Mexico State University Extension Veterinarian  

The NM–ALIRT program was started in 2007 to provide an emergency response network of livestock veterinarians for the state of New Mexico. This program provides a mechanism for a quick veterinary response in the event of a large or suspicious livestock loss in New Mexico. NM–ALIRT is a multi-agency supported response team centered on veterinary practitioners geographically scattered around the state. It is designed
to provide for the gathering of diagnostic specimens and the transport of these specimens to the New Mexico Veterinary Diagnostic Services Laboratory in Albuquerque. These specimens will be processed as quickly as possible to hopefully arrive at a quick and accurate diagnosis to minimize the loss for the livestock producer and to safeguard the livestock industry. NM-ALIRT veterinarians have undergone training in foreign animal disease recognition, necropsy technique, specimen processing, handling and shipment, agri-terrorism, personal protection equipment training, incident command system training, toxic plants, global positioning system (GPS) unit usage and media interaction training. These veterinarians have been equipped with field diagnostician’s kits and other support materials necessary to provide this response.

Along with the responsibility of emergency response, NM-ALIRT veterinarians also provide monthly syndromic surveillance data to a central database that provides statewide tabulation of cases so a baseline disease incidence can be established. Veterinarians report cases that fall into certain syndrome categories and these reports are tracked and trends monitored. The categories monitored are syndromes that may be of concern in foreign animal disease situations, or diseases that could potentially threaten the New Mexico livestock industry.

The NM-ALIRT program was able to participate in a Foreign Animal Disease (FAD) Full Scale Exercise held in Playas, NM. The NM-ALIRT veterinarians were teamed with a NM livestock inspector and county extension agent to form response teams during the exercise. These teams were assigned tasks associated with the FAD response. The exercise included gathering, processing and packaging for shipment diagnostic specimens harvested at necropsy. These specimens were harvested under field conditions that mimicked an actual response to a potential zoonotic disease outbreak, including the use of PPE and hot/cold zone transition procedures. This exercise provided a chance for veterinarians to use their training and also magnified awareness of the value of these teams in an actual response. Our areas of weakness were brought to light and corrective measures will be implemented. The readiness of the NM-ALIRT veterinarians to respond was favorably evaluated. This exercise proved to be an invaluable training mechanism for emergency preparedness in New Mexico.

Florida State Rift Valley Fever Exercise and Laboratory Tactical Exercise

Greg Christy
Florida Department of Agriculture and Consumer Services

A multi-agency state-level tabletop exercise and an associated animal disease laboratory tactical exercise for a simulated Rift Valley fever outbreak in Florida. Rift Valley fever has been identified as the third most potentially economically devastating animal disease that could impact the United States according to the USDA National Veterinary Stockpile (NVS)
REPORT OF THE COMMITTEE

Steering Committee. Rift Valley fever is a vector-borne zoonotic disease that presents multiple and unique challenges to human and animal disease response agencies.

These exercises were prepared and hosted by the Florida Department of Agriculture and Consumer Services, the University of Florida, College of Veterinary Medicine and the Florida Division of Emergency Management. The purpose of these exercises was to give participants an opportunity to plan, initiate, and evaluate current response concepts and capabilities in a simulated introduction and outbreak of Rift Valley fever. Over 130 people from 14 international, federal, state and professional agencies and organizations participated in the exercises. The structure of the exercises, lessons learned and participant recommendations will be discussed.

International Disposal Symposium Summary and Technologies
Lori P. Miller
National Center for Animal Health Emergency Management (NCAHEM), USDA-APHIS, Senior Staff Officer, Environmental Engineer

International Disposal Symposium Summary and Technologies - a summary of new information and the latest technologies presented during the 3rd International Symposium on Management of Animal Carcasses, Tissue and Related Byproducts held July 21-23, 2009 at the University of California in Davis. Topics include Emergency Response issues, depopulation and disposal technology advances, and policy barriers. The highlights and conclusions on the various topics will be presented briefly, and the next steps for carcass management will be discussed.

JOINT MEETING SESSION with the National Assembly of State Animal Health Officials (NASAHO)

USDA-APHIS-VS Emergency Management and Diagnostics Update
Jose’ R. Díez
Associate Deputy Administrator, USDA-APHIS-Veterinary Services (VS), National Center for Animal Health Emergency Management (NCAHEM)

The progress in APHIS Emergency Management and Diagnostics, particularly within VS’ National Center or Animal Health Emergency Management was discussed. The presentation followed the four cornerstones of Emergency Management: planning, preparedness, response, and recovery.

In the planning arena, Dr. Díez discussed actions bringing life to the VS 2015 vision introduced by Dr. John Clifford last year at USAHA. In the discussion, he addressed how VS is preparing its workforce for the future to ensure continued response readiness.

Preparations for a response to an animal disease have continued between APHIS and the Department of Homeland Security. Dr. Díez described preparations as well as the coordination among animal health, public health, and food safety officials to ensure a common approach
to a potential finding of the novel H1N1 2009 virus in U.S. swine. The
preparedness activities of the National Veterinary Stockpile and those
related to 3D—depopulation, disposal, and decontamination were
discussed.
	nCAHEM’s response guidance continues to evolve and is now
available to the public. Participants will learn how to access and contribute
to the latest iterations of various response documents in development.
Dr. Díez reviewed the most recent foreign animal disease investigations
undertaken by VS, with some emphasis on the ongoing contagious equine
metritis investigation and response. He also described the increase in the
National Animal Health Response Corps and its associated activities.

Finally, Dr. Díez discussed recovery activities. Continuity of business
has taken an increasingly larger role in recent years, and he reviewed
steps APHIS-VS is taking to maintain that trend within the egg sector
and the dairy industry, and with respect to foot-and-mouth diseas (FMD)
planning.

Implementation of VS Memo 580.4 ~ Procedures for the
Investigation of Potential Foreign Animal Disease/ Emerging
Disease Incidents (FAD/EDI)
Barbara Martin
USDA-APHIS-National Veterinary Services Laboratory, National Animal
Health Laboratory Network (NAHLN) Coordinator

The 580.4 memo has been utilized since being approved for FAD
sample submission. New flowcharts describing 580.4 procedures have
been developed to address communication and procedure glitches. Draft
diagrams follow:
Figure 1. FAD Sample Classification and Prioritization
Foreign Animal Disease (FAD) Investigation Is Initiated...

- Assigns Foreign Animal Disease Diagnostician (FADD)
- Ensures EMRS Referral Control # is assigned
- Assigns FAD/EDI Case Coordinator(s)
- Ensures that initial case report is prepared and transmitted to the FADD
- Consults with FADD, NVSL and NAHLN laboratory to determine a diagnostic sample submission plan. Includes AVIC and SAHO for state of NAHLN lab, if different from the state of sample origin.
- Consults with FADD to ensure that an investigation classification and a diagnostic sample submission priority are assigned
REPORT OF THE COMMITTEE
National Veterinary Stockpile Preparedness
Lee Myers
USDA-APHIS-VS, National Veterinary Stockpile, State-Federal Liaison

Dr. Lee Myers, State Federal Liaison for the National Veterinary Stockpile, briefed the Committee about the National Veterinary Stockpile (NVS) program within USDA-APHIS, Veterinary Services. Dr. Myers (1) presented the new NVS countermeasures, (2) described the future NVS capabilities, (3) described the available NVS planning tools, and (4) reported on the status of State/Tribe/US Territory NVS preparedness.

New countermeasures the NVS program acquired during the last year include reconfigured 24-Hour Push Packs; Kifco® and the North Carolina nozzle poultry depopulation foaming units; CO2 poultry depopulation carts; enhanced services from NVS depopulation, disposal, and decontamination (3D) commercial services; and additional distribution centers across the nation to reduce deployment time. Capabilities the NVS staff hope to acquire in the future include self-refilling syringes to deliver vaccine; vaccine and test kits for appropriate threats, such as classical swine fever, Rift Valley fever, foot-and-mouth diseases, etc.; cold storage at east, central, and west NVS logistical centers; indefinite delivery/indefinite quantity contracts for medical waste disposal; supply chain management system for NVS staff to coordinate deployments; continued contractor training; and large animal handling equipment.

Planning tools for State, Tribe, and U.S. Territory officials are posted on a password protected NVS website for planners http://nvs.aphis.usda.gov. Posted on the site is the following information: NVS Basics Brief (powerpoint presentation); NVS Template for State Plan v1.2 October 2009; NVS Planning Guide v2 June 2009; NVS Business Plan v3.1 October 2009; Illinois NVS Plan May 2009; and Kentucky NVS Guidelines Draft June 2009. Using the NVS Template for State Plan simplifies the planning process by "filling in the blanks" and customizing the plan for jurisdictional circumstances, and enhances regional preparedness by having consistent approaches across multiple States. NVS planners should contact the NVS State Federal Liaison to gain access to the secure site.

The NVS outreach program actively engages State and Tribe officials in NVS preparedness efforts. The Southern Agriculture and Animal Disaster Response Alliance member States will develop NVS plans in FY 2010, and operations-based logistics exercises are planned for the States of Alabama, Louisiana, and Mississippi in April 2010. Looking ahead for FY 2011, the NVS program is soliciting approximately three contiguous States or Tribes as partners who will commit to NVS preparedness, develop written NVS plans, exercise the plan, post the plan on the NVS website for planners, and help advise other States.
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Rebirth of Veterinary Medical Assistance Teams (VMAT)
Heather Case
American Veterinary Medical Association, Director of Scientific Activities Division

The American Veterinary Medical Association (AVMA) has re-launched the Veterinary Medical Assistance Team program as a private non governmental program. The teams are funded by the American Veterinary Medical Foundation. There are currently four regional teams each with one 4-6 person unit on call at all times as of May 1, 2009. States may request one of three offerings:

1) A 4-6 person early assessment team (of veterinarians and veterinary technicians) for 72 hours on the ground
2) A 4-6 person basic treatment team (of veterinarians and veterinary technicians) for 5 days on the ground
3) An individual VMAT volunteer to present a lecture (typically 60-90 minutes long) on a relevant emergency preparedness and response topic.

Before a VMAT can be deployed, a signed Memorandum of Understanding between the AVMA and the state animal health authority must be on file with the AVMA.

The AVMA VMAT program is not meant to replace state and local response teams. AVMA VMAT is intended to support local response efforts by filling gaps or providing surge capacity. While many states have developed veterinary and animal response teams, many gaps remain.

1) The early assessment teams may be used as a resource by the state to determine which of their own state assets to deploy in a response.
2) The basic treatment teams may be used as surge capacity for state response teams or to fill gaps providing basic veterinary care at state run animal disaster operations.
3) The AVMA VMAT program has over 15 years of emergency preparedness and response experience, including deployments to the World Trade Center and the hurricanes of 2005. Team members have first hand knowledge of response to multiple events and have received extensive training in preparedness and response. In addition, several team members are board certified specialists and many members have extensive training and experience in areas such as safety, administration, mental health, and logistics.

AVMA VMAT members are volunteers and do not receive a salary. Travel, housing and per diem expenses are covered by the AVMA VMAT program through AVMF funding.

Additional information about the AVMA VMAT program can be found at www.avma.org/vmat or e-mail avmavmat@avma.org.
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U. S. Department of Homeland Security (DHS), Office of Health Affairs Update
Tom McGinn
Chief Veterinarian, DHS-Office of Health Affairs (OHA)

A discussion of U.S. agriculture importance and potential risk was discussed. The dependence on someone else to produce our food has changed the risk, and our growing dependency on other countries is changing our risk. We need to learn how to address these risks. The answer is being able to measure the impact of not having the resources to do what is needed to mitigate these risks.

An illustration was given regarding a FERN (Food Emergency Response Network) Exercise in Georgia where measurement of response time and mitigation of risk was documented in order to obtain more federal resources. We are much more effective at getting the resources we need if we can benchmark key capabilities and demonstrate what difference they make to the outcome.

Lessons Learned Information Sharing allows us to learn from each others’ experiences. Success shared builds success. DHS has developed a partner page and are requesting after action reports like those shared this morning in CAEM meeting be entered into this website. Not only will this build success but is will also aid in the education of the emergency management community of our emergency issues and the need to form partnerships with them to meet challenges beyond our own capabilities.

This presentation concluded the joint session with National Assembly of State Animal Health Officials. Committee presentations followed.

Kevin Dennison
Western Region Emergency Programs Manager, USDA-APHIS-Animal Care

USDA-APHIS-Animal Care (AC) has two critical emergency management roles for our 175+ staff nationwide, including approximately 110 field staff and supervisors, five Emergency Programs staff, and National/Regional Headquarters staff. AC’s role via the National Response Framework is to support the safety and well-being of pets. This includes working with FEMA, other Federal agencies, and non-governmental organizations to support State and local response. AC also has a statutory role pertaining to licensees under the Animal Welfare Act, including exhibitors (zoos, sanctuaries, circuses, etc.), certain biomedical research facilities, commercial pet breeding kennels, and some animal transportation operations. During a disaster, AC veterinarians and inspectors will monitor the status of licensees and work through local or State emergency management to facilitate communication, identify
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resources, and provide technical assistance.

The core projects for the safety and well-being of pets mission includes:

- Working in partnership with FEMA to develop the Household Pet Support Task Force CONOPS plan and a planning template for State, Tribal, or Territorial jurisdictions for multi-agency coordination pertaining to household pet and service animal issues. A draft Federal CONOPS is written and additional State stakeholders will be engaged in developing the template tool.

- A second Summit on Companion Animal Emergency Management will be held December 7-10 in Kansas City. APHIS is funding Iowa State University to plan the event and invite one person from each State to attend travel-paid. The meeting is hosted by the National Alliance of State Animal and Agricultural Emergency Programs.

- Nine best-practice working groups are being set up to meet face to face at the KC meeting and provide ongoing national expertise in specific planning and response sectors for pets and other animals.

- AC is funding select State exercises (CA and NC this year, LA last year).

- AC, in partnership with ISU, is developing animal emergency management training and defining ROSS positions for AC staff.

For zoological emergency management issues, AC is doing the following:

- Proposed a contingency planning requirement for all AWA licensees. The proposed rule has received public input and is being reviewed within the Federal system.

- Has encouraged the Association of Zoos and Aquariums to submit a proposal for a zoological best-practice working group on emergency management.

- Has provided guidance to AC Staff on their responsibilities during disasters concerning AWA licensed facilities

PET Net – Pet Event Tracking Network to Monitor and Document Pet Food/Animal Feed Contamination Events

Chris Melluso
FDA-Center for Veterinary Medicine

FDA reporting, surveillance, and notification systems have put into place a program to detect adulterated pet foods since the widespread contamination of pet foods with melamine and cyanuric acid which occurred in 2007.
Aligning Foreign Animal Disease Response Planning and a Just-In-Time Food Supply

Mac Farnham

Center for Animal Health and Food Safety at the University of Minnesota

The Center for Animal Health and Food Safety at the University of Minnesota is working with APHIS, producer groups and the food industry to facilitate industry, academic and government engagement in foreign animal disease (FAD) response planning. The goal of the collaboration is to develop effective response plans that successfully respond to the FAD while minimizing unintended consequences on the animal populations and food industries they are designed to protect. Many food companies have moved away from warehouses for long term storage and incorporated ‘just in time’ dynamic supply chains that take freshly prepared food directly from the processor to the point of sale. As a result, huge volumes of animals and animal products are in transit at any one given point in time with little stored inventory of food products available at any one point in the chain. Regulatory requirements to stop movement of all animals and animal-derived products may have serious deleterious effects on the whole supply chain even if it successfully eradicates the disease. Appreciating the challenges of controlling and eliminating the FAD, while at the same time maintaining the supply of product to the consumer and the viability of the food industry, represents an important step in addressing this complex and multifaceted problem. The overall goal of this project is to promote ongoing dialogue between and among the government, industry and academic sectors (stakeholders) affected by any potential FAD. Such a dialogue seeks not only to develop and strengthen relationships across boundaries between disciplines and institutions, but further to involve a more complete cross section of vested stakeholders in the development of FAD response planning and subsequent policy decisions with far reaching implications for US agriculture.

The overall project comprises several parts;

1) Facilitating communication between stakeholders (government, academia, industry) involved in FAD planning and response

2) Engaging the various stakeholders in the process of FAD planning and response

3) Facilitating development of proactive risk assessments and a movement control framework / permitting system for continued movement of animals and animal products that present a negligible risk of spreading the FAD

4) Providing an open and transparent system for FAD response planning which builds on the strengths of the different sectors involved

To date the project has made some strong progress with “proactive risk assessments” to support business continuity for eggs in the context of highly pathogenic avian influenza in eggs, and foot-and-mouth disease in pork products and milk. Active collaborations between industry and
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government are critical to the success of these efforts. If you or someone you know would be interested in contributing to this exciting process please feel free to contact us. We currently have two very active disease specific working groups for highly pathogenic avian influenza and foot-and-mouth disease. We welcome additional participation.

- For more information contact our project lead: Dr. Tim Goldsmith gorld0188@umn.edu 612-625-0883
- HPAI Working Group: Dr. Brendan Lee leex3625@umn.edu 612-625-3921
- Dr. Girum Ejigu ejigy002@umn.edu 612-624-3837
- FMD Working Group: Dr. Pattie Bedford bedfo020@umn.edu 612-625-6708
- Dr. Mac Farnham farn0032@umn.edu 612-626-3136
- Dr. Karin Hamilton hamil362@umn.edu 612-626-3178

National Center for Foreign Animal and Zoonotic Disease Defense Activities
Neville Clarke
Director, National Center for Foreign Animal and Zoonotic Disease Defense (FAZD Center)

- Development of a Dashboard Approach for the Common Operating Picture for the National Biosurveillance Information System (NBIS) – The FAZD Center developed a dashboard approach for a biological systems common operating picture (BCOP) for the NBIS that provides a new capability for analysts to aggregate data from multiple sources into a common framework for assessment of emerging and ongoing biological events at national and global scales with the objective of providing improved and enhanced awareness of events threatening human and animal health. The NBIS aggregates information from multiple sources and agencies for both analysis and presentation to senior decision makers. With the outbreak of H1N1 influenza, the FAZD Center was asked to participate with the Department of Homeland Security (DHS) in taking the BCOP to an immediate operational stage. This was accomplished in weeks rather than months as originally scheduled. The system is now in use by analysts from several participating agencies with the Center providing an access portal for the system at Texas A&M. The BCOP will continue to be improved by the FAZD Center and eventually located within DHS for long term use.

- Emergency Response Support System (ERSS) for Animal Disease Outbreaks – Outbreaks of exotic animal disease present a complex challenge for decision makers at multiple levels of scale in modern incident command structures where responses to such outbreaks are managed. Incident commanders require immediate access to both historical information and emerging data about
the outbreak in the form of statistics about the outbreak, weather, and geographic features of the surrounding areas in the form of databases, charts, maps, photos, and other information as well as the ability to assess the consequences of alternative response strategies in near real time. The ERSS employs a dashboard approach to provide a consolidated view of synchronized information from multiple sources. The dashboard may be populated with a variety of spatially explicit and other information presented in an integrated format so that interrelationships can be readily evaluated and the consequences of optional decisions portrayed. The ERSS is highly flexible and alternative displays can be provided for the incident commander and at regional and national levels of incident management. A working prototype of this system has been demonstrated to the APHIS Emergency Management System and the Department of Homeland Security Office of Health Affairs and plans are underway to develop an operational prototype of the system.

- Databases and Models for Interstate Movement of Animals to Support Models of Animal Disease Spread – Most epidemic models assume disease is spread by direct or indirect contact at local levels without accounting for the long distance movement of animals across the country that occurs in commerce. The DHS has provided special funding to the FAZD Center and NCFPD to acquire the data to build a national transportation model to generate input for multiple epidemiologic modeling efforts. The initial effort focused on beef, dairy, and swine, with other commodities to be added in the future. Known as the Food and Agriculture System Transportation (FASTRANS) model, this project is providing the first quantitative estimates of interstate livestock movement effects on the spread of high-consequence animal diseases.

- Study on Effectiveness of Animal Identification System in Reducing the Impact of a Foot-and-Mouth Disease Outbreak – A functional national animal identification system would substantially enhance the ability to trace the origin of an outbreak of exotic diseases as well as to determine its further distribution from the site of an outbreak. But critics suggest the cost of animal identification outweighs the benefits. A FAZD Center study assessed the potential benefits of using an animal identification system for tracing during a postulated FMD outbreak in the Texas High Plains. The study provided quantitative estimates of benefits and demonstrated that the savings resulting from reduction in cost of containment of the disease and loss of animals more than justify the cost of implementing a national animal identification system (particularly for feedlots).
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Electronic “Tool Kits” for Positions Described in APHIS’ FMD and A.I. Response Plans
Annette Whiteford
California Department of Food and Agriculture, Director of Animal Health and Food Safety Services Division

CDFA developed a CD to train (just-in-time) field veterinarians and animal health emergency responders in policy and procedure of California animal health emergency events. A video demonstration showed its components which included Incident Command System forms, state laws/rules and animal handling procedures. Other states may use it if they would like to.

Program to Enhance Regional Collaboration and Utilize the National Credentialing Standards for Animal Emergency Responders
Ray Burden
Associate Director, Center for Agriculture and Food Security and Preparedness at the University of Tennessee, College of Veterinary Medicine

Center for Agriculture and Food Security and Preparedness, University of Tennessee College of Veterinary Medicine

The proposed national training program will address Focus Area 3: Regional Collaboration. Implementation of the National Credentialing Standards for Animal Emergency Responders (AER) will be supported through development and delivery of a collaborative national training program targeted towards state and local officials with a responsibility for management of all hazards disaster response and recovery. These standards were finalized in 2007 and are intended to be used to support collaboration and the utilization of regional, state, local, private sector, and academic resources to build capabilities for an effective response and recovery from an all hazards animal related disaster. This training program will be in compliance with the outcome of the DHS-Federal Emergency Management Agency, AER Work Group Phase 2. No training currently exists to support adoption and effective utilization of these standards nationally.

A national credentialing system is mandated by Homeland Security Presidential Directive (HSPD) 5 and is intended to improve the methods, capabilities and coordination of emergency responders to deal with response and recovery from all hazards domestic incidents. Credentials are baseline criteria representing the minimum requirement for response personnel to participate in the National Incident Management System Integration (NIMS) Division, National Emergency Responder Credentialing System. A credential provides for a quick and accurate verification of an individual’s identity and helps ensure that personnel representing various jurisdictional levels and functional disciplines possess a minimum common level of training, experience, and physical and medical fitness for any incident management or emergency responder position that
they may be asked to fill. The AER credentialing standards can serve to prevent access to an incident by unauthorized personnel and help maintain perimeter control of an incident. These standards provide a flexible system for states and responder groups to build capacity, rather than expecting reliance on narrowly defined, prescribed resources. This flexibility is preferred because, although typed resources (teams, units, etc.) are particularly helpful when needs and resources are similar from one incident to another and requests for these standardized resources are made frequently, these conditions rarely apply to animal-related disasters. For animal emergencies, that are rare and diverse, it is more helpful for a state to request individual resources (credentialed responders) that can then be assimilated into appropriate resources (teams) at the incident site.

The training program will describe the AER Resource Typing and Credentialing templates and how they can be used to support pre-incident capability based planning. Planners will be provided key information and practical examples as to how to use the templates to identify which tasks their jurisdiction or organizations should or could perform and how resources can be shared regionally to effectively manage an incident through the Emergency Management Assistance Compact (EMAC). By training managers how to utilize this information during the preparedness phase of disasters, efficiency and effectiveness of a response and the establishment of regional collaboration for response and recovery can be greatly facilitated. Specific models of regional collaborative agreements for sharing resources through EMAC for animal disaster response, such as the Southern Animal Health Association (SAHA) model and others, will be discussed with course participants. Key elements from these models will be identified to support local and regional collaboration discussions. Regional and private sector participation at instructor-led (IL) course deliveries will lay the groundwork for effective networking and collaboration. This training program can serve as a model for the implementation of national credentialing standards for other disciplines once developed, such as for public health, food response and others.

The training program will include two components: A) a four hour online course at the awareness/ performance level; and B) a 1½ day IL management level course that will be delivered in the local community. The online course will be a recommended pre-requisite for the IL course to minimize in person classroom time, but will also be open to those individuals who cannot attend the IL course. The online course will provide all necessary background information so that participants will be able to move rapidly into applying the knowledge in practical exercises during the IL phase of the training program. Final online course level and course objectives for both courses will be finalized during the development process. The IL course will be primarily exercise-based with scenarios and video injects to illustrate the process of resource typing and use of the credentialing standards to facilitate effective management of state and local resources and sharing of resources between the public-private
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sectors and across state lines. Over three years, the online course will be launched, and 54 deliveries of the IL course (51 deliveries and three pilots) will be offered nationwide. The training program will utilize a blended learning strategy incorporating online and in classroom delivery to reach the national audience and to ensure a cohesive training program. Collaborative planning to share resources between the public-private sector and between states in the event of an animal-related disaster will be one of the primary measurable outcomes of this training program.

Update on the Food and Agriculture Sector Protection Measures
Tony Caver
State Liaison Food and Agriculture Sector, Partnership and Outreach Division, Office of Infrastructure Protection, Department of Homeland Security

The presentation gave a brief update of the Food and Agriculture Government Coordinating Council. It focused on the Food and Agriculture Specialists responsibilities to provide subject matter expertise and information sharing on Critical Infrastructure and Key Resources (CIKR) issues that impact the food and agriculture sector. Updates were presented on the information sharing processes and the web-based platforms, Homeland Security Information Network – Food and Agriculture (HSIN-FA) and FoodSHIELD and the critical assessment tool FASCAT.

We represent Animal Emergency Management and want to provide your perspective on how we can improve our processes to protect the food and agriculture sector.

Multi-jurisdictional Response to an Anthrax Outbreak on a Domestic Bison Ranch
Jeanne Rankin
Assistant State Veterinarian, Montana Dept. of Livestock

An anthrax outbreak in bison on a very large ranch in Montana required an integrated multi-agency response to remove and dispose of carcasses. A public road crossing the ranch was blocked for large equipment operations and public information was distributed to outdoor enthusiasts wishing to use the area.

Livestock Issues in Hurricane Ike
Dee Ellis
Assistant State Veterinarian, Texas Animal Health Commission

The impact of Hurricane Ike on the upper Texas coast in September of 2008 resulted in the death of over 10,000 cattle and the displacement of over 15,000 more. The issues encountered by the Texas animal disaster response teams included accessibility, carcass disposal, animal identification, sheltering, evacuation, rescue, and relocation of the surviving livestock. The economic impact to the region was devastating and the cost to first responders was especially significant. As a result of
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the experience, Texas emergency response officials went back to the
drawing board to refine the Texas response plan. Subsequently, the
Texas Animal Response Plan was created to mitigate the effects of future
large scale events and better respond to the same. This talk will cover
the issues disclosed after Ike, and the plan Texas responders forged
through new and innovative partnerships between state, local, federal and
non-governmental organizations, to deal with future livestock in disaster
situations.

Low Path Avian Influenza (LPAI) H5N8 on an Idaho Commercial
Gamebird Farm Response and Lessons Learned
Marilyn M. Simunich
Assistant State Veterinarian and Director Animal Health Laboratory,
Idaho State Department of Agriculture

Difficult working conditions and multi-agency involvement made
response to an low-pathogenic avian influenza outbreak on a large
commercial gamebird farm challenging. The state had a USDA-approved
LPAI Response and Containment Plan in place for protocol on the
response, but owner-USDA agreement on indemnity and premises
cleaning and disinfecting possibilities caused weeks to months delay in
response time. Rather than USDA-purchased chickens, owner-purchased
sentinel pheasants were monitored for recurrence of low pathogenic
avian influenza (LPAI) after cleaning and disinfection of the farm to enable
the owner to resume business immediately at the end of the one month
surveillance period.

Committee Business
One Resolution regarding multi-agency support for expanded research
of disposal methods was finalized and voted on by the Committee to send
to the Committee on Nominations and Resolutions for consideration.

Monthly conference calls are the last Thursday of each month with
a few exceptions. There is no call in same month as AAVLD/ USAHA
meeting. The November and December calls fall during holidays so they
are often combined into an early December call. The 2009 Nov-Dec
conference call will occur on Dec. 10th at the same time as usual.
The Committee met on October 11, 2009 at the Town and Country Hotel, San Diego, Calif., from 12:30 p.m. to 5:30 p.m. There were 53 members and guests present. Drs. Case and Elvinger introduced the topics to be presented and announced one business item to be addressed during the business session regarding the formation of a National Animal Health Surveillance System (NAHSS) subcommittee as a successor committee to the former NAHSS Steering Committee.

One Time-Specific Paper was presented by Dr. John Huntley, State Veterinarian of New York, and Kathleen Finerty, New York State Cattle Health Assurance Program (NYSCHAP) coordinator, entitled “The New York State Cattle Health Assurance Program and Animal Health Information Environment, Towards Informed Animal Health.” The paper in its entirety is included at the end of this report.

State of the National Animal Health Surveillance System (NAHSS).

Dr. Sarah Tomlinson
National Surveillance Unit (NSU), Centers for Epidemiology and Animal Health (CEAH), USDA-APHIS, Veterinary Services (VS)

The NAHSS is in its fifth year. In 2004, the NAHSS Steering Committee was formed, the NAHSS strategic plan was written and Veterinary Services’ National Surveillance Unit (NSU) was created. The NAHSS strategic plan and its twelve guiding objectives served as the means to illustrate the progress of the NAHSS. These accomplishments cannot be attributed to NSU or VS alone, instead to the NAHSS partnerships and alliances that have been developed.

Some of the major accomplishments of the NAHSS include: Coordination and collaboration on the design and implementation
of surveillance, including the establishment and multiple examples of successful application of the surveillance development process; development of and international collaboration on surveillance standards; initiating changes in the VS data management system that reflect a comprehensive surveillance approach; establishment and maintenance of an animal health surveillance inventory; improved collaboration with Federal, State and International partners for sharing surveillance information; enhancement of surveillance reporting systems such as the National Animal Health Reporting System (NAHRS) and development of routine surveillance reports to inform decision-making; collaboration with industry, States, and universities on animal disease education efforts; and surveillance methods development for planning and analysis.

Looking forward, surveillance is one of the focuses of VS’ 2015 vision. The Surveillance for Action working group will use the foundations of the NAHSS to form specific action plans to implement some of the components. Further, the comprehensive and integrated surveillance approach will continue to progress, using the success of the comprehensive swine surveillance as the model to follow.

Dr. Willeberg commented that international programs within the OIE should all make their surveillance databases available for aggregate studies. The national ownership of the data is one of the reasons that is given for the lack of participation. While the current disease data are available for viewing, they are not in a format that is amenable for easy integration into analytical tools that might be used to provide added value. Current member countries cannot, without effort, retrieve data for their own countries. Dr. Weber mentioned that there are efforts to streamline surveillance guidelines between NAHSS and the OIE. The impression from Dr. Willeberg as a former chief veterinary office (CVO) is that to get data from other countries, you would have to get permission from those CVOs. However, the World Animal Health Information Database (WAHID) system provides a large amount of standard tables, but these data are not available in a downloadable format. The amount of effort to extract these data could be reduced if a standard download format were provided.

National Animal Health Reporting System (NAHRS) 2008/09 update
Dr. Stan Bruntz
NSU, USDA-APHIS-VS-CEAH

The NAHRS Steering Committee met September 16-18, 2009 in Fort Collins, Colorado. The following issues were discussed and were brought forward to the full committee: Participation—as of September 2009, forty-six States are currently reporting to NAHRS. NAHRS information continues to be an important source of information used by Veterinary Services to complete U.S. animal disease status reports for the World Organization for Animal Health (OIE). NAHRS Steering Committee Membership changes include: Dr. Jim Logan, Wyoming State Veterinarian will be the Small Ruminant Working Group representative; Dr. Bruce Stewart-Brown, Perdue Farms, Poultry Working Group representative; Dr. Flint Taylor, Western Region National Assembly of State Animal
Health Officials (NASAHO) representative; and Dr Josie-Traub Dargatz, Colorado State University, will replace Dr. Tim Cordes as Equine Working Group representative. The committee will look at filling the North Central, NASAHO representative, the cattle commodity representative, and the National Poultry Improvement Plan (NPIP) representative positions. The 2008 NAHRS Annual Summary Report included resource information on OIE listed diseases and an overview of National Animal Health Surveillance System (NAHSS) surveillance activities in the United States. The expansion of NAHRS aquaculture reporting moved forward with all OIE aquaculture diseases being included on the 2009 NAHRS reports. Dr. Heidel, the Aquaculture Working Group, and NSU are currently working on NAHRS aquaculture disease reporting criteria. NAHRS Online Reporting Tool, version 2, had about six weeks when it was down in July/August due to security downloads that caused a glitch in the system. VS security downloads and requirements have been an issue and a source of frustration for NAHRS participants, which is set for release in November 2009. The NAHRS Steering Committee discussed the possibility of NAHRS being included in the VS Animal Health Monitoring and Surveillance (AHMS) Cooperative Agreement process—all members agreed that States should gain credit for general surveillance and FAD surveillance through participation in NAHRS. It was also reported that OIE changes in 2009 included removing malignant catarrhal fever from the OIE list and adding of epizootic hemorrhagic disease (EHD).

The NAHRS Steering Committee meeting concentrated on the response to 2008 USAHA Resolution 10, on the development of a United States National List of Reportable Animal Diseases (NLRAD). The NAHRS Steering Committee in conjunction with the VS-CEAH National Surveillance Unit (NSU) has developed a NLRAD overview paper and proposed NLRAD. This proposed NLRAD list and white paper will be routed through the Veterinary Services Management Team (VSMT), National Assembly of State Animal Health Officials (NASAHO), commodity groups, and other stake holders in 2009 to early 2010. The goal is to bring the proposed list to the 2010 USAHA meeting for approval.

National Animal Health Information Technology Board (NAHITB) Roadmap
John Picanso
USDA-APHIS-VS

Picanso provided an overview of the current technology efforts underway at APHIS-VS as well as an overview of the technology roadmap for VS. He emphasized the IT Execution strategy that centers around five initiatives: data acquisition and exchange, security, software services and delivery, governance, and modernization of legacy IT applications.

Data acquisition – the emphasis in this area is in mobile information management (MIM) to get devices closer to the data acquisition site. The
initial results show that there is nearly a break even between the cost of the technology and a team of data collectors, but the improvement of data quality makes the benefits much higher. A national implementation strategy has been developed for MIM as well as research and development and training as well as 3rd party integration of these tools. The future is to develop more of the applications that are accessible on MIM devices. About 332,000 activities have been performed on these devices in the last year.

Future tasks include integration with VS Laboratory Submission (VSLS), APHIS wildlife surveillance and exploring hardware solutions for animal side data collection and management. Enterprise messaging is another area of emphasis and they have developed a VS surveillance message schema that will be available for users to review and implement in the near future. Web services, terminology standards are also being supported. A commercial enterprise services bus has been purchased and is being implemented within VS.

Security – recent moves by the Department of Homeland Security (DHS) to increase the number of cybersecurity experts will impact the security levels that will need to be adhered to by VS systems. There will be much more stringent security required for any interconnecting system with VS. Most of this initiative is in progress due to the recent expansion of security requirements.

Software services and delivery – Activities include an enterprise reporting strategy and the leveraging of enterprise services to accomplish a shared environment. The security aspect of this has been accomplished to meet the new security requirements. Mr. Picanso gave an example of the National Veterinary Logistics Systems Project. The information technology aspect of this is a modified commercial off-the-shelf product that meets the majority of the needs to manage the project. The Emergency Management Response System (EMRS) is still being used to manage significant disease outbreaks in a number of states. Although there are concerns about performance and functions of EMRS, it is still providing services that there are not currently resources to replace it. EMRS training was performed in a number of states for both technical and emergency management personnel. VSPS for health certification was utilized in 33 states over the past year for generation and all of the US was involved in the destination of animal movement. Nearly 2.74 million certificates were issued through the system in FY 2008-09. A new release of the standard premises registration system with revised geospatial functions is being developed. The central functions of animal traceability are approximately 90%. Currently 534,000 premises registered.

Governance – Internal to VS and not presented.

Modernize Legacy IT systems – this is the most challenging area due to the limited resources available to do the necessary foundational work. A substantial effort is required to address the new accreditation
requirements that will go into effect in January 2010. A number of specific legacy systems that are being evaluated for updating were discussed. Finally, a qualitative summary of the status of the five initiatives was presented showing the current status of each.

**Current status of the National Animal Health Laboratory Network (NAHLN)**
Dr. Leah Estberg
NSU, USDA-APHIS-VS-CEAH

The Laboratory Registry and Reporting system functionality is currently in production (live) in the NAHLN IT system. Laboratories recorded in the Laboratory Registry are able to report test results electronically. They are able to send the results using Health Level Seven (HL7) messages. HL7 standardized messages support a high level of data quality that enables useful, automated processing of information exchanged directly between Laboratory Information Management Systems (LIMS) and the NAHLN IT system. This data quality is also improved by standardizing the terminology used to communicate specimen type, animal taxonomy, test performed, etc. with Systematized Nomenclature of Medicine (SNOMED), Logical Observation Identifiers Names and Codes (LOINC) and HL7 terminology standards. The NAHLN IT system receives the results messaged, routes them to the VS Laboratory Submission (VSLS) IT system, stores them, and makes them accessible for viewing online by the laboratory that sent the message. As of October 1, 2009 a total of 10 labs had messaged 2,392 CSF results and a total of eight labs had messaged 3,142 wild bird avian influenza results.

**Efforts of the CAHIA to generate the Emerging Disease Identification Plan**
Mr. Joe Mlakar
Center for Animal Health Information and Analysis (CAHIA), USDA-APHIS-VS-CEAH

Mlakar described the process used by CEAH for identifying emerging animal diseases. Specifically, he spoke on motivation, objectives, criteria for defining emerging diseases, data sources, analysis methods, means of communication, and how CEAH intends to evolve its process of identifying emerging diseases and communicating its findings in the future.

He also described a pilot project with the objective of developing methods for weekly monitoring of abattoir condemnation data in order to identify emerging animal diseases or unusual changes in condemnation rates over time. Data sources for these projects include: Argus – open source data mining for animal health related events; ProMed; OIE reports; electronic Animal disposition reporting system (eADRS) from the Food Safety Inspection Service (FSIS); EMRS; law enforcement MIS (LEMIS); and atlases for import/export trends.
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Reviewing Control Measures Using Surveillance Data
Dr. Mo Salman
Colorado State University

Dr. Salman presented some statistical methodologies to assess options in reviewing control measures using surveillance data. An understanding of the sensitivity and specificity of surveillance data is crucial. Application of the appropriate statistical techniques is important and an evaluation of the available techniques was performed and examples were provided. Example data were FSIS data for national pseudorabies virus (PRV) surveillance, like slaughter samples for serology as well as random meat juice samples from slaughtered swine. Six statistical assessment method types were discussed. The important consideration was that there was a good understanding of the source data in order to make informed decisions on which statistical methods are both best suited to the type of data and the desired outcomes of the analysis.

Progress, current uses and future developments of the BioPortal project
Dr. Andres Perez
University of California, Davis

Dr. Perez presented progress, current uses and future developments of the BioPortal project as well as some recent enhancements and expansion of disease coverage. Access to the Foot-and-Mouth Disease Bioportal website is open to the public (with registration) and may be accessed from http://fmdbioportal.ucdavis.edu/.

USDA's National Veterinary Accreditation Program
Dr. Todd Behre
National Animal Health Policy and Programs, USDA-APHIS-VS

Dr. Behre presented USDA's National Veterinary Accreditation Program, the soon-to-be implemented changes, and relevance and applications to surveillance.

The National Veterinarian Accreditation Program (NVAP) oversees the activities of 71,000 veterinarians in the nation who provide regulatory duties for USDA. Accredited veterinarians examine and certify the health status of hundreds of millions of animals moving in domestic and international commerce every year. APHIS’ mission to “Safeguard Animal Health”, thus ensuring a plentiful and safe food supply for our citizens, would not be possible without NVAP’s leveraging of accredited veterinarians’ expertise and roles in the communities they serve. APHIS anticipates the publication regulations this Fall which will substantially change the business processes of the program, creating greater educational opportunities for accredited veterinarians. The regulation was conceived through the collective efforts of several national...
and international organizations, and is specifically aligned with ensuring the credibility of the world in NVAP’s work.

From the proposed rule in 2006: “We are proposing these changes in order to support the Agency’s animal health safeguarding initiatives, to involve accredited veterinarians in integrated surveillance activities, and to make the provisions governing our National Veterinary Accreditation Program more uniform and consistent. These proposed changes would increase the level of training and skill of accredited veterinarians in the areas of disease prevention and preparedness for animal health emergencies in the United States.”

Dr. Behre presented the most recent updates to the National Veterinary Accreditation Program. There are 7,000 accredited veterinarians. Only 20,225 are working on food and fiber species. The initiative is aimed at improving the knowledge of accredited veterinarians in order to better prepare for emergency detection and response. Needs include time allotted in the curriculum, appointment of regulatory instructors, teaching materials and continuing education. A number of web based modules have been created to provide education to the existing accredited veterinarian base. Many of the new rules may result in a number of accredited veterinarians dropping out of the program.

Committee Business

The Committee meeting concluded with the Committee Business session in which two items were discussed.

Dr. Willeberg requested that the Committee consider action regarding the current disease data from OIE that are available for viewing, but not in a format that is amenable for easy integration into analytical tools that might be used to provide added value. Current member countries cannot, without effort, retrieve data for their own countries. The committee decided to develop this over the next year.

The second item involved the folding of the former VS sponsored and appointed National Animal Health Surveillance System committee into a USAHA Committee subcommittee. Drs. François Elvinger and Sarah Tomlinson informed the audience about history, charge, and functions of the former Steering committee. The original committee was formed as a result of the 2001 safeguarding review recommendation that stated a steering committee be formed to provide guidance, priorities, feedback and evaluation to the national surveillance system (NSS). The review also recommended that a surveillance director position be established. The Committee was formed in 2004 to satisfy a charge based on the safeguarding review. Dr. Elvinger reviewed the charge and functions of the Committee. The strategic plan that was established was presented by Dr. Tomlinson in her earlier presentation. He summarized the makeup of the group and their actions in the early years of their existence. With the renewed enforcement of the Federal Advisory Committee Act (FACA)
the charge of the committee and its functions were rewritten to remove any consensus guidance roles in order to comply with the law. This removed a large amount of the effectiveness of the committee. Thus it was proposed that this committee be moved to become a subcommittee of this Committee, which would allow it to fulfill the initial functions and be an advocate for NAHSS through the USAHA resolution process. The discussed subcommittee is to take over the function of the former steering committee. It has support from CEAH and makes sense given the advancements that have taken place within the NSS. An alternative considered and rejected was the creation of a new separate USAHA/AAVLD Committee. There is a need to make sure that the makeup of the committee be the same representation as on the original steering committee. During discussion a question was raised as to whether there was a precedent for this type of committee? Indeed the Animal Health Emergency Management Committee went through the same proposed process, as also the NAHLN steering committee was rolled up under this type of structure. Further discussion involved the committee’s involvement with the VS Vision 2015 Surveillance for Action workgroup and it was suggested to keep as close as possible contact to the vision process. Combining the current NAHRS Steering committee with the newly proposed subcommittee was suggested but at this time decided to be kept separate as it is working well to date and fulfills very specific functions. The Committee had a quorum of 11 members present, a motion was proposed, seconded and positively voted on to form a National Animal Health Surveillance Systems subcommittee of the USAHA/AAVLD Committee on Animal Health Surveillance and Information Systems.
Introduction

Animal health information systems are essential to meet the present and future needs of the animal agricultural industry. The increased speed of commerce and the reduced emphasis on traditional disease control programs challenge current methods of managing population level animal health. New York State has considered the requirements of an animal health information system that will support population animal health in today’s environment. This strategic planning effort has identified five principles of a successful animal health information system. Those principles are:

1. Data acquisition must be designed to maintain transaction accuracy, ease of use and the speed of commerce. Data acquisition is often the limiting factor in realizing the full potential of animal health information systems today.

2. The system must support day-to-day decision making at all levels of the production continuum. These decisions support on-farm health, preharvest food safety goals, and state or national population animal health goals. A system designed only for emergency animal health events will likely fail when it is needed.

3. A successful system must integrate data from key sources using common, standardized definitions and business rules.

4. Analytical tools must support effective and efficient epidemiologic activities, including tracing, trending, spatial analysis and outbreak mapping. These tools should also help define and track the extent (spatial and temporal) and the quality of the data collected.

5. The implementation of a capable, extensible system as the foundation for more strategic goals ensures current success and permits evolution to meet future needs.

In response to these requirements, New York State has established, over the past 10 years, three integrated and mutually supporting animal health information applications within the New York Animal Health Information Environment (Fig 1). In addition, the voluntary New York State
Cattle Health Assurance Program (NYSCHAP) provides a framework in which weak, vulnerable or problem areas on a production unit may be identified and addressed through the implementation of a farm specific herd plan.

Determining and mitigating animal health risks on farms will support animal health in state or national animal populations. The New York Animal Health Information Environment was designed to assist producers in meeting their animal health and production goals. These efforts also support collective state and national animal health goals.

Objective:

The objectives of the New York Animal Health Information Environment are:

- Move towards a web based, immediately accessible core database to underpin more advanced goals.
- Integrate key data representing the state of animal health in New York’s animal populations to allow analyses across programs.
- Inform animal health and production management decisions on the farm.
- Manage the information necessary to support state and national animal health programs.
- Achieve collective recognition and benefits associated with managed animal health risks.
- Better characterize the determinants of animal health and production on the farm.
- Provide a framework for effective emergency response to animal health events.
- Provide a platform to leverage the benefits of technology to support animal health and production goals on the farm and as part of state and national programs.

Design:

The system framework consists of voluntary and mandatory elements that support the acquisition and analysis of animal health and production data. The New York Animal Health Information Management Environment is supported by three relational databases that store data and relationships on farm demographics, operational characteristics including production and health parameters, and individual and pooled diagnostic data. Information gathered from these transactional databases is integrated within a data warehouse for trending and aggregate level analysis. Common data definitions are enforced to minimize translational activities at interfaces as data moves from one platform to the other. Data security is assigned according to user type and role and is managed through the lightweight directory access protocol (LDAP).
Sample Population:

New York State continues to maintain its position as the third largest dairy production state in the nation. All New York producers are participants in the New York Animal Health Information System core programs. NYSCHAP is a voluntary program consisting of a subset of New York State dairy and beef producers. Dairy NYSCHAP participants account for 14% of the total herds and 35% of the dairy cows (1) in the State.

Methods:
Components: New York State Animal Health Information Management Environment.

The New York State Animal Health Information Management Environment (Fig 1) is composed of four major elements representing four distinct information levels.

- **New York Animal Health Information System (NYAHIS)**: Statewide comprehensive animal health information management, reports and epidemiological tools
- **Universal Veterinary Information System (UVIS)**: Diagnostic laboratory information management and reporting
- **New York State Cattle Health Assurance Program (NYSCHAP)**: Producer health and production information management application within NYAHIS
- **Animal Health Information Warehouse (AHIW)**: Animal health information integration, analysis, and epidemiological tools

The integrated package of animal health information system tools was developed to meet current and future needs for the maintenance of population animal health and program status.
Fig. 1 Components of the New York Animal Health Information Management Environment
The development and function of each element is described below:

1) **New York Animal Health Information System (NYAHIS) - Statewide comprehensive animal health data management:** NYAHIS is the statewide core animal health information system. It is a web-based Oracle 10g relational database maintained by Trace First Ltd that informs management in support of collective animal health activities, including animal disease tracking, epidemiology, animal movement, and farm contact information. It also supports program level decisions and analysis. The information is used to establish priority of effort, efficient use of resources, and the identification of high risk populations. Core activities within NYAHIS include:

   **Premises and Demographic Data:** Premises and herd data, contact information, location, and general farm operation information serves as the backbone of the New York animal health information system. This information is established and maintained through the combined efforts of producer groups, veterinarians, and animal health officials. The enforcement of well established business rules surrounding this core information establishes valid relationships between animals, herds, premises and animal program status and ensures data integrity. An important feature of the premises data of the NYAHIS is that it complements the requirements of the national premises registration system.

   **Herd Data:** NYAHIS supports the collection and management of herd level data. Disease certification program and quality assurance program status is validated using herd level data.

   **Individual Animal Data:** Animal level data supports movement analysis, individual animal health status, trace functions, and the generation of a virtual exposure cohort.

   **Passive Data Collection:** New York State recognizes that a critical and limiting feature of the expanded use of electronic information systems and tools is data acquisition, especially at the individual animal or transaction level. Efforts continue to improve individual animal data acquisition without placing a burden on the production manager. Several solutions to improve individual animal level data acquisition have been developed. Passive data capture systems are those that do not require operator action to collect data. Such systems have been developed for the cervid and live bird market poultry industries in New York State.

2) **The Universal Veterinary Information System (UVIS) - Animal diagnostic laboratory information management:** UVIS was designed as the transactional database that maintains animal health diagnostic testing data and results. The database, developed and customized by the
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Ross Group Inc.(2) and implemented and maintained by the Animal Health Diagnostic Center at Cornell University, manages information surrounding diagnostic accessions and results for the veterinarian and producer community. The UVIS system informs veterinarian and producer actions on the farm. Diagnostic test results and interpretations serve as the criteria to validate animal health disease control program status. Analytical tools within the UVIS application assist in the assessment of diagnostic resource needs and diagnostic test usage. Additional business intelligence tools provide ad hoc query and developed reporting capabilities from UVIS data. Such tools permit broader analysis of spatial and temporal coverage of diagnostic surveillance testing.

3) New York State Cattle Health Assurance Program (NYSCHAP)
- Animal production unit health and production information management: The NYSCHAP application within NYAHIS is an information application that facilitates the acquisition and analysis of production and animal health data, and supports management decisions intended to meet farm animal health and production goals. The foundation of the program is a group of general “core management practices” that serve as a framework for the maintenance of animal health, animal care, and production targets.
Conceptually, these best management practices occupy the center of the animal health assurance wheel (See Fig 2) and can be expected to support production, animal health, food safety, product quality and profit goals on the farm. The core consists of principles and practices that support general livestock health. The core management principles can best be described as representations of a comprehensive farm biosecurity system.

The modules represented by the spokes around the wheel are specific integrated activities designed to impact a particular issue, disease, or area of concern. Modules have been developed to address Johne’s disease, farm expansion, cattle welfare, bovine leukosis, beef quality/residue avoidance, mastitis, Salmonella, bovine lameness and bovine viral diarrhea. Modules addressing environmental pathogens and nutritional assessments are currently in the development phase. Module activities supplement the core management principles to achieve disease or issue specific goals.
Farm Evaluation and Herd Plan Implementation (Fig 3): The NYSCHAP Process

Each participating farm establishes a farm team for the purpose of assessing and implementing key control practices designed to address risk areas on the farm. The process involves the following steps:

- Establish the baseline herd health and production status
- Define the farm system and areas of concern
- Conduct the herd risk assessment and analysis
- Establish production or animal health targets
- Establish control strategies for the risk areas noted during the assessment
- Prioritize the control strategies and reconcile with available farm resources
- Establish and implement the herd plan
- Evaluate the herd plan and adjust as required
4) **Animal Health Information Warehouse (AHIW) - Animal health information integration, analysis, and epidemiological tools:** The AHIW is designed to provide the platform for the integration of data from the three component transactional databases. The AHIW is an Oracle(3) Data Warehouse consisting of a number of designated Data Marts constructed to filter and present the data in a form that is useful for establishing associations, trends, reports, and other useful animal health analyses. The stage is set to explore associations between animal health and production management practices on the farm and the predictive value of these measures for production or animal health outcomes. Validation of derived metrics and indices, as described in the results section will be initiated in budget year 2010-2011.
Results

Statewide comprehensive animal health data management:

The New York Animal Health Information System is the central informational tool for managing daily animal health transactions and for meeting emergency or outbreak needs. The transactional database was created by a team of experts from Trace First Ltd (4), a software development company with substantial background and experience providing animal health information systems and constructing integrated packaged tools that would meet the current and future needs of the production and animal health communities. Queries and reports support basic epidemiologic analytical functions that inform animal health decisions. Some of the tools include the generation of a virtual cohort of exposed animals, animal tracking and movement, animal restriction flags, outbreak mapping, and premises description information. Emergency contact information is also maintained within the system.

NYAHIS is the central integration point for the collection of data associated with the qualification and maintenance of status in disease control programs. The success of the system lies in the well designed architecture that reflects the structure of the animal production systems it models. Table relationships facilitate the collection and maintenance of key data and reports. The data relationships permit views and analysis with appropriate granularity, permitting the user to drill from the general to the specific. Applications are built on the core data and table structure within NYAHIS.

Specific examples illustrating the utility of NYAHIS in the support of animal health activities include:

**NYSCHAP:** This application is perhaps the best example of the utility of the NYAHIS system to support diverse animal health applications using the core data tables. This application is described in detail in the animal production unit section below. The application works offline supporting in-field data capture in remote areas.

**Avian influenza:** NYAHIS supports an application to receive delivery crate ID data, associate them with a time-date stamp and premises information, and create a biosecurity audit system. This ensures that crates are managed in a manner to prevent avian influenza from being introduced and amplified in the live bird marketing system, and subsequently infecting downstream poultry flocks. The application assists in the detection of the entry of unqualified birds or improper biosecurity. Breaches in biosecurity are signaled in real time.

**Chronic Wasting Disease (CWD) program:** NYAHIS supports an application to record visual and electronic ID to establish the mandatory annual inventory for qualification under the CWD captive cervid program. The application permits a download
of data from a prior visit to a local laptop/tablet PC so that the inventory can be completed on a remote PC or other data collection device. Any cervid ID expected, but not visually or electronically seen, is flagged as an exception. The system ensures that animals are either tested for CWD, legitimately moved as live animals or remain residents of the herd. The application works offline supporting in-field data capture in remote areas.

**CWD response:** The analysis of the spatial and temporal characteristics of the 2004 CWD outbreak in New York was facilitated significantly by the mapping and analytical tools provided in the NYAHIS. The program provided visual projections of the infected premises and surrounding land for an appreciation of the potential wildlife exposure. In addition, high risk exposure links were flagged using tracking functions in the database, permitting rapid assessment and resolution of the outbreak.

**Deer Tuberculosis response:** NYAHIS supported the emergency response to the 2008 tuberculosis outbreak in a captive deer farm in New York. It facilitated the identification of at-risk premises, dangerous animal movements, and potential at-risk adjacent farms and operations. It served as the centerpiece for the Incident Management System planning and response.

**Animal Disease Control Flags:** The NYAHIS provides the ability to flag records for restriction, including quarantine, permit, and other controls. This helps the administrative staff properly manage certificates of veterinary inspection, movement permits, and entry permits. It is a valuable aid to appropriate animal health management.

**Emergency contacts:** This utility permits notification of producer groups, veterinarians, trade associations and others of key information about animal health. Movement restrictions, disease risks and warnings, and situation updates have been issued using this utility. New York State continues to expand the use of this tool to disseminate timely information.

**Bulk Milk Tank Herd Health Screen:** A herd health screening system based on bulk milk tank samples has been created for the purpose of applying improved diagnostic tests on bulk milk tank samples for the detection of animal health issues in a herd, or monitoring progress of an animal health program. The NYAHIS bulk milk tank application notifies milk haulers to collect scheduled milk samples for analysis. The results are received from the UVIS laboratory system and integrated within the NYAHIS into a report for the producer’s use. The program is currently at the pilot stage, while capacity and capabilities are being built. Once established, it is anticipated that the system will be used to provide a quick,
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easily applied indicator of population level animal health status for infectious agents of animal health or public health concern. This system has a useful parallel as a surveillance tool in the event of a large scale or catastrophic animal health event where bulk milk tank samples may provide a readily available sensitive and accurate means of rapidly characterizing the extent or dissemination of an outbreak and permit the efficient assignment of response resources.

Universal Veterinary Information System (UVIS) - Animal laboratory diagnostic information management: The Animal Health Diagnostic Center at Cornell University has customized the UVIS transactional database to meet New York’s diagnostic needs. The UVIS database holds diagnostic accessioning and test results for animal populations within New York State. It supports diagnostic accessioning and reporting within the teaching hospital at Cornell University, private practitioner community, and the New York State Department of Agriculture and Markets’ animal health and surveillance programs. Selected diagnostic data collected and/or generated at the Animal Health Diagnostic Center is extracted and loaded into the Animal Health Information Warehouse for integration with other animal health data. The data in UVIS may be accessed by using developed reports or ad hoc queries that can be created using a browser-based business intelligence tool (Brio)(5) designed to work with Oracle Enterprise solutions.

NYSCHAP - Animal production unit health and production information management: The NYSCHAP program provides a framework to assist with herd management decisions for production and health. Over the 11 year period that NYSCHAP has been operational, more than 1300 of New York State's 5700 dairy farms have participated in the base program and one or more modules. The most popular module, in terms of participation, is the Johne's control program. The Johne's control program is particularly amenable to the NYSCHAP approach, since Johne’s control depends heavily on the implementation of herd health management principles that reduce the introduction and amplification of Mycobacterium avium ssp paratuberculosis (MAP) within the farm, and the reduction of exposure to susceptible groups on the farm. Nearly 56% of the farms (6) have demonstrated progress as measured by a reduction in prevalence of Johne’s disease in the cattle population employing this process. Participation in other modules is summarized (7) in Fig 4.
In a study on the impact of the NYSCHAP program, this systematic approach strongly influenced the adoption of animal health practices. The average percentage of management practices that were actually implemented in the 1999 study was 79%, indicating that the average farm implemented 13.4 of the advised measures. (8)

Each year, the NYSCHAP team conducts an annual review to help establish new goals, objectives, and health and production targets. A herd plan is then developed and implemented to achieve those goals. Laboratory capacity has been expanded to support this population-based program, an expansion which also supports an emergency surge capacity within the diagnostic laboratory system.

The NYAHIS has been an essential tool to manage the organization and analysis of NYSCHAP data. The initial NYSCHAP implementation was supported by a paper based data collection system. Recognizing the need for data management and analysis, an electronic solution was sought. A contract was established with Trace First Ltd (4) to build a field-centric data information application that would support the NYSCHAP program. The construction of an integrated, animal health information environment became a priority. An electronic herd health and production baseline survey was constructed for the purpose of measuring known or expected determinants of animal health and production. The survey instrument was adapted to a Microsoft Office (9) InfoPath data collection form that facilitated the integration of the data into the New
York Animal Health Information System via the NYSCHAP application. The Microsoft Office InfoPath product provides a platform for offline data capture and offers substantial flexibility for future changes in the survey instrument. A hard coded solution, by contrast, offered limited ability to accommodate future changes and conditions. The assessment tool provides a benchmark of important metrics that support animal health and production decisions on the farm. A performance history is maintained. The establishment of the survey and performance data in the NYAHIS facilitates the longitudinal comparison of outcomes within the herd. Problem areas are flagged for further investigation and correction in the subsequent herd plan.

New York Animal Health Information Warehouse (AHIW)
- Animal health information integration, analysis, and epidemiological tools:

Data from the transactional databases in the New York Animal Health Information Management Environment is sent to the data warehouse for higher level analysis and the production of integrated reports. The data in the AHIW may be accessed by using pre-designed reports or ad hoc queries via a browser-based business intelligence tool (Discoverer Plus) designed to work with Oracle Enterprise solutions. Several important reports have been developed in the effort to produce measures of progress, aggregate reports, and analyze performance over time. A summary of those measures follows:

Outcome Measurement
It is recognized that on-farm outcomes are the result of a number of variables that are hard to characterize or control completely. Attributing a response to individual management practices is risky, given the multifactorial nature of production and health. Consequently, New York State has established three distinct indices designed to capture trends in animal health, production, and preventive practices. These indices are then combined into a single index to characterize progress, or lack thereof, within an individual production unit. These indices are described briefly (Fig 5):

Herd Health Index: This index is a weighted value comprised of herd health metrics including somatic cell count, reproductive measures, individual disease cases, lameness cases etc.

Production Index: This index is comprised of production metrics including calving interval or 21 day pregnancy risk, milk production, etc. of how sensitive an operation is to an adverse herd event. It includes management practices, surveillance procedures, standard operating procedures (SOP’s) in place, training, management meetings etc. This index is important because it serves as an indicator of how vulnerable an operation is to an introduced infectious agent or other factor.

This information is generated within the data warehouse structure. Longitudinal analysis of individual parameters and collective indices
provide an additional perspective on the data. The granularity of the individual data elements that comprise these indices is retained for additional targeted analysis to determine the relative contribution of the measure to the production or animal health outcome. The higher level analysis of this data has not yet begun and will likely be the subject of research studies suggested by the data set. Most of the current analysis is descriptive in nature.

The current functionality of the data warehouse and its summary statistics is restricted due to recent changes in the source databases feeding the warehouse. A priority project to update the warehouse and include additional analytical tools is underway. Future studies will explore the validity of the herd indices in assessing a production unit’s animal health and production viability.
**Fig. 5 Composition of Derived Indices: Example Preventive Practice Index**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Index Value</th>
<th>Index Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Records</td>
<td>Y = +1 N= -1</td>
<td>6%</td>
</tr>
<tr>
<td>Herd Health Records</td>
<td>Y = +1 N= -1</td>
<td>6%</td>
</tr>
<tr>
<td>Animals Introduced to Premises - 5 yrs</td>
<td>Y = -1 N= +7</td>
<td>20%</td>
</tr>
<tr>
<td>Health Practices: Replacements or Additions</td>
<td>Vacc, Quarantine, Johne’s test, BVD test, Mastitis Cult each +1 None = -2</td>
<td>20%</td>
</tr>
<tr>
<td>Neonatal Calf Mgmt.</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Calving area used exclusively for calving</td>
<td>Y = +1 N= -1</td>
<td></td>
</tr>
<tr>
<td>Source of Colostrum</td>
<td>Pooled = -2</td>
<td></td>
</tr>
<tr>
<td>Colostrum Test Status</td>
<td>If either checked = +1</td>
<td></td>
</tr>
<tr>
<td>Initial Feeding</td>
<td>0-2 = +2, 3-4 = +1, 5-6 = 0, 7-12 = -1, &gt;12 = -2, Not Timed = -2</td>
<td></td>
</tr>
<tr>
<td>Qts. Colostrum Fed</td>
<td>4 or &gt; = +1, 3 = -1, 2 = -2, 1 = -3, 0 = -4</td>
<td></td>
</tr>
<tr>
<td>Bulls receive Colostrum</td>
<td>Y = +1 N= -1</td>
<td></td>
</tr>
<tr>
<td>Milk Source</td>
<td>Waste Milk = -2, Whole Milk = -1, Pasteurized Whole Milk = 0, Milk Replacer = +1</td>
<td></td>
</tr>
<tr>
<td>Calf Removed</td>
<td>0-4 = +1, 5-8 = 0, 9-12 = -1, 13-24 = -2, &gt;24 = -3</td>
<td></td>
</tr>
<tr>
<td>Dip Navel</td>
<td>Y = +1 N= -1</td>
<td></td>
</tr>
<tr>
<td>Employee Mgmt.</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Regular meetings</td>
<td>Y = +1 N= -1</td>
<td></td>
</tr>
<tr>
<td>Freq. of meetings</td>
<td>monthly or &lt;= +1, quarterly = 0, annual = -1, sporadically = -2</td>
<td></td>
</tr>
<tr>
<td>SOPs</td>
<td>Milking Protocol, Maternity Mgmt., Newborn Calf Mgmt., Calf/Heifer Mgmt., Treatment Protocols, Drug Usage all +1 each all others = 0 each, No = -2</td>
<td>20%</td>
</tr>
<tr>
<td>PPI Total</td>
<td>Sum of all metrics</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions and Clinical Relevance

The New York Animal Health Information Management Environment supports day-to-day animal health program operation, the application of controls, and the derivation of potentially useful summary statistics. Animal health indices may be considered in the same context as herd screening strategies. Indices that are inconsistent with established norms should prompt additional on-farm investigation to anticipate future problems, issues, or mitigation strategies. Overall this environment has:

- Demonstrated its utility as a resource to assist with the response to disease outbreaks, analysis of epidemiologically linked premises (dangerous contacts), and management of animal disease tracking, control efforts and strategies.
- Demonstrated the ability to accept automatically acquired data to support disease control programs.
- Generated data that suggest additional research questions, which are the subject of future targeted studies. This process offers the possibility that herd recommendations may be refined to produce desired animal health and production outcomes.
- Demonstrated that promotion of animal health and production goals at the local level supports state and national animal health goals at the global level.

Activities conducted to support the New York Animal Health Information Management Environment have generated the additional benefit of establishing positive working relationships between regulatory animal health officials, private veterinary practitioners, producers and the state diagnostic laboratory. These relationships result in an animal health support continuum that is useful to address endemic animal health problems and also strengthen the emergency response infrastructure. The NYAHIME ensures that regulatory veterinary medicine is an integral part of the agricultural community.

References:

1) 2009 New York State Agricultural Statistics
4) Trace First Limited. a:tek center, Edenvaveys Road, Armagh BT60 1NF Northern Ireland www.tracefirst.com
7) 2009 New York State Department of Agriculture and Markets Budget Story
ANIMAL HEALTH SURVEILLANCE AND INFORMATION SYSTEMS


REPORT OF THE COMMITTEE ON ANIMAL WELFARE

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R. Hughes, AR; Jamie S. Jonker, DC; Anthony P. Knight, CO; Daniel
A. Kovich, VA; Steve K. Laughlin, OH; Carolyn Laughlin, OH; Cathy
A. Liss, DC; Martha A. Littlefield, LA; Janet E. Maass, CO; John R.
MacMillian, AR; Gordon ‘Cobbie’ Magness, SD; Amy W. Mann, VA;
Chuck E. Massengill, MO; Terry R. Menlove, UT; Marshall Meyers, DC;
L. Devon Miller, IN; Dana M. Miller, VA; Sherrie R. Niekamp, IA; Sandra
K Norman, IN; Elizabeth J. Parker, DC; Kristine R. Petrini, MN; John R.
Ragan, MD; Herbert M. Richards III, HI; M. Gatz Riddell, Jr., AL; Nancy
J. Robinson, MO; Keith Roehr, CO; John R. Scamahorn, IN; Shawn
P. Schafer, ND; David D. Schmitt, IA; Dennis L. Schmitt, MO; Andy L.
Schwartz, TX; James L .Schwartz, WY; Dale F. Schwindaman, MD;
Shari C. Silverman, NJ; Philip Stayer, MS; Bruce N. Stewart-Brown,
MD; Paul L. Sundberg, IA; George A. Teagarden, KS; Robert M. S.
Temple, OH; Mary Kay Thatcher, DC; Kerry Thompson, DC; Bob Tully,
KS; Charles D. Vail, CO; Gary M. Weber, MD; Annette M. Whiteford, CA;
Norman G. Willis, CAN; Ellen M. Wilson, CA; Dennis J. Wilson, CA; Josh
L. Winegarner, TX; Nora E. Wineland, CO; Richard W. Winters, Jr., TX;
Michael J. Wood, VT; Ernest W. Zirkle, NJ.

The Committee met on October 14, 2009 at the Town and Country
Hotel, San Diego, Calif., from 8:00 a.m. to 12:00 p.m. There were 24
members and 43 guests present. Chair Amelita Facchiano was unable
to attend this year’s meeting and in her absence Co-Vice Chairs Ria
de Grassi and Carolyn Stull fulfilled the duties of the chair. Ms. de
Grassi reviewed the activities of the committee during and following the
2008 meeting in Greensboro, North Carolina. She acknowledged the
committee’s mission statement in her opening remarks and then referred
the committee members to the USAHA website to review in detail the
2008 Resolutions and the U.S. Department of Agriculture’s (USDA)
responses to those resolutions.
Reducing the Use of Antibiotics in Food Animal Production

Cathy Liss
Animal Welfare Institute (AWI)

Ms. Liss gave her report entitled Reducing the Use of Antibiotics in Food Animal Production. Her opening remarks included that 70% of antibiotics used in the United States are prophylactically fed to cattle, pigs, and chickens according to the Union of Concerned Scientists, while the Animal Health Institute estimates agricultural use for growth promotion to be 13%. By either account, Ms. Liss stated that the U.S. leads the world in the use of antibiotics in food animal production. She proposed that fortunately through the use of responsible, humane management practices, farm animals can be raised under conditions that obviate the need for prophylactic feeding of antibiotics. By increasing reliance on vaccinations, diligently monitoring animal health, and, most importantly, by phasing out stressful confinement housing systems that compromise animals’ immune systems and facilitate disease transmission, AWI’s own Animal Welfare Approved program is but one example (www.animalwelfareapproved.org) of raising farm animals by which producers can manage animal diseases without resorting to the indiscriminate use of antibiotics.

Directions and Focus of AVMA's Animal Welfare Division for 2010

Gail Golab, PhD, DVM, MACVSc (Animal Welfare), Head, Animal Welfare Division, American Veterinary Medical Association (AVMA)

Dr. Golab reported on anticipated AVMA activities for 2010 in fulfillment of its ongoing strategic goal to be “an advocate for and an authoritative, science-based resource on animal welfare.” Fulfillment of the goal was described as being collaborative (with the AVMA Animal Welfare Committee, Animal Welfare Division, and other AVMA leadership as principal players) and as focusing on four areas: policy development and implementation, veterinary education, international engagement, and some special projects. The AVMA approach to policy development is becoming more comprehensive with increased attention being paid to what the scientific basis is for animal care practices and to making specific recommendations on avoiding or managing of any adverse consequences for animals. Common options for implementation include public policy activities and stakeholder education; the former is moving away from a paradigm of being reactive (responding to others’ proposals) to being proactive (introducing proposals to address clearly identified concerns). Veterinary education in animal welfare is being addressed at three levels: students (lectures and opportunities for practical application), graduate veterinarians (CE AVMA meeting, state/allied group meetings), and specialization. In the international arena, AVMA’s focus is on improved engagement and communication. Once again the emphasis is on actively seeking out opportunities to share information and provide input, including participation in meetings and symposia. Special projects of the AVMA during the next 12 months include continued work on updating the
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AVMA Guidelines on Euthanasia (more than 70 experts involved) and an educational symposium to be hosted jointly with the Association of American Veterinary Medical Colleges (AAVMC) (November 9-11, 2009 at Michigan State University).

USDA-APHIS: Animal Care Program and Future Developments
Chester Gipson, DVM
Deputy Administrator, Animal Care, USDA-Animal and Plant Health Inspection Service (APHIS)

Public awareness and increased emphasis on animal welfare has given APHIS additional responsibilities. Those responsibilities have been delegated to the Animal Care (AC) unit, the unit within APHIS responsible for enforcing the Animal Welfare Act (AWA) and regulations and the Horse Protection Act (HPA) and regulations. To respond to the additional responsibilities, the AC unit was authorized to establish an Emergency Programs Unit and a Center for Animal Welfare to provide the critical leadership necessary to effectively carry out the new responsibilities. The focus of the newly established units will support the current mission of AC while using the unique expertise within AC. Animal Care’s Center for Animal Welfare will serve as the national resource for policy development and analysis, training, science, and technology in support of the AWA and the HPA; the Center will benefit both USDA and its stakeholders by providing essential technical information and educational programs. The Center’s activities align with APHIS Mission Priority 4: “Enhance the well-being of animals covered by the Animal Welfare Act (AWA) and the Horse Protection Act (HPA).” The long-term strategy is for the Center for Animal Welfare to be recognized as an OIE (World Organisation for Animal Health) Collaborating Center.

Hallmark in Retrospect
Jeremy Russell
Director of Communications and Government Relations, National Meat Association

Mr. Russell addressed the challenges of the largest meat recall in U.S. history by giving a presentation titled, Hallmark in Retrospect. He described the roots of this catastrophe going back to what people sometimes refer to as “the cow that stole Christmas”—the first cow in the U.S. detected with Bovine Spongiform Encephalopathy (BSE) on December 23, 2003. The reaction to that news was extreme. The incident had several long-term consequences, one of which—nearly five years later on February 17, 2008, was when Hallmark announced that it was voluntarily recalling approximately 143 million pounds of raw and frozen beef products. This recall was designated as Class II “due to the establishment’s noncompliance with regulatory requirements and the remote possibility that the beef being recalled could cause adverse health effects if consumed.” The measure that the USDA put in place was a ban
on all downer cattle entering the food supply. Mr. Russell acknowledged that there is a laundry list of things that went wrong at Hallmark. These things, such as using high pressure hoses and fork lifts to move downed animals, were illegal, reprehensible, and should have been caught by the company management and/or the government inspectors. Subsequent to the recall, both the industry and the inspection process were exonerated by a USDA Office of Inspector General (OIG) audit that concluded “that the events that occurred at Hallmark were not a systemic failure of the inspection processes/system.” The problem was Hallmark employees breaking the rules, not the rules themselves or how they are enforced. In the end, about 6 percent of the product was reported recovered by the establishment, which is a high recovery rate for any recall. Mr. Russell reported that the recall happened because Hallmark broke the rules and there was no way to prove that the animals involved did not have BSE. Since the Hallmark recall, several slaughter operations have installed video surveillance technology at their operations to monitor animal handling. Mr. Russell assured the committee that National Meat Association will continue to support the industry on the production and dairy side, through excellent quality assurance programs.

Lessons Learned from California’s Proposition 2
Ryan Armstrong
Owner/President, Armstrong Egg Farms

Mr. Armstrong gave an egg farmer’s perspective on the “lessons learned” from California’s Proposition 2, which was a citizen’s initiative to restrict the housing practices of laying hens, veal calves, and gestating sows. Mr. Armstrong recounted his role in the progression of Proposition 2, including participating in many interviews and editorials prior to the election. He acknowledged that the consumers do have concerns for animal welfare issues and that farmers must continue to produce food with increased restrictions that aren’t always science based. He also described the difficulty for the farmers in the specific interpretation of the initiative’s language in order to comply with the regulations, along with the economic impact of these potential changes on his family’s egg business. Many questions and concerns were heard from committee members following his presentation.

Regulating Livestock and Poultry Care at the State Level: Michigan and Ohio
Steven Halstead, DVM
Michigan State Veterinarian, and
Tony Forshey, DVM
Ohio State Veterinarian

Drs. Halstead and Forshey jointly addressed the topic, Regulating Livestock and Poultry Care at the State Level: Michigan and Ohio. Dr. Halstead described the recent interaction with The Humane Society of the
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United States (HSUS) and legislative activities in Michigan concerning the introduction of House bills 5127 and 5128 that focused on the development of food animal industry derived standards and the initiation of third-party audits on farms throughout Michigan. The pork and egg industries supported a substitute House bill for 5127, which the Governor signed on October 12, 2009. This bill eliminates within 10 years gestation stalls for sows, grants the provision of 1.0 sq. foot of space per laying hen, and eliminates veal crates within three years. Additionally, enforcement will be the responsibility of the Michigan Department of Agriculture through civil courts. In review of this series of events, Dr. Halstead asked the membership to consider the following questions: is an approach similar to that in the initial Bill package (and also being modeled by Ohio) viable? Considering The HSUS involvement, there is a sense that the livestock industry was forced to arrive at this outcome rather than lead the discussion and implementation of livestock welfare protective legislation. How does livestock agriculture regain the initiative and leadership?

Dr. Forshey described the proactive approach of the State of Ohio to support State Issue 2 to create the Ohio Livestock Care Standards Board, a statewide board to set guidelines for food animal care. State Issue 2 was placed on the ballot through a joint resolution passed by a majority in the Ohio House and Senate; the Ohio voters will vote on November 3, 2009. The endorsements for Issue 2 include the Ohio Veterinary Medical Association, Ohio Grocers Association, and the Ohio Restaurant Association among others. The Board will be comprised of 13 Ohioans and assure Ohio families of a safe, locally grown food supply, excellent care of the state's flocks and herds, and reinforce consumer confidence in Ohio- raised food.

New York State Cattle Health Assurance Program
Kathy Finnerty
New York State Cattle Health Assurance Program (NYSCHAP)
Coordinator, and
Belinda Thompson, DVM
Cornell University

The presentation highlighted the requirements and achievements of the integration of dairy welfare certification into the NYSCHAP. The NYSCHAP includes many educational modules for cattle producers including topics such as calf pen management, vaccination programs, Johne's disease, culling, lameness, and cattle welfare. The requirements of the program include training of employees, facility and animal assessments, third party veterinary verification, and written standard operating procedures for areas such as non-ambulatory cattle, elective surgical procedures, euthanasia, cattle handling, hospital/sick cattle, newborn calves, and emergency management plans. The program consists of an annual herd health plan with the involvement of the herd veterinarian. The program is a voluntary and confidential program for
Committee Business:
The business meeting followed the last presentation. Two resolutions were considered. The first Resolution sought USAHA’s support of the AVMA’s August 2009 Response to the Final Report of the Pew Commission on Industrial Farm Animal Production; the resolution passed. The second Resolution requested USAHA’s support for the continued development of the Center for Animal Welfare at USDA and for USDA-APHIS’s leadership to serve as a national resource for policy development and analysis, to develop training, science, and technology on animal welfare topics, to be recognized as a collaborating center for OIE and other international entities, and to continue to enhance the well-being of animals covered by the AWA and the HPA. The Resolution passed; however, committee members Cathy Liss and Charles Vail, DVM, abstained. The Resolutions were forwarded to the Committee on Nominations and Resolutions for review.
The Committee met on October 11, 2009 at the Town and Country Resort in San Diego, Calif., from 12:30 to 4:30 p.m. There were 16 members and 15 guests present. The Committee session opened with introduction of chairs Kevin Snekvik and Andrew Goodwin, followed by presentations.

**Update on the VHS qRT-PCR**

Dr. Beverly Schmitt  
National Veterinary Services Laboratory (NVSL), USDA-Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Canadian Assay and Cornell Laboratory quantitative reverse transcriptase polymerase chain reaction (qRT-PCR) has been evaluated by the National Veterinary Services Laboratory (NVSL), but there are not currently enough samples for full validation. If validation can be worked, it would be appropriate for use. NVSL needs input on if the Canadian qPCR (detects multiple strains but lower sensitivity) or the Cornell assay (detects specifically viral hemorrhagic septicemia strain IVb at a higher sensitivity) would best fit the current need. The Canadian assay is currently a two-step PCR, but NVSL attempting to convert to one-step PCR.

It was strongly recommended the utilization of a technical working group consisting of stakeholders to help determine the fit for purpose of the PCR assay.

The new NVSL is complete and was moved into in the end of August.
Update on the interim Viral Hemorrhagic Septicemia (VHS) Federal Rule:
Dr. Gary Egrie
USDA-APHIS-VS

The Interim Rule was published September 9, 2008, with the effective date initially set for November 10, 2008. On October 28, implementation was delayed 60 days (January 10, 2009) to allow for comments to be addressed. On January 2, 2009, implementation delayed indefinitely.

VHS Public Comments - What we Heard:
• Length of time that testing results from nonsecure water sources would be valid is too short
• 72-hour visual inspection
• Validity of interstate certificate of inspection
• Availability and cost of services
• Proscriptive methods for water treatment
• Requirements to test fish going to live fish markets

The indefinite delay is attributed to:
• Wide range of positions from stakeholders across the country
• Difficult to find middle ground that still accomplishes the intent of the Federal Order
• We desire to publish a reasonable, scientifically valid, implementable rule
• Federal Order remains in effect

Next steps include:
• Publish a proposed rule incorporating what we heard in the comments
• Proposed rule
  o Will have performance standards
  o Be more flexible
  o Allow VS to respond more quickly

APHIS Aquaculture Program Updates:
Dr. Gary Egrie

A significant amount of VHS surveillance has been conducted from 2007 to present. There was an increase in surveillance outside of the Great Lakes States in FY 2010, and an increase in the flexibility of the cooperative agreements. APHIS continues to coordinate education and outreach activities with Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Agency (NOAA).

National Aquatic Animal Health Plan (NAAHP)
Dr. Gary Egrie

The NAAHP was drafted by the National Aquatic Animal Health Task Force – led by APHIS-VS, the U.S. FWS, and National Marine Fisheries Service, par of NOAA. The plan includes:
• PURPOSE – To provide a framework for how APHIS, FWS, and NOAA should develop programs for diseases that affect
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the health of aquatic animals (finfish, crustaceans, and mollusks)

• STATUS – Notice of availability was published in the Federal Register on August 21st and will be open for public comment period through October 2009
• NAAHP is not a regulation, it is a roadmap for how Federal agencies will work together to protect aquatic resources.
• NAAHP provides general principles and guidelines for how the U.S. Federal agencies with jurisdiction over aquatic animal health should take action to protect farmed and wild resources, facilitate safe commerce, and make available laboratory testing, training, and other programs as needed to implement the NAAHP

Three primary recommendations have been developed:
• Create a National Advisory Committee
• Develop a national aquatic health laboratory network
• Develop a secure information system

NAAHP Secure Information System
Dr. Gary Egrie

The NAAHP Secure Information System is being initiated this fiscal year. It is intended to provide States, Tribes, industry, the Federal Government and other stakeholders with the tools necessary to:
• Support reporting of aquatic animal diseases
• Protect aquatic animal resources
• Support movement and certification documentation
• Produce reports, maps, and other documentation for surveillance and disease management purposes

National Animal Health Reporting System (NAHRS) update:
Dr. Jerry Heidel
USDA-APHIS-VS

NAHRS is working on a list of aquatic animal diseases. In efforts to standardize lists of aquatic pathogens, the list within the NAAHP will be utilized as a guideline.

NAHRS is also working on case definitions for diseases, which includes efforts to synonymize the Blue book and OIE will provide case definitions and harmonizing test protocols.

Aquatic Animal Diagnostic Laboratory Network:
Dr. Kevin Snekvik
Washington State University

Background on recent developments regarding the desire by university, state, federal and private laboratories involved in aquaculture disease diagnosis to form a laboratory network for disease diagnosis and surveillance. The USDA provided a survey to laboratories involved in
aquaculture testing in order to get information regarding interest in being involved in aquaculture testing. The following numbers are derived from the survey:

<table>
<thead>
<tr>
<th>Total number of laboratories that received request</th>
<th>81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of laboratories that responded</td>
<td>54</td>
</tr>
<tr>
<td>Number of laboratories interested</td>
<td>35</td>
</tr>
<tr>
<td>Number of laboratories not interested</td>
<td>19</td>
</tr>
<tr>
<td>Laboratories that have not responded</td>
<td>27</td>
</tr>
<tr>
<td>Interested laboratories actively testing for path.</td>
<td>20</td>
</tr>
</tbody>
</table>

This included USFWS Fish Health Centers and USGS.

Benefits of a laboratory network include:

- Uniform Testing SOP’s across the U.S.
  - Laboratories
  - USDA-APHIS
  - NVSL
- Better trained staff within laboratories
- Assay development (interlaboratory test evaluation)
- Disease prevalence/ Freedom

Development of Draft Laboratory Network Plan

- 2008 USAHA-AAVLD Funding Resolution
- NAAHP Completion
- USDA Webinars with NAHLN, NPIP, National Plant Pathogen Network, AVMA
- Draft Plan Development Process
  - Goodwin/ Snekvik
  - USDA, USFWS, NOAA Fisheries
  - USAHA-AAVLD Aquaculture Committee
  - Network Discussion Group (Friday)

Dr. Andy Goodwin covered the draft aquaculture laboratory network plan developed by the Co-chairs and modified by the subcommittee on the laboratory network. The document is included following this report.

Committee Business

Kathy Kurth proposed a Resolution entitled, “Federal funding for an aquatic animal laboratory network”. The motion was seconded by Dr. Ehlenfeldt. Agreement on the wording was reached by the committee. A vote was taken and there was unanimous approval of the Resolution by the Committee.

Dr. David Scarfe proposed a Resolution entitled, “Implementation of the national aquatic animal health plan.” Agreement on the wording was reached by the Committee. A motion to vote was put forth by Dr. Scarfe and seconded by Dr. Heidel. A vote was taken and there was unanimous approval of the resolution by the Committee.
1) Purpose of the Network

Purpose of the Laboratory Network: To protect the health of wild and cultured fish and shellfish, to provide quality testing in support of interstate and international trade, and to meet challenges associated with implementation of the National Aquatic Animal Health Plan.

2) Principles of the Network

a) All State, Federal, academic, extension and private laboratories that meet the qualifications detailed in Section 4 will be eligible to participate in the Network.

b) Participating laboratories will all use standardized protocols for the detection of pathogens important in interstate and international trade and to the natural aquatic resources of the nation, or included in the NAAHP. These protocols will include pathogen detection, calibration and operation of all relevant equipment, and the collection, handling, transport, storage, and preparation of samples for testing.

c) Participating laboratories are free to choose which NAAPTN tests they will offer. There is no requirement for laboratories to offer all NAAPTN tests.

d) Laboratories must have an established Quality Assurance (QA) system, a quality manager and document control system, must provide written documentation that the system is followed, and provide this documentation for annual review by APHIS, USFWS, or NOAA.

e) Participating laboratories will have qualified personnel to conduct or supervise the specific assays for the detection of aquatic animal pathogens and are able to recognize new or emerging pathogens.
that may be of importance for aquatic animal health, public health or trade purposes.

f) Results from the NAAPTN laboratories will be recognized by the co-competent US authorities for aquatic animal health (APHIS, NOAA, and USFWS).

g) Participating laboratories must be appropriately equipped to conduct those assays.

h) Network laboratories will have adequate biosafety and biosecurity in place to ensure employee safety and pathogen security.

i) There will be a reporting system in place to provide the information necessary for implementation of a comprehensive NAAHP, but that will also appropriately protect the confidentiality of those that submit samples to a network laboratory.

j) To maintain competency and to reduce inter-laboratory variability, laboratories will participate in an annual training event for new lab personnel, and training events scheduled to support the implementation of new NAAPTN assays.

k) That standardized reagents will be made available to Network Laboratories as appropriate.

l) Participating laboratories must pass NAAPTN proficiency testing to remain in the network.

m) When suspect positive test results are obtained, participating laboratories will forward samples to other Network Laboratories or NAAHP approved reference laboratories for confirmation of the positive test result.

3) The Trial Period

Rather than attempt to establish a NAAPTN in a single step, the Program will begin with a trial period. The goals of this period will be:

a) to establish a collaborative structure to develop standardized protocols;

b) to gain experience in the communicating those protocols;

c) to develop methods to insure laboratory compliance;

d) to develop standardized reference materials for lab use;

e) to develop proficiency testing samples for labs;

f) to develop mechanisms for collecting lab results;

g) to determine test accuracy and sensitivity among laboratories;

h) to determine the need for formal centralized training of laboratory personnel; and

i) to establish a mechanism to validate future pathogen screening methodology.

4) Qualified Laboratories for the Trial Period

a) For the trial period, a minimum of 10 labs will be included, but more laboratories would be desirable if sufficient funding is available. A mix of private, state, University, and federal laboratories will be selected by the NAAPTN Committee based on the following criteria:

i) experience in aquatic animal pathogen testing and a
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demonstrated interest in regulatory aquatic animal testing;
ii) a written letter from the appropriate State official or co-
competent authority (APHIS AVIC, USFWS, or NOAA)
supporting the laboratory’s participation in the pilot and full
NAAPTN;
iii) a Quality Assurance (QA) system that includes a quality
manager appointed member of staff who, regardless of other
duties and responsibilities, shall have defined responsibility
and authority for ensuring that the quality system is
implemented and followed at all times;
v) a document control system that will ensure that only the
current version of a correct document is in use in the
laboratory, and that the documents needed for staff to
perform their work are available at the work location;
v) equipment needed to do cell culture and PCR procedures
required by NAAPTN protocols; and
vi) laboratory space with appropriate biosafety for sample
handling, processing and testing capacity for network
purposes (as required by APHIS).

b) After the trial period, laboratories that meet the following criteria
will be eligible for full NAAPTN:
i) Nomination by their official State agency for aquatic animal
health, APHIS, NOAA, or USFWS;
ii) A letter of support from their APHIS AVIC, NOAA, or
USFWS;
iii) Implementation of an appropriate formal MOU with APHIS
that will describe acceptable use of any funds or materials
provided by APHIS and provide a formal agreement by the
NAAPTN lab to fully comply with the requirements of the
NAAPTN; and
iv) Review and approval by the NAAPTN Committee.

NAAPTN laboratory participation is reviewed on an annual
basis, and continued participation is granted based on:
i) Full reporting of all required data to the NAAPTN office;
ii) A passing performance on NAAPTN proficiency tests (if
proficiency is below standards, approval may continue
based on the development and implementation of a plan for
corrective action); and
iii) Continued compliance with NAAPTN eligibility requirements.

5) Laboratory Responsibilities
a) During the trial period, participating NAAPTN laboratories must:
i) Send at least one laboratory employee to an initial training
session organized by the NAAPTN that will include both
assay performance and record keeping requirements;
ii) Perform all proficiency tests required by the NAAPTN;
iii) Perform assays on other samples provide by the NAAPTN;
iv) Follow the approved NAAPTN protocols for all NAAPTN
testing; and
v) Report all results to the NAAPTN office in a timely manner.
b) For the full NAAPTN, laboratories must:
   i) Participate in NAAPTN mandated training;
   ii) Follow the approved NAAPTN protocols for all NAAPTN testing;
   iii) Report all results to the NAAPTN office in a timely manner;
   iv) Perform all proficiency tests required by the NAAPTN; and
   v) Perform assays on other samples provided by the NAAPTN as part of the development of protocols for new NAAPTN pathogens.

6) Development of Test Protocols
a) For the trial period, protocols will be developed only for VHSV and will include both a cell culture-based screening test / PCR confirmation protocol sufficient to support international trade and a quantitative PCR protocol for consideration as an alternative screening test for VHSV.

b) For the full NAAPTN, protocols will be developed for pathogens that meet any of the following criteria (in order of priority):
   i) OIE listed pathogens needed to support export markets;
   ii) Pathogens listed in the NAAHP;
   iii) Other pathogens important for interstate trade or the protection of natural aquatic resources;
   iv) Other pathogens important for export; or
   v) Emerging pathogens.

c) Protocols to be developed under the NAAPTN in accordance with Chapter 1.1.2 Principles of Validation of Diagnostic Assays for Infectious Diseases, OIE Manual of Diagnostic Tests for Aquatic Animals, 2006 in order to meet the following goals:
   i) Acceptable for trade and protection of natural aquatic resources (sensitivity, accuracy);
   ii) Standardized reagents available;
   iii) Greatest possible standardization to reduce costs (especially applicable when testing for multiple pathogens that can share a common testing pathway); and
   iv) Least possible expense consistent with i and ii above.

d) Protocols will be developed by a NAAPTN Sub-Committee.

7) Roles and Responsibilities
a) APHIS
   i) As part of the trial NAAPTN:
      (1) Establishing cooperative agreements with each participating laboratory to provide funding as described in Section 8.a.;
      (2) Provide other funding for the development of the NAAPTN as described in Section 8.a.;
      (3) Appoint an additional member to the NAAPTN protocol development sub-committee;
      (4) Provide positive and negative tissue samples for virus isolation of VHSV for proficiency testing of NAAPTN laboratories;
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(5) Provide any required VHSV standards to NAAPTN laboratories;
(6) Ensure the availability of approximately 100 VHSV known VHSV-positive and 300 negative qPCR test samples for participating laboratories. The positive samples may be any fish species but must be suitable for use in the NAAPTN VHSV protocols and should be from populations that may reasonably be expected to harbor VHSV;
(7) Collect all proficiency and testing data from NAAPTN laboratories, analyze that data to describe laboratory and assay performance, report the findings to the NAAPTN Committee;
(8) Conduct an on-site inspection of participating non-federal laboratories to insure compliance with NAAPTN guidelines; and
(9) Recognize VHSV test results from NAAPTN laboratories as sufficient for APHIS endorsement of export health certificates, recognizing that individual importing countries may have their own specific requirements.

b) USFWS

i) For the trial NAAPTN:
(1) Fulfill its role on the USFWS/AFS-FHS Joint Inspection Committee;
(2) Conduct an on-site inspection of participating USFWS laboratories to insure compliance with NAAPTN guidelines;
(3) Serve on the protocol development sub-committee;
AQUACULTURE

(4) Serve on the full NAAPTN committee; and
(5) Recognize test results from NAAPTN laboratories as sufficient for export certification.

ii) For the full NAAPTN:
(1) Fulfill its role on the USFWS/AFS-FHS Joint Inspection Committee;
(2) Serve on the protocol development sub-committee;
(3) Serve on the full NAAPTN committee; and
(4) Recognize test results from NAAPTN laboratories as sufficient for export certification.

NOAA
i) For the trial NAAPTN:
(1) Fulfill its role on the USFWS/AFS-FHS Joint Inspection Committee;
(2) Conduct an on-site inspection of participating NOAA laboratories to insure compliance with NAAPTN guidelines;
(3) Serve on the protocol development sub-committee;
(4) Serve on the full NAAPTN committee; and
(5) Recognize test results from NAAPTN laboratories as sufficient for export certification.

ii) For the full NAAPTN:
(1) Fulfill its role on the USFWS/AFS-FHS Joint Inspection Committee;
(2) Serve on the protocol development sub-committee;
(3) Serve on the full NAAPTN committee; and
(4) Recognize test results from NAAPTN laboratories as sufficient for export certification.

d) NAAPTN Committee:

i) Composition: For the full NAAPTN the NAAPTN Committee will be composed of one representative from each NAAPTN laboratory, the co-chairs of the NAAPTN protocol development sub-committee, the APHIS and NOAA members of the NAAPTN protocol-development committee, and an industry representative chosen by the NAA. For the trial NAAPTN, the committee will be composed of the co-chairs of the USAHA/AAVLD Aquaculture Committee, and the non-NAAPTN lab representatives described in 7.d.i.

ii) Duties
(1) Final approval of protocols developed by the protocol sub-committee;
(2) Approval of laboratories for participation in the NAAPTN and the trial NAAPTN;
(3) Annual re-approval of laboratories for participation in the NAAPTN;
(4) Identification of pathogens to be included in the NAAPTN; and
(5) Provide an annual report of NAAPTN activities to stakeholders.

e) NAAPTN Protocol sub-committee:
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i) Composition: The NAAPTN protocol sub-committee will be composed of the members of the USFWS/AFS-FHS Inspection Protocol Committee (including the NOAA and APHIS members), an additional representative appointed by APHIS, and the chair(s) of the NAAPTN Committee.

ii) Duties
   (1) Development of protocols as needed in support of the NAAPTN;
   (2) Annual evaluation of test performance data from NAAPTN labs; and
   (3) Annually recommending to the NAAPTN Committee adoption, continuation, withdrawal, or revision of NAAPTN protocols.

8) Funding
   a) APHIS responsibilities during the trial NAAPTN:
      i) Through cooperative agreements with participating laboratories, APHIS will fund:
         (1) Testing expenses calculated by multiplying the required number of tests for NAAPTN participation by the normal charges per test (based on the unsubsidized commercial rate).
         (2) An additional $5,000 to each participating laboratory to cover set-up and administration costs associated with switching to NAAPTN protocols.
            (a) Funding for all laboratories will be an identical amount (as long as all trial obligations are met).
            (b) APHIS will cancel, at their discretion, cooperative agreements with laboratories that fail to meet reporting deadlines or that fail to pass an on-site inspection by APHIS, USFWS, or NOAA.
      ii) APHIS will also fund:
           (1) Travel expenses for the protocol development committee;
           (2) A training meeting for NAAPTN representatives;
           (3) Actual travel expenses for those attending the training;
           (4) Development and shipping of proficiency testing samples;
           (5) Development and shipping of additional samples described in 7.a.i.6;
           (6) Collection, analysis, and reporting of lab performance data to the Committee; and
           (7) A meeting of the trial NAAPTN Committee at the end of the trial period.
   b) APHIS funding responsibilities during the full NAAPTN:
      i) NAAPTN laboratory costs associated with validation of new assays per 5.b.;
      ii) Travel expenses for the protocol development committee;
      iii) Required training and travel for NAAPTN representatives;
      iv) Development and shipping of proficiency testing samples;
AQUACULTURE

v) Development and shipping of additional samples described in 7.a.i.6;
vi) Collection, analysis, and reporting of lab performance data to the Committee; and
vii) A meeting of the trial NAAPTN Committee at the end of the trial period.
c) Participating NAAPTN Laboratory fiscal responsibilities during the trial NAAPTN:
i) All expenses not included in 8.a.
d) Participating NAAPTN Laboratory fiscal responsibilities during the full NAAPTN:
i) All expenses not included in 8.b.

9) Implementation of the Full NAAPTN
a) At the end of the NAAPTN trial, a meeting of the NAAPTN Committee will be held to decide if full implementation of the NAAPTN is appropriate.
b) If the committee does advise implementation, it will also make any necessary revisions to the program structure.
c) As new diseases are added to the NAAPTN, the NAAPTN system will replace the current “APHIS Approved Protocols” system as testing recognized by APHIS for export health certification purposes or surveillance.
d) The full NAAPTN will be implemented as described in this document, with any revision required (9.b), contingent on the availability of funding.

10) Continuation of the NAAPTN
a) At an annual meeting, the NAAPTN committee will decide to continue or revise the NAAPTN.
b) If revision is required, such changes will be made by the committee.
c) Continuation is contingent on the availability of funding.
The Committee met on October 2, 2009 at the Town and Country Hotel, San Diego, Calif., from 7:00 p.m. to 10:15 p.m. There were six members and 4 guests present. Chair Bob Pitts called the meeting to order. He introduced himself as a long time member of the committee, one involved in vaccine research, production and testing for 4 years, Vice President of Quality Assurance and Regulatory Affairs at Bioniche Animal Health USA, Inc. for 18 years and an individual committed to quality animal health. The Committee had everyone introduce themselves. Chair Pitts expressed pleasure at the turnout and interest. The Vice-Chairman position is vacant and applicants were encouraged. The committee Mission Statement was reviewed: “The purpose of the Biologics and Biotechnology Committee is to monitor 1) new development in veterinary biologics, 2) regulation of the manufacture, distribution and use of veterinary biologics, and 3) needs of the livestock industries for new biological products. The Committee has the responsibility of keeping abreast and advising USAHA of new biotechnology, products and regulations that may have profound economic implications on animal health. Further, the Committee provides a forum to focus on issues and developments in the field of biotechnology that are designed to provide protection to man, animals and the environment.

The Chair recognized the participation by key USDA personnel and thanked them for accepting speaker roles. Dr. Hill and Dr. Whipple had been scheduled as speakers but both were called back to Ames unexpectedly. Dr. Rippke and Dr. Kehrli, respectively, presented for them.

APHIS-VS-Center for Veterinary Biologics (CVB) Program Updates and Issue Discussion
Dr. Byron Rippke
Director of CVB-Licensing and Policy Development (LPD)

Dr. Rippke told the members about the successful move into the new facilities at the National Centers for Animal Health (NCAH). This $460 million project is proceeding well. The Combined Service Plan involves...
286 support personnel with the goal of providing support activities to CVB, NACS, USDA Agriculture Research Service (ARS), and National Veterinary Services Laboratory (NVSL). It was noted that operational expenses (utilities, etc.) were again not included in the budget. The electric bill was over $5 million. The compliance in the new facilities with the Select Agent Program is an important and big project.

He showed the current APHIS organization chart that now includes an informational section with John Picanso as the Chief Information Officer reporting to Dr. Clifford.

The Strategic Vision for 2015 plan was discussed and the formation of four working groups to help implement it. The One Health Group is formed and active and the other three are in various stages of formation. It is their intention to synthesize their recommendations to assure they meet regulatory, budget and technological requirements. CVB is seeking stakeholders to provide input to this plan.

With changing disease situations, CVB is adjusting their approach to such diseases as Bovine Tuberculosis and Bovine Brucellosis. Position papers are available on their web site.

In 2008 CVB asked for $16.6 million but was given $12.63 million. In 2009, they asked for $16.92 million and got $14.51 million. In 2010 they asked for $17.325 million. CVB continues to handle 4,462 submissions, issue 55 new licenses released 13,868 serials of product with limited personnel and limited budget. User Fees are being considered and may be implemented in the next few years. The vacancy situation is:

Reviewers - 5 vacancies out of 17 positions
- Specialists – 8 out of 16
- Epidemiologists – 1 out of 2
- Statisticians – 1 out of 5
- Laboratory VMO/Micro – 8 out of 18
- Techs – 8 out of 28
- Section Leaders – 1 out of 10
- Ast/Assoc Dir. – 1 out of 2
- Support Staff – 5 out of 35
- Info Management – 7 out of 35

Influenza H1N1 seed lots were made and distributed to vaccine manufactures in a well thought-out activity to expedite any new vaccines. An expedited Conditional License approach is also available.

CVB has also been active in a coalition concerning pre-harvest interventions with E. coli O157 in cattle. A Conditional License was issued this year to one manufacture.


In a cost and time-saving move, the annual Public Meeting scheduled in the spring of 2010 was cancelled.
Creating the New NADC: A Progress Report
Dr. Marcus Kehrli, Jr.
National Animal Disease Center (NADC), Virus and Prion Diseases

Dr. Kehrli presented this for Kurt Zuelke, DVM, PhD, NADC Director and Diana L. Whipple, NADC Deputy Director, who were unable to attend.

This past year has been quite eventful at NADC with the successful relocation from our 48-year-old research facilities into the new Combined Laboratory Facility of the National Centers for Animal Health that now co-houses NADC of the Agricultural Research Service, and CVB and NVSL of APHIS. The move was 95% completed the first week of September. Plans were put into place and successfully executed to maintain research efforts at the NADC with minimal interruption. The new research laboratories are now operational and they work very well to support our research programs. Our focus now is to strategically position NADC’s research capacity to address the most critical animal health research needs of the U.S. livestock industries. We continue to maintain our science-based, customer-focused, and forward-looking research capacity that will enable NADC to diversify and increase our funding base and synergize opportunities in the new facilities with our APHIS colleagues. Our research mission will continue to be aligned with the USDA priorities of 1) International food security by maximizing U.S. animal health to assure international market access; 2) Sustainable opportunities for economic growth and prosperity for rural communities and producers by developing effective disease detection and control technologies for cost-effective livestock production; 3) Assure a safe and wholesome food supply by decreasing pathogen prevalence among livestock and the impact of food borne pathogens; 4) Protecting animal and human health through cutting edge research to deliver next generation diagnostics, vaccines and other novel disease intervention strategies. This past year we also made strategic decisions to reduce scientific staff to address pressing financial issues associated with operation of new and old research facilities and as part of this, we reorganized the NADC scientific staff around key scientific themes into the following 4 research units: 1) Ruminant Diseases and Immunology Unit, 2) Infectious Bacterial Diseases Unit, 3) Food Safety and Enteric Pathogens Unit, 4) Virus and Prion Disease Unit. Our business plan for the future is to re-grow our critical mass of scientists as operational costs decrease with the decommissioning and demolition of our old facilities. A couple research highlights for this past year include the research conducted with the novel 2009 (A/H1N1) pandemic virus that we conducted in pigs that has demonstrated the pathogenesis of the pandemic virus in pigs and that pork from pigs that recover from this virus is safe to handle and eat as the virus is only isolated from respiratory tract tissues during the acute stages of the disease and pigs quickly recover from the infection and no longer shed virus. We also were able to establish the efficacy of commercial vaccines against this novel virus should the virus become established in U.S. pigs. In addition, this
past year NADC scientists organized and participated in the 2009 ARS Metagenomics Conference.

Influenza Research Update
Dr. Marcus Kehrli, Jr.,

The following researchers were recognized as part of the Influenza team: Amy L. Vincent, DVM, PhD, Alessio Lorusso, DVM, PhD, Janice Ciacci-Zanella, DVM, PhD, Eraldo Zanella, DVM, PhD, Kelly A. Lager, DVM, PhD, Kay S. Faaberg, PhD, Marcus E. Kehrli, Jr., DVM, PhD* Swine and Prion Diseases Research Unit, National Animal Disease Center, USDA-ARS, Ames, IA.

Soon after the emergence of the H1N1 virus in April 2009, ARS scientists at the National Animal Disease Center in Ames, Iowa, began research using virus samples provided by the Centers for Disease Control and Prevention (CDC). Our immediate attention went to developing 2 differential diagnostic tests (one RT-PCR and one gel-based RFLP) based on the novel matrix gene present in the pandemic virus, this work was completed the same day (01May09) that we began inoculating pigs in a pilot pathogenesis study. We also designed a larger pathogenesis/transmission study that began shortly thereafter. The first pig studies were designed to evaluate whether the novel 2009 (A/H1N1) pandemic virus would infect, cause disease in and transmit between pigs; these two separate studies quickly answered this question and the pandemic virus strains tested were confirmed to be pathogenic in and transmissible between pigs. As part of these pathogenesis studies, it was confirmed that 2009 (A/H1N1) pandemic influenza virus was only isolated from tissues associated with the respiratory tract in acutely infected pigs and that pigs quickly recover from the infection and the virus was no longer able to be isolated. Next our focus was whether current U.S. H1N1 swine influenza vaccines can protect pigs from infection with the 2009 H1N1 influenza virus circulating in people. Our research also evaluated whether pre-existing titers in pigs previously infected with endemic H1N1 swine influenza viruses circulating in the U.S. pigs could protect against the 2009 (A/H1N1) pandemic influenza virus and it was found that pigs that had recovered from a circulating endemic swine influenza virus appear to have substantial cross-protection against subsequent challenge with the pandemic virus. Finally, three commercial vaccines were selected for efficacy testing against the pandemic virus based on serological cross-reactivity of vaccine antisera in a hemagglutination inhibition assay using 2009 A/H1N1 influenza viruses isolated from persons in California, New York, and Mexico. Results showed that in spite of limited cross reactivity against the new 2009 A/H1N1 influenza viruses the 3 vaccines tested each provided significant protection against lung lesions in pigs challenged with a 2009 (A/H1N1) pandemic influenza virus. The most optimal protection was seen with an inactivated vaccine made from the homologous pandemic virus. Importantly, none of the vaccines tested
caused disease enhancement in the lungs as is sometimes observed when the challenge virus is a mismatch with the vaccine virus strain. We have also tested experimental MLV vaccines and will continue research to develop new vaccines that afford the best degree of heterologous protection possible.

**Nanotechnology-based Detection and Diagnostic Tools for Livestock Pathogens**

Dr. John Neil
National Animal Disease Center, Microbiologist in Ruminant Diseases

Historically, cell cultures have been used as an integral part of diagnostic tests for livestock pathogens. These tests include serum neutralization and virus isolation. However, cell culture is cumbersome, time consuming, labor intensive and expensive. Other assay platforms have been developed to overcome these shortfalls. Enzyme linked immunosorbent assays (ELISAs) and other solid phase diagnostics have seen wide use but still lack sufficient sensitivity in some applications.

New readout technologies have allowed the development of rapid and extremely sensitive diagnostic assays that measure antibody/antigen interactions. One such platform, surface enhanced raman scattering (SERS) has been shown to be low cost, rapid, sensitive and extremely reproducible. SERS is based on gold nanoparticles that have been conjugated to a raman reporter and a monoclonal antibody that is specific for the pathogen target. This technology has sensitivity to at least femtomolar concentrations of analyte. Because the excitation wavelength of the laser that used in the system is dependent on the test substrate and not on the analyte, only a single laser is needed. The finished assays are stable over long periods of time because the reactions are not sensitive to humidity, quenchers or to fading. Thus they can be archived for long periods of time without loss of signal should they need to be analyzed again.

In proof of concept experiments, two animal viruses were used to test the system, feline calicivirus (FCV) and porcine parvovirus (PPV). These were chosen because they are grown to high titers and monoclonal antibodies were readily available. The first experiments involved the attachment of the monoclonal antibodies to the gold substrate and then analyzing capture of FCV to the substrate by atomic force microscopy. These experiments showed that dilution of virus resulted in less virus captured as expected. The same results were obtained using the SERS gold nanoparticles where declining signal was observed with dilution of the virus. This initial SERS test detected down to $1 \times 10^6$ TCID$_{50}$/ml of FCV. Again, similar results were obtained using PPV as the analyte.

In experiments to increase sensitivity of the SERS technology, the size of the assay address was tested. In these experiments, it was found that the smaller the address used, the greater the sensitivity. When an address of 2 mm was used the limit of detection of PPV was $1 \times 10^4$
TCID$_{50}$/ml. However when an address of 0.2 mm was used, the level of detection dropped to 45 TCID$_{50}$/ml. The laser used for the detection of captured nanoparticles had a beam diameter of 0.2 mm. By analyzing the entire address rather than a small portion, the sensitivity was greatly increased.

The shape of the nanoparticles was also tested. It was found that changing the shape from spherical (used in the experiments described above) to cubic resulted in a 300x increase in level of detection. Similarly, rotation of the gold-coated substrate in the solution to be analyzed resulted in greater sensitivity and a significant decrease in time necessary to conduct the assay.

Research is ongoing to develop and improve the SERS technology and adapt it to use with more relevant livestock pathogens. However, it is possible that assays will soon be developed that will find utility in veterinary diagnostics.

**Brucellosis in the U.S. and Ongoing Vaccine Research**

Dr. Steven Olsen
NADC, Veterinary Medical Officer, Bacterial Diseases

Brucellosis is a series zoonotic pathogen which continues to persist in wildlife reservoirs despite being essentially removed from domestic livestock. There is a need to develop new vaccines and technologies to address brucellosis in wildlife reservoirs. We have evaluated various *Brucella* vaccines and vaccine delivery systems in domestic wildlife and demonstrated efficacy in targeted species. However, because of cost and limitations in delivering vaccines to wildlife, the most efficacious vaccines that can most efficiently delivered are needed. Our project continues to work to develop new and improved vaccines and delivery methods. We are also currently characterizing pathogenesis and serology after challenge of cattle with *B. suis*. Although the project is ongoing, preliminary data suggests that *B. suis* is not abortigenic in cattle and that colonization in cattle is reduced as compared to *B. abortus* experimental challenge.

**Committee Business:**

Last year’s Resolution Number 32 was reviewed. This Resolution asked USDA to request and utilize Operational Expenses for the National Centers for Animal Health that would not impact program funding. The response stated the money was requested in the 2009 President’s Budget but was not realized by Congress in the final 2009 Budget. They will be requested again. It was the consensus of all Committee members that the operational expenses are still a problem for CVB and members unanimously agreed on the importance of this funding in the 2011 final budget.
The Committee met on October 2, 2009 at the Town and Country Hotel, San Diego, Calif., from 1:00 to 4:45 p.m. There were 6 members and 28 guests present. James Maclachlan and William Wilson, Chair and Vice-chair, respectively, introduced the meeting. There was no discussion of previous Committee business or resolutions.

The Molecular Epidemiology of Bluetongue Virus Infection in Europe: Impact of Vaccination was presented by Professor Peter P. Mertens, Institute of Animal Health, United Kingdom. The paper in its entirety is included at the end of this report.

Southeastern Wildlife Cooperative Surveillance Activities
Dr. Joseph L. Corn and Ms. Stacey L. Vigil
Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

An update on surveys for Culicoides sp. in the Southeastern United States was provided. These surveys are being conducted as part of a Cooperative Agreement for Exotic Arthropod Surveillance with Veterinary Services (VS), USDA Animal and Plant Health Inspection Service (APHIS). Surveys are ongoing in Florida, Georgia, Alabama, Mississippi, Louisiana, Arkansas and Texas. Survey sites in Arkansas, Mississippi, Florida and Texas include premises where exotic bluetongue virus or exotic epizootic hemorrhagic disease virus positive animals had previously been detected. Contents of light traps are processed and Culicoides sp., identified at SCWDS. During November 2007 – August 2009 traps were set for 2,247 trap nights at 127 premises in 55 counties throughout the Southeastern United States. A total of 1,298,696 insects have been sorted from traps set out during this period; 31,284 of these were Culicoides sp. Thirty-two species have been identified, but identification of most of the Culicoides sp. have not been identified.
insects collected is pending. Possible range expansions of *Culicoides insignis* and *Culicoides alachua* have been detected. Additional field collections and identification of *Culicoides* sp. collected are underway and will continue in 2010.

**Epidemiology of Bluetongue Virus Infection in California**
Dr. Christie Mayo  
School of Veterinary Medicine, University of California  
An overview of a recent surveillance program for bluetongue virus that has been initiated in California was provided. This is a collaborative undertaking between the University, the California Department of Food and Agriculture, and the California Animal Health and Food Safety Laboratory, and utilizes some 120 sentinel calves in different regions of the state. Calves are monitored monthly for the presence of viral nucleic acid and/or antibodies. Thus far the study has demonstrated limited perinatal infection of calves as well as seasonal infection from August onwards.

**NVSL Update, OIE Manual Update, and Review of OIE meeting in Teramo**
Dr. Eileen Ostlund  
National Veterinary Services Laboratories, USDA-APHIS-VS  
**Bluetongue virus (BTV) and epizootic hemorrhagic disease virus (EHDV) isolations/PCR positives**
**Calendar year 2008**
Bluetongue virus or RNA was detected in 15 samples submitted during calendar year 2008. The positive bluetongue virus isolation and polymerase chain reaction (PCR) test results from submissions to the National Veterinary Services Laboratories (NVSL) in 2008 are listed in Table 1.
REPORT OF THE COMMITTEE

Table 1. BT virus isolation (VI)/PCR positives, Calendar year 2008

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>1</td>
<td>Deer isolate/tissue (received from SCWDS*)</td>
<td>Positive</td>
<td>BTV-3</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Sheep</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>Positive</td>
<td>BTV-9</td>
</tr>
<tr>
<td>KS</td>
<td>1</td>
<td>Cattle</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>OK</td>
<td>1</td>
<td>Deer isolate</td>
<td>Positive</td>
<td>BTV-3</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Deer isolate/tissue (received from SCWDS*)</td>
<td>Positive</td>
<td>BTV-12</td>
</tr>
<tr>
<td>TX</td>
<td>2</td>
<td>Deer isolate (year unknown)</td>
<td>Positive</td>
<td>BTV-17 (one also EHDV-6)</td>
</tr>
<tr>
<td>UNK</td>
<td>6</td>
<td>Bovine hemoglobin</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>UNK</td>
<td>1</td>
<td>Bovine Serum Albumin</td>
<td>Positive</td>
<td>Negative</td>
</tr>
</tbody>
</table>

*Southeastern Cooperative Wildlife Disease Study, Athens, GA

During calendar year 2008, 15 samples tested positive for EHDV by virus isolation and/or PCR. The positive EHDV isolation and PCR test results from submissions to the National Veterinary Services Laboratories (NVSL) in 2008 are listed in Table 2.

Table 2. EHDV isolation (VI)/ PCR positives, Calendar year 2008

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>2</td>
<td>Deer isolate</td>
<td>Positive</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>IA</td>
<td>1</td>
<td>Deer</td>
<td>Positive</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>MT</td>
<td>1</td>
<td>Deer</td>
<td>Positive</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>OK</td>
<td>1</td>
<td>Deer isolate</td>
<td>Positive</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>SD</td>
<td>5</td>
<td>Deer</td>
<td>Positive</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Deer isolate</td>
<td>Positive</td>
<td>EHDV-1</td>
</tr>
<tr>
<td>TX</td>
<td>2</td>
<td>Deer isolate</td>
<td>Positive</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>TX</td>
<td>2</td>
<td>Deer isolate</td>
<td>Positive</td>
<td>EHDV-6 (also BTV-17)</td>
</tr>
</tbody>
</table>

Calendar year 2009 (January 1– October 1)

As of October 1, 2009 bluetongue virus has been identified in a deer isolate sample submitted from Texas. Both EHDV-2 and EHDV-6 were isolated from a Missouri deer submission. Two additional deer samples from Texas were submitted as isolates. One of these contained EHDV-1 and the other contained EHDV-6.

In addition to results reported above, two lots of fetal bovine serum (FBS) from Mexico tested positive for bluetongue virus by sheep inoculation. One of these lots was tested late in 2008 and one lot in early 2009.
Summary of non-endemic bluetongue virus isolates identified at NVSL 1999-2009

In the United States, bluetongue virus types 2, 10, 11, 13 and 17 are considered endemic. Some states are free or seasonally free of bluetongue activity while others experience less seasonality. Of the endemic types, BTV-2 is restricted primarily to Florida and the other types are more widespread. Since 1999, NVSL had identified 25 isolates of non-endemic bluetongue virus from U.S. ruminant species. At least one isolate has occurred in each of 6 southeastern states (Arizona, Florida, Louisiana, Mississippi, Oklahoma, Texas); the largest number have been identified in samples originating from Florida. A total of 10 previously unrecognized bluetongue serotypes have been identified to date (BTV types 1, 3, 5, 6, 9, 12, 14, 19, 22, 24). Of these, BTV-3 has been the most frequent non-endemic isolate and has been found in 4 states; BTV-3 isolates have occurred in 6 of the past 10 years. None of the non-endemic bluetongue types has caused widespread disease outbreaks. The Culicoides spp. vectors responsible for transmission of the non-endemic types are unknown.

Examination of archived Caribbean and Central American isolates of bluetongue virus

In 2008, the NVSL typed 6 bluetongue virus isolates that were obtained in 1990 from water buffalo from Trinidad and Belize. The BTV types found were BTV-3, BTV-13, BTV-17, BTV-18, BTV-19, and BTV-22. Additionally the NVSL typed 5 isolates from Brahman cattle from the Dominican Republic. Three of these were BTV-19 and one each was BTV-10 and BTV-11.

2009 Bluetongue Serology Proficiency Test

Fifty-four laboratories participated in the 2009 bluetongue (BT) proficiency test. The panel consisted of 20 serum samples. The passing score was one or zero samples missed. All 54 laboratories passed the proficiency test with 53 of 54 laboratories agreeing with each other and NVSL on all 20 samples. Laboratories approved to conduct official (export) bluetongue serology are listed on the website: http://www.aphis.usda.gov/animal_health/lab_info_services/approved_labs.shtml

OIE (World Organization for Animal Health) Bluetongue Network

An international network of OIE bluetongue reference laboratories, OIE collaborating centers, and National Reference Laboratories has been formed to facilitate information and reagent exchange among laboratories. Representatives of the network have met in Italy in 2007 and in 2009. Further information about the OIE bluetongue network can be obtained at www.oiebtnet.izs.it.
Real-time PCR for the Simultaneous Detection of All Serotypes of EHDV
Dr. Alfonso Clavijo
Texas Veterinary Medical Diagnostic Laboratory

A new real-time reverse transcriptase polymerase chain reaction (RT-PCR) for the simultaneous detection of all serotypes of epizootic hemorrhagic disease virus (EHDV) has been developed. The new assay targets the EHDV NS gene that is relatively conserve with the EHDV serogroup and detects all eight serotypes. The assay did not cross-react with U.S. serotypes of BTV. This assay complements the previous published real-time RT-PCR assay that targets the EHDV NS3 gene and is a less complex design. This work was done in collaboration and is complementary to previous work done by the USDA-ARS-Arthropod-Borne Animal Diseases Research Laboratory. Further studies will include this addition of this assay into the multiplex real-time RT-PCR assay that detects and distinguishes between BTV and EHDV.


Update on Bluetongue and Epizootic Hemorrhagic Virus Isolations during 2008 and 2009.
Dr. David Stallknecht
Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

An update on bluetongue and epizootic hemorrhagic virus isolations during 2008 and 2009 was reported. In 2008, isolations were made from wild and captive white-tailed deer in Arkansas (BTV-3), Indiana (EHDV-2), Kansas (EHDV-2, EHDV-6), and Texas ((EHDV-1, EHDV-2, EHDV-6, BTV-12, BTV-17). As of October 9 this year (2009), viruses have been isolated from white-tailed deer in Florida (EHDV-2), Kansas (EHDV-2), Louisiana (EHDV-2), Michigan (EHDV-6), Missouri (EHDV-2), Tennessee (EHDV-2), and Texas (BTV-17). BTV-3, BTV-12, and EHDV-6 all represent viruses that were not know to occur in the United States prior to 1999 (BTV-3), 2006 (EHDV-6), and 2008 (BTV-12). There have been multiple isolations of BTV-3 and EHDV-6 suggesting that these viruses are established.
BLUETONGUE AND RELATED ORBIVIRUSES

The Arthropod-Borne Animal Diseases Laboratory: Research Program Update and Current Status
Dr. Barbara S. Drolet
USDA, ARS, Arthropod-borne Animal Diseases Laboratory (ABADRL)

Dr. Drolet presented the Arthropod-borne Animal Diseases Laboratory research program update on behalf of herself, Kristine Bennett, James Mecham, Myrna Miller, and William Wilson. The Arthropod-Borne Animal Diseases Research Laboratory (ABADRL), located in Laramie, Wyoming, currently consists of 26 staff including microbiologists, virologists, entomologists, and veterinarians, as well as staff who support the laboratories, administration and facilities. The Research Leader position has been vacant since August of 2007, with three ABADRL research scientists rotating as Acting Research Leaders. All ABADRL facilities have been officially downgraded to biosafety level 2 (BSL-2) for laboratory, small animal, insect, and large animal work. The mission of the laboratory is to solve major endemic, emerging, and exotic arthropod-borne disease problems in U.S. livestock. Research emphasizes the molecular biology of pathogens and vectors, vector biology and competence, epidemiology, and animal pathogenesis. Arboviruses, including bluetongue virus (BTV), vesicular stomatitis virus (VSV), and Rift Valley fever virus (RVFV), are the major focus of concern because they were identified during the ARS Animal Health stakeholder workshop as high priority insect-transmitted livestock pathogens.

To accomplish their continuing BSL-3 inclusive research mission, the ABADRL is contracting work out, as well as establishing more national and international collaborations with scientists who have access to BSL-3 facilities and/or reside where the BSL-3 agents are endemic. Significant amounts of time and budget resources are being used to travel to collaborator locations to conduct research. These locations include: Colorado State University, Fort Collins, Colorado; USDA, APHIS National Wildlife Research Center, Fort Collins, Colorado; U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID), Fort Detrick, Maryland; Canadian Food Inspection Agency (CFIA), Winnipeg, Canada; Kenya Centers for Disease Control; Kenya Medical Research Institute (KEMRI), Kenya Agriculture Research Institute (KARI), Kenya Central Veterinary Laboratory; Onderstepoort Veterinary Institute (OVI), South Africa, Onderstepoort Biological Products (OBP), South Africa; Animal Health Research Institute of Egypt; and the Department of Veterinary Services of Yemen.

The ABADRL has three 5-year project plans under two ARS National Research Programs. One project plan under the Animal Health National Program is entitled “Countermeasures to control and eradicate Rift Valley fever”. Research objectives in this plan are 1) to determine the vector competence of North American mosquito species for both wild type and vaccine strains of RVFV; 2) to develop vaccine and diagnostic expression and delivery systems for RVFV; and 3) to develop operator-safe, sensitive
diagnostic tests for the early detection of RVFV, including assays to distinguish infected from vaccinated animals. Research progress to date includes vector competence studies for wild type virus, animal infection model studies for both wild type and vaccine strains, production of BSL-2 anti-RVFV antisera derived from expressed viral proteins, and the development of BSL-2 diagnostic assays including enzyme-linked immunosorbent assay (ELISA) and immunohistochemistry.

A second project plan under the Animal Health National Program is entitled “Virus-vector-host interactions of arboviral diseases of livestock” and focuses primarily on BTV and VSV. Research objectives in this plan are 1) to identify biological determinants of disease susceptibility associated with arboviral infections; and 2) to determine the host-range specificity of exotic bluetongue viruses, namely the susceptibility of North American sheep and white-tailed deer to the European strain of BTV type 8 (EU-BTV-8). Research progress to date includes in vitro studies to determine the role of Culicoides salivary proteins on establishment of VSV infection and interferon production in porcine cells, molecular analysis of bovine membrane proteins, and the cloning and expression of BTV attachment proteins. Additionally, white-tailed deer are being hand reared and weaned in preparation of the EU-BTV-8 infection study, but researchers are still waiting for permit approvals for importation of the virus from The Netherlands to our CSU collaborator.

The project plan under the Veterinary, Medical, and Urban Entomology National Program is entitled “Vector competence and protection of U.S. livestock and wildlife from arthropod-borne diseases”. This includes research on important vector insect species such as mosquitoes, midges, and sand flies and important arboviruses such as exotic BTV and RVFV, as well as insecticide resistance mechanisms and molecular mosquito taxonomy tools. Research objectives in this plan are 1) To assess the risk of endemic arthropod vectors to transmit introduced exotic arboviruses in North America, and 2) to identify targets and evaluate tools for vector control and interruption of transmission cycles to protect livestock and humans from vector-borne pathogens. This past year the research plan was written and approved by ARS National Program Leaders as well as an Office of Scientific Quality and Review Panel and given an official start date of October 1, 2009.

The current facilities at Laramie cannot support the high containment research mission of the laboratory and funds are not available to replace the current facility. The President’s FY09 budget called for the relocation of the ABADRL from Laramie, Wyoming to Ames, Iowa for consolidation with USDA, ARS, National Animal Disease Center. The response of the U.S. Senate to these recommendations was a request for more information regarding the research mission and current facilities of the ABADRL, and an assessment of no fewer than two relocation sites. A study of four possible relocation sites (Fort Collins, Colorado; Moscow, Idaho; Manhattan, Kansas; and Ames, Iowa), conducted by ARS
headquarter, area office, and location staff, addressed each location as to facilities, capacity, expertise, and scientific synergy with the ABADRL mission. The Agriculture Appropriations Committee reviewed the site visit report and voted unanimously for ABADRL to be relocated to Manhattan, Kansas. The Congressional Conference report language confirmed Manhattan as the relocation site, with $1.5M in relocation assistance. The Ag bill was passed by the House on October 7, 2009 and subsequently passed by the Senate on October 8, 2009. The relocation will become official upon signature by the President of the United States. The move timeline is uncertain, but will be completed by the end of FY10. The ABADRL will be housed with four other ARS research units at the Grain Marketing and Production Research Center (GMPRC) in Manhattan and will conduct BSL-2 research in that facility. The ABADRL will conduct BSL-3 laboratory, insect, small animal and large animal research in facilities owned by Kansas State University.

The ABADRL currently has the highest level of funding in its history, thanks to additional funding sources such as Department of Homeland Security, ARS Office of International Research Projects, and the Department of State Biosecurity Engagement Program. Additionally, the laboratory has the largest number of national and international collaborations in its history, and continues to have a productive research program addressing the needs of our stakeholders.

Evaluation of Real-time PCR Assays for the Detection of BTV in Bovine Semen
Dr. Peter Kirkland, R. Davis and X. Gu
Elizabeth Macarthur Agricultural Institute, Camden, New South Wales, Australia

Although there has been a long term requirement to screen the semen of cattle that have potentially been infected with bluetongue virus (BTV), until recently, there has been little evidence of the presence of BTV in the semen of naturally infected bulls. Studies conducted in the USA and Australia consistently showed that BTV was not present in the semen of bulls infected with “wild-type” strains of virus. However, if a mature animal was infected with a cell culture adapted strain of BTV, infectious virus could be detected in the semen for a short period soon after the onset of infection. Recently, following the natural infection of cattle in Europe with BTV serotype 8, virus has been readily detected in semen and has also crossed the placenta, causing foetal infections. Although these strains of BTV-8 are naturally circulating, they possess the characteristics attributed to cell-culture adapted or vaccine strains of virus.

During one of the large studies conducted in Australia, mature bulls were experimentally infected with a laboratory adapted strain of BTV serotypes 1. A total of eight bulls were inoculated and on each occasion that a semen sample was collected, blood samples were also collected to monitor the onset and duration of viraemia. From day seven
after experimental infection, samples were collected twice weekly for 4 weeks then once a week for a further four weeks. Methods used to detect infectious virus in blood and semen included the inoculation of embryonated chicken eggs (ECE) followed by passage in insect and mammalian cell cultures, direct passage in both insect and mammalian cell cultures, and inoculation of sheep. For both blood and semen, a large volume of sample was examined to maximize virus detection. Serological methods (AGID, cELISA and VNT) were also employed to monitor infection. The semen samples from these bulls were stored both in liquid nitrogen and also at -80°C. Recently, these samples were tested using a semi-automated method for RNA extraction and both a nested reverse transcriptase polymerase chain reaction (nRT-PCR) assay and a BTV pan-reactive real time reverse transcriptase polymerase chain reaction (qRT-PCR) assay.

BTV was detected intermittently in semen from a number of the mature bulls that had been experimentally infected with this laboratory-adapted strain of BTV-1. These detections occurred during or immediately after the period of detectable viraemia. The duration of viraemia varied from 17 to 31 days. Each of the virus isolation methods had comparable sensitivity if samples were passaged sufficiently. BTV was most readily detected by inoculation of ECE or sheep. When the semen samples were examined by nRT-PCR, similar results were obtained to the virus isolation methods even though a 10 fold lesser sample volume was assayed. Superior results were obtained from the semi-automated magnetic bead based nucleic acid extraction system compared to a manual column extraction method. When the semen extracts were tested in the qRT-PCR, a higher level of sensitivity was achieved than with any of the other virus detection methods. In some bulls, where infectious virus had been detected intermittently, viral RNA was detected consistently. Further, viral RNA was detected for several collections (7-10 days) longer by qRT-PCR than by conventional methods. Comparison of several published qRT-PCR methods and commercially available kits for BTV showed that the “Swiss” method (Hoffmann et al., 2008) had the highest analytical sensitivity.

It was concluded that a combination of a magnetic bead based nucleic extraction method and an appropriate pan-reactive qRT-PCR will readily and reliably detect BTV in the semen of bulls and will permit a large number of samples to be tested in a short time.

Successful Development of a Recombinant African Horse Sickness Virus Vaccine
Dr. James Maclachlan
School of Veterinary Medicine, University of California, Davis

Dr. Maclachlan described collaborative studies with Dr. Alan Guthrie and his staff at the Equine Research Centre, Faculty of Veterinary Science, University of Pretoria, Onderstepoort, South Africa and Drs.
Jules Minke, Jean-Christophe Audonnet and others at Merial Inc. and Sanofi-Pasteur that lead to the successful development of a recombinant African horse sickness virus vaccine [1]. The vaccine is based on the strategy used for successful development of a recombinant bluetongue virus vaccine [2], utilizes the canarypox virus expression vector as well as the genes encoding the outer capsid proteins of African horse sickness virus. This vaccine induces sterilizing immunity in vaccinated horses, and vaccinated animals readily can be distinguished from infected animals using conventional group-specific serological tests (DIVA).


Committee Business

George Winegar, USDA, Retired, brought the Committee on Import/Export resolution requesting that OIE and Sanitary and Phytosanitary (SPS) guidelines be used at the initiation of all international trade for discussions to the BT and related Orbiviruses committee for consideration. The Committee endorsed this resolution, forwarding to the Committee on Nominations and Resolutions. No additional resolutions were proposed or other business discussed.
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THE MOLECULAR EPIDEMIOLOGY OF BLUETONGUE VIRUS INFECTION IN EUROPE: IMPACT OF VACCINATION

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Introduction

Bluetongue virus (BTV) is endemic in warmer regions around the world, between ~45-53°N and 35°S, including North and South America, Africa, the Indian subcontinent, Australasia, and Asia (Mertens et al 2007b). BTV is transmitted primarily by adult female hematophagous midges (genus Culicoides - Mellor and Boorman, 1995) and can infect most ruminants or camelids (Chandel et al., 200; Ruiz-Fons et al., 2008). However, the virus can also be transmitted vertically in cattle and sheep (Menzies et al., 2008), and can infect certain large carnivores via an oral route or injection (Jauniaux et al., 2008). There is also some evidence that BTV can be transmitted vertically in the midge (White et al 2005). The severity of the disease is dependent on host species, breed/strain, and on their serological status for BTV. However, it is also dependent on the virus itself and attenuated strains have long been used as ‘live vaccines’ (Veronesi et al., 2005).

The nucleotide sequences of BTV isolates reflect their geographic origins (Gould and Pritchard, 1990; Pritchard et al., 1995; 2004), and the majority of the BTV genome segments can clearly be divided into ‘eastern’ or ‘western’ groups/topotypes (Maan et al., 2007; 2008; 2009; Mertens et al., 2007a). This indicates that these viruses have evolved, with little genetic exchange between regions, over a very long period of time, allowing them to acquire multiple point mutations and clear regional differences. With the identification of ‘Toggenburg orbivirus’ (TOV), there are now 25 distinct serotypes of BTV that can be identified by the specificity of reactions between their outer capsid proteins and neutralizing antibodies generated during infection of the mammalian host. The BTV genes encoding these outer-capsid proteins show nucleotide sequence variations that correlate with both virus serotype and the geographical origin of the virus isolate (Mertens et al 2007b). Since 1998, nine serotypes of BTV have invaded Europe, which appears to represent a ‘cross-roads’ between east and west, containing a unique mixture of viruses from both geographic regions.

‘Molecular epidemiology’ studies can be used to compare RNA sequences from novel BTV isolates with those of existing strains from known locations and dates, identifying both virus serotype and topotype.
Sequence variations can also identify individual virus lineages within the same area and the presence of ‘reassortant’ strains containing genome segments from different ‘parental’ strains. BTV molecular epidemiology studies depend on development of sequence databases for the RNA segments of ‘known’ virus isolates from defined locations with well documented isolation dates and passage histories. Ideally these viruses should be held in long-term reference-collections (e.g. the BTV-collection at IAH Pirbright - Mertens et al 2007c: http://www.reoviridae.org/dsRNA_virus_proteins/ReoID/BTV-isolates.htm), allowing sequence data to be linked to biological characteristics and epidemiology of specific isolates.

The BTV genome codes for a total of 10 distinct viral proteins, one from each dsRNA segment, seven of which (VP1 to VP7) are structural components of the virus particle. Three distinct non-structural proteins (NS1, NS2 and NS3/NS3a) are also synthesized during replication in infected cells (Mertens et al., 1984; 2005). Cross-hybridisation studies (Huismans et al., 1987; Mertens et al., 1987), and recent nucleotide sequence comparisons (Bonneau et al., 2000; Wilson et al., 2000; Potgieter et al., 2005; Balasuriya et al., 2008; Maan et al., 2007; 2008) have shown different levels of variation in individual BTV genome segments and the proteins they encode. The capsid proteins that are situated on or near to the surface of the virus particle are more variable than components of the virus core, or the non-structural proteins (Mertens 2004; Maan et al., 2008; 2009). Mertens and associates (2007d) describe the individual BTV proteins and RNAs in detail. VP2 (encoded by Seg-2) is the outermost of the BTV capsid proteins and represents a primary target antigen for neutralizing antibodies (Huismans and Van Dijk, 1990; Roy et al., 1990; De Maula et al., 2000). Phylogenetic analyses of Seg-2 show that it represents the least conserved region of the BTV genome, and separates into 25 distinct clades that consistently reflect virus serotype (<33% nt sequence variation within serotype: 29-59% variation between types - Maan et al., 2007; 2009). However, sequence variations in Seg-2 also provides evidence for distinct eastern and western lineages (topotypes) within individual BTV types (<13% Seg-2 nucleotide variation within topotype).

The ‘eastern’ BTV group includes viruses from India, Indonesia, China or Australia, while the western group includes viruses that are primarily from Africa and North or South America (Maan et al., 2007; 2008; Mertens et. al., 2007a). There is also evidence for a far eastern group(s), although few sequences are currently available. Sequence variations in Seg-2 provide a basis for molecular epidemiology studies that can be used to identify/confirm virus serotype, the geographical origins of the virus lineage and distinguish between even closely related virus strains within a single epizootic or region. VP5 (encoded by Seg-6), is the smaller of the BTV outer capsid proteins and Seg-6 is the second most variable region of the BTV genome (<43.9% nucleotide variability overall - Singh et al., 2004; Maan et al., 2008). Although VP5 also influences the specificity of
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reactions with neutralising antibodies, its contribution is less significant than VP2 (Mertens et al., 1989; DeMaula et al., 2000).

Recent analysis of BTV genes showed that genome Seg-7 (encoding outer core protein VP7) is the third most variable genome segment (<34.7% nt variability), despite VP7 representing the primary target for the majority of BTV serogroup-specific serological assays (Wade-Evans et al., 1990; Afshar et al., 1992). Oligonucleotide primers were also designed targeting Seg-7, for use in BTV virus-species/serogroup-specific RT-PCR assays (Anthony et al., 2007). Genome segments 1, 3, 4 and 9 (encoding structural proteins) and segments 5, 8 and 10 (encoding non-structural proteins) are highly conserved across the entire BTV species/serogroup, although they also show eastern and western grouping (topotypes) with 20 – 31% nt variation. The high levels of conservation in Seg-3 have been used to distinguish and identify members of different Orbivirus species (Attoui et al., 2001; Nomikou et al, 2009). Sequence comparisons of the polymerase gene have been used to compare even distantly related reoviruses, identifying members of different genera within the family Reoviridae (Attoui et al., 2000; Mertens, 2004).

Real-time RT-PCR assays targeting BTV Seg-1 (Shaw et al., 2007) and Seg-9 (Maan et al – in preparation) can be used to identify RNA from either eastern or western BTV topotypes, or combined in a pan-BTV-specific assay (available from Qiagen Germany).

**BTV incursions into Europe:** BTV has been recorded on the fringes of Europe for many years with several serotypes present in Turkey, Cyprus, Israel and Africa (Taylor and Mellor, 1994). Before 1998, BTV had caused only periodic and relatively short-lived epizootics within southern Europe, involving a single serotype on each occasion (Mellor & Wittmann, 2002). However, since 1998 Europe has experienced multiple BT outbreaks, involving at least 13 incursions/strains, belonging to a total of nine different BTV serotypes (BTV-1, 2, 4, 6, 8, 9, 11, 16 and 25) (reviewed by Maan et al 2009; Mellor et al 2009). BTV-15 and 24 were also identified in Israel during 2006 and 2008 respectively (the first time in the Mediterranean region) suggesting that they could represent future threats to Europe.

The majority of the European viruses in were identified by conventional (gel based) RT-PCR using serotype specific primers targeting Seg-2 and sequence analysis (Mertens et al., 2007a; e). However real-time RT-PCR assays are now also available for all of the European BTV serotypes (from Laboratoire Service International – France).

**BTV-1:** Sequencing and phylogenetic analyses of Seg-2 have identified three separate introductions of BTV-1 into the Mediterranean region, in 2001, 2006 and 2007 (Mertens et al 2007g). These include an eastern strain (in Greece), related to viruses from India, and two incursions of a western strain, one of which spread to south-west France during November 2007. This provided the first overlap between the northern
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European outbreak of BTV-8 (see below) and any other BTV strain/serotype and opportunities for genome segment exchange/reassortment.

**BTV-2:** BTV-2 was first identified in Tunisia during February 2000, then on the Italian island of Sardinia during August 2000 and by October it was confirmed in Sicily, Calabria (southern mainland Italy), Corsica and the Spanish islands of Menorca and Mallorca (Anon 2000a, b, c and d). Seg-2 of the Tunisian BTV-2 is almost identical (99.8%) to isolates from Corsica and Sardinia, indicating that like BTV-1, BTV-2 spread northwards from Africa into Italy and the western Mediterranean islands. The initial European BTV-2 outbreaks were not caused by the live, attenuated vaccine, however, subsequent BTV-2 isolates from mainland Italy were as much more closely related to the vaccine strain used in the region, indicating that it had been transmitted in the field (Ferrari et al., 2005, Batten et al., 2008).

**BTV-4:** A western strain of BTV-4 was first detected in Greece during 1999, although it had previously been recorded to the south and east of Europe (e.g. Cyprus, Syria, Jordan, Israel, and Turkey - Taylor and Mellor, 1994). BTV-4 was also isolated in Israel during 2000, 2006 and 2008. Phylogenetic analyses demonstrate that the European and Israeli strains are closely related to earlier isolates from Cyprus (CYP1969/01) and Turkey (TUR1978/01), and to the IAH reference strain of BTV-4 (RSArrrr/04) which also originated from Cyprus (ASOT-1) (Sellers et al., 1979). This suggests the 1999-2000 Greek strain of BTV-4 has been circulating in the Mediterranean region for at least 40 years (Mertens et al 2007k). In 2003 a distinct strain of BTV-4 was detected in the western Mediterranean islands (Menorca - SPA2003/02 and Corsica - FRA2003/01) (Breard et al., 2007). The virus is believed to have a sub-Saharan origin, entering Europe from North Africa, possibly from Tunisia or Algeria. It was concluded that there had been introductions of BTV-4 into Europe, from North Africa in both 2003 and 2004.

**BTV-6:** In October 2008, 4 animals on different farms in eastern Holland tested positive for BTV by RT-PCR. Full genome sequence confirmed the introduction of a new western strain of BTV-6 into northern Europe, showing that it was derived from the live South African vaccine (with 99.7 – 100% nucleotide identity in most genome segments). However, it was also identified as a reassortant virus, with Seg-10 derived from another (unknown) parental strain (most closely related to the BTV-2 vaccine strain RSAvvv2/02 – 98.4%). There was also evidence of reassortment with BTV-8 (Seg-7), indicating that it had been circulating in the region from some time. Like BTV-8, it is still unclear how BTV-6 first arrived in Europe (although illegal use of live vaccines has been suggested) (ProMED 31-OCT-2008).

**BTV-8:** In August 2006, BT was recognized for the first time in northern Europe (OIE, 2006; Toussaint et al., 2006). The outbreak was initially mild and subsided during the winter of 2006/2007 but reappeared in the same regions during May-June 2007 with greatly increased severity
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killing thousands of animals (mainly sheep). Although these BTV-8 outbreaks stopped during the winter of 2007/2008, export of infected animals into northern Spain and Italy lead to further outbreaks in both regions (EFSA report, 2007). Sequence analyses of Seg-2 and 6 from the first virus isolate from the outbreak demonstrated that it belongs to a western lineage from sub Saharan Africa but is distinct from the South African BTV-8 vaccine strain (Maan et al., 2008; Mertens et al 2007m).

During January 2008, a group of cows, some of which had previously been infected with BTV-8, were imported from the Netherlands into Northern Ireland. Although all of these animals were negative by RT-PCR assays of blood samples, three of their calves were born RT-PCR +ve for BTV-8 RNA, providing clear evidence of vertical transmission in utero.

Two in-contact adult cows also became infected with the same virus, providing evidence of horizontal transmission despite the absence of adult Culicoides (Menzies et al 2008).

In May 2009 there were BT outbreaks in Israel due to type 8. The Israeli strain showed 99.7% similarity in Seg-2 to the Netherlands isolate, and is therefore thought to be derived from the European BTV-8 outbreak. BTV-8 was also isolated in Oman during 2009 but showed only 95.2% similarity in Seg-2 to the Netherlands BTV-8, indicating that although it is a western /African strain from a similar lineage, it was not derived from the European BTV-8 outbreak.

**BTV-9:** The first outbreaks of BT in Europe since the 1980s, occurred on four Greek islands (Rhodes, Leros, Kos and Samos) close to the Anatolian coast of Turkey during October 1998, caused by BTV-9 (Mertens et al 2007n; Anon. 1998a, b). Sequence analysis of Seg-2 identified an eastern strain of BTV-9, distinguishing it from the South African BTV-9 vaccine strain which belongs to a western group (Mertens et al 2007o). BTV-9 had previously been reported in Anatolian Turkey, Syria, Jordan and Israel (Taylor and Mellor, 1994).

The virus spread to mainland Greece, south-eastern Bulgaria and European Turkey during 1999, (Anon. 1999a and b), then in 2001 to Serbia, Montenegro, Kosovo, Macedonia, Bulgaria, Croatia (Anon. 2001a; Anon. 2001b - f), mainland Italy and Sicily. In 2002 BTV-9 was identified again in Bosnia, Bulgaria, Montenegro, Yugoslavia and Albania and there was an unconfirmed report of BT in Kosovo (Calistri et al., 2004). Although BTV-9 was also isolated in Sicily in 2003, this was from an animal that died within week after vaccination with the live BTV-9 vaccine and the virus that was recovered proved to be identical (Seg-2) to the South African vaccine strain which may reflect the use and persistence of the live vaccine strain in the region (Savini et al., 2008). BTV-9 also caused further outbreaks in Italy, during 2004.

**BTV-11:** On 20 December 2008, blood from an animal form East Flanders in Belgium was tested positive for BTV-11 using conventional RT-PCR targeting genome segment 2 (Mertens et al 2007a, e). Seg-2 sequence data from this sample showed 99.74% nucleotide identity with
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South African reference strain of BTV-11 (RSArrrrr/11) and 100% identity with that of the modified ‘live’ vaccine strain of BTV-11 from South Africa. Only around 84% similarity was found to BTV-11 strains from the USA. A Zimbabwe strain of BTV-11 gave an intermediate level of similarity in Seg-2 (De Clercq et al. 2009).

**BTV-16:** Outbreaks caused by BTV-16 occurred in Greece during 1999-2000, and in the Turkish province of Izmir during 2000 (Mellor et al. 2009). During 2002 and 2004 further outbreaks occurred on Sicily, mainland Italy, Sardinia, and Corsica, and on Cyprus during 2006 (Mertens et al. 2007p). Sequence analysis of Seg-2, indicates that all of the Mediterranean/European isolates of BTV-16 belong to an eastern group of viruses and are closely related to the South African BTV-16 vaccine (<0.7% variation), suggesting a recent common ancestry (Mertens et al. 2007q). The BTV-16 vaccine strain can cause severe disease in some European breeds of sheep, with viraemia levels (>10^6 TCID_{50}/ml) that are sufficient to allow infection of feeding Culicoides and therefore onward transmission of the virus (Veronesi et al., 2005). The vaccine strain was originally derived from the reference strain that was originally isolated from Hazara in West Pakistan during 1960 (Howell et al., 1970). This close relationship suggests that the live, attenuated vaccine may be involved in the origins of all of the European incursions of BTV-16. The live vaccine strain of BTV-16 was used as part of an annual vaccination campaign in Israel (Shimshony, 2004) and could represent a source for the European viruses. However, the Italian field strain of BTV-16 appears to have an even closer relationship to the vaccine strain than the viruses from either Greece or Turkey (~99.9% in Seg-2), suggesting that it was not derived from the earlier Greek or Turkish outbreaks (Batten et al., 2008; Savini et al., 2008). The Italian BTV-16 strain from 2002 is a reassortant, containing Seg-5 derived from the BTV-2 vaccine strain that was also used as part of the multivalent vaccine in Israel (Batten et al. 2008). The outbreak in Sardinia during 2004 was caused by the BTV-16 vaccine used in Italy during 2004 (Savini et al., 2008) and was not caused by the strain from Greece and Turkey. In November 2008, there were reports of further outbreaks due to BTV-16 in Greek island of Lesvos returning after ~7 years (ProMED 20-JAN-2009), and in both Israel and Oman.

**BTV-25:** During late 2008, a novel BT-like virus (Toggenburg orbivirus (TOV)) was detected in goats from Switzerland (Hoffman et al. 2008). Initial molecular epidemiology studies indicate that the maxim sequence identity to any BTV ranged from 63% (segment 2) to 79% (segments 7 and 10). Therefore this virus may represent a previously unknown 25th serotype of BTV and appears to belong to a distinct toptotypic group within the Bluetongue virus species. Initial attempts to isolate this virus proved unsuccessful, hindering serotyping, although antisera from infected animals failed to neutralize any of the existing 24 BTV types, again indicating that it represents type 25.
Identification of reassortants: Phylogenetic analyses of BTV core/non-structural proteins

In attempts to minimize BTV circulation, live attenuated monovalent vaccines for BTV-2, 4, 8, 9 (western topotype) and BTV-16 (eastern topotype) were used in the Mediterranean region. The South African ‘Group B’ multivalent live attenuated vaccine (containing types 3, 8, 9, 10 and 11) was also used briefly in Bulgaria during 2000 (Panagiotatos, 2004; Savini et al., 2007). These activities have generated an unprecedented mix of BTV field and vaccine strains within Europe and have provided multiple and widespread opportunities for the exchange/reassortment of genome segments (Monaco et al., 2005; Batten et al., 2008; Nomikou et al – in preparation). Reassortment has been detected in genome Seg-3 between western BTV-2 from Corsica and Italy with the western BTV-4 strains from Morocco and Spain (Maan et al., 2008). Similar comparisons of Seg-5 from the eastern strains of BTV-6 from Greece and BTV-9 from Bulgaria showed 99.9% identity indicating that they have also been involved in reassortment (Maan et al., 2008).

Impact of vaccination

The spread of BTV can be controlled by vaccination of susceptible ruminant populations. Currently two different forms of BTV vaccine are used for this purpose: inactivated, mostly monovalent vaccine formulations; or modified live virus vaccines (MLVs), many of which are available as multivalent preparations from South Africa. There concerns over the virulence of BTV-MLV in naïve animal populations and their transmission/persistence in the field (Veronesi et al 2005). MLVs can also exchange genome segments/reassort with other BTV strains, generating novel progeny viruses, which may have novel biological characteristics (Batten et al., 2008). BTV MLVs have not been licensed for use in northern Europe and authorities in affected countries decided to wait for production of inactivated BTV-8 vaccines. Although inactivated BTV-2 and BTV-4 vaccines had already been used in southern Europe (Savini, et al. 2008), almost two years elapsed between the initial BTV-8 incursion in the Netherlands/Belgium in 2006 and the first field vaccinations in the UK during 2008. However, the efficacy of inactivated vaccines has clearly demonstrated by the voluntary vaccination campaign in England and Wales, which prevented re-emergence of BTV-8 in the UK during 2008, after >1000 cases in 2007 (Carpenter, et al. 2009).

Polyvalent, cross-serotype, inactivated BTV vaccines are not widely available although a bivalent inactivated BTV-1 and 8 vaccine is now available in Spain (www.fortdodge.eu). The incursion of different BTV types into new European locations is unpredictable and vaccine production is largely ‘reactive’, potentially resulting in significant periods between incursion and the availability of a vaccine against the homologous type. Some local authorities may therefore consider the use of MLVs, and two distinct MLV’s (BTV-6 and 11) were detected in animals in Belgium,
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the Netherlands and Germany during 2008. It was suggested that they may have been used illegally and were transmitted by northern European Culicoides (ProMED 05-FEB-2009; ProMED 18-OCT-2008) (Maan et al. in preparation; de Clercq et al 2008).

Conclusions/Discussion

Sequence analyses of European BTV isolates and comparisons to other strains from around the world have shown variations in segments 1, 3, 4, 5, 8, 9 and 10 that correlate primarily with the geographical origins of the virus lineage from which they were derived. These variations divide the viruses into eastern and western topotypes and even into ‘local’ topotypes within each group (Maan et al., 2008). This indicates that the viruses in these different regions have been separated and have acquired point mutations over a long period of time (Pritchard et al., 1995; Wilson et al., 2000; Balasuriya et al., 2008; Maan et al., 2008). The involvement of VP7 in BTV infection of insect cells and of NS in the release of virus particles from insect cells, suggests that variations in Seg-7/VP7 and Seg-10/NS3 could relate to different groups/populations of insect vectors in different geographic regions from which these viruses were derived (Balasuriya et al., 2008; Maan et al 2008). Further analyses of additional BTV isolates from around the world will help to define the nature and distribution of different topotypes for each of the BTV genome segments.

There is compelling evidence linking local climate change to changes in the distribution of Culicoides imicola in southern Europe (Purse et al., 2005). Higher ambient temperatures appear likely to have increased the vector competence of certain northern Palearctic Culicoides species in the region. These changes have coincided with outbreaks of BT in Europe, caused by eleven distinct BTV strains from nine different serotypes. Several of these virus lineages (with the exception of the eastern strain of BTV-1 from Greece 2001) have persisted and spread both westwards and northwards across much of southern and central Europe. With the arrival of BTV-8 in northern Europe during 2006, there have been incursions of BTV into Europe in ten of the last 11 years (1998 – 2009). There have also been disease outbreaks caused by persistence and transmission of BTV-vaccine strains in the field (Ferrari et al., 2005; Monaco et al., 2006; Savini et al., 2008). Molecular epidemiology studies have not only helped to identify the origins and serotypes of the European viruses, they have also confirmed that they arrived via four distinct routes (Maan et al 2009).

Once a Culicoides-borne disease (such as BT) becomes established in an area containing competent vector species (as in the Mediterranean Basin) outbreaks may occur in successive years. This is particularly true if a mechanism exists for virus survival from one ‘vector-season’ to the next (BTV-overwintering) (Takamatsu et al., 2003, White et al., 2005). The vertical and horizontal transmission of BTV-8 that was observed in Northern Ireland and several other countries in northern Europe, appears
likely to provide at least one such overwintering mechanism for BTV (Menzies et al 2008). Continuing changes in global climate may also increase the distribution and competence of vector-insect populations in the region allowing the virus to spread still further north. BTV therefore represents a significant continuing threat to animal health across the whole of Europe. Consequently, effective control/vaccination programmes are required that will reduce disease in affected countries and help to create barrier regions to prevent further spread of these viruses.

It is clear that the use of live BTV vaccines increases the genetic diversity in the virus population and poses a risk of genome segment reassortment between vaccine and field viruses potentially generating virus strains with novel biological properties. The use of live vaccines has clearly not eradicated BTV from Southern Europe. However, inactivated vaccines based on European BTV strains, developed by Merial, Fort Dodge, Intervet and other companies, do not depend on virus replication in the vaccinated host, and are incapable of causing ‘vaccine outbreaks’ or of becoming involved in genome segment reassortment. In addition, the inactivated vaccine campaign organized by Defra during 2008, appears to have eradicated BTV-8 from the UK, and represents a major success for veterinary science.

Recent studies of orbivirus isolates from Alabama, Missouri and Florida since 1999, using Seg-2 specific RT-PCR assays have identified eight BTV serotypes that were previously exotic to the USA (BTV types 1, 3, 5, 6, 14, 19, 22 and 24) (Johnson et al., 2007; Mertens et al., 2007b; Maan et al – in preparation). These observations indicate that the effects of climate change are not restricted to Europe. They are also unlikely to be restricted to Culicoides species or the viruses that they transmit. These changes may therefore affect other vector groups (e.g mosquitoes), potentially changing the distribution and incidence of other arthropod transmitted diseases, both in Europe and elsewhere.

Sources of Information
Mertens et al 2007f: www.reoviridae.org/dsRNA_virus_proteins/outbreaks.htm#top
BLUETONGUE AND RELATED ORBIVIRUSES

BTV isolates by serotype: www.reoviridae.org/dsRNA_virus_proteins/ReoID/BTV-isolates.htm
BTV accession numbers: www.reoviridae.org/dsRNA_virus_proteins/orbivirus-accession-numbers.htm
BTV RNA and proteins: www.reoviridae.org/dsRNA_virus_proteins/BTV.htm

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Hofmann, M.A., Renzullo, S., Mader, M., Chaignat, V., Worwa, G., Thuer,
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BLUETONGUE AND RELATED ORBIVIRUSES


REPORT OF THE COMMITTEE ON BRUCELLOSIS

Chair: Glenn E. Plumb, WY
Vice Chair: Jim R. Logan, WY

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The Committee met on October 12, 2009 from 1:00 to 4:30 p.m. and October 13, 2009 from 8:00 to 11:30 a.m. at the Town and Country Hotel, San Diego, Calif. There were 50 members and 52 guests present. The meeting was chaired by Dr. Glenn Plumb. Ten scientific presentations and reports, a panel dialogue on the future of the U.S. Brucellosis Program, and five resolutions were presented to the Committee for consideration. Dr. Jim Logan, Vice-Chair, gave a brief review of the 2008 meeting in Greensboro, North Carolina, and reported on two resolutions from that meeting. The response from United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to both was positive.
The Committee received and approved reports from the following three subcommittees, which are included at the end of this report: Report of the Scientific Advisory Subcommittee on Brucellosis; Report of the Feral Swine Subcommittee on Brucellosis and Psuedorabies; and Report on the Subcommittee on Brucellosis in the Greater Yellowstone Area.

FY09 U.S. Cooperative Brucellosis Eradication Program was presented by Dr. Debra Donch, Veterinary Services (VS), USDA-Animal and Plant Health Inspection Service (APHIS).

The Future of the U.S. Brucellosis Program
Dr. LeeAnn Thomas
USDA-APHIS-VS

The cooperative Federal-State-industry effort to eradicate brucellosis (Brucella abortus) from cattle in the United States has made significant progress since the program’s inception in 1934. In 2008 and once again in July 2010 all States were recognized as Class-Free (i.e. disease free status). However, unique challenges remain in the form of a surveillance system that uses redundant surveillance streams where slaughter stream samples are tested with multiple testing protocols; a time consuming and rigid regulatory process; a costly and inflexible State-based status classification system; a continued foci of endemic disease in bison and elk in the Greater Yellowstone Area (GYA); and the implementation of more stringent interstate movement requirements when States impose more stringent requirements on states with affected herds. Veterinary Services’ (VS) developed a concept paper that has been made available for public comment in the Federal Register that describes our approach to addressing these challenges that included specific input from the GYA States. The concept paper provides an action plan that: 1.)effectively demonstrates the disease-free status of the United States through a national status-based program supported by a national surveillance strategy; 2.)enhances efforts to mitigate disease transmission from wildlife; 3.) enhances disease response and control measures; 4.) modernizes the regulatory framework to allow VS to address risks quickly and sensibly; and 5.) implements a risk-based disease management area concept. To succeed, this new approach will require VS’ continued partnership with State animal health and wildlife officials, other Federal agencies, industry, international partners, academia, and other stakeholders. Successful partnerships will allow us to use available resources efficiently to achieve program objectives and protect our national livestock herd. This action plan will benefit Federal and State animal health officials, the regulated industries, and producers by allowing a more adaptable science-based response that is both effective and timely and that addresses the unique challenges facing the program today. Copies of the action paper have been made available at this meeting today for your review and comments.
Yellowstone bison historically occupied approximately 20,000 km² in the headwaters of the Yellowstone and Madison rivers in what is now referred to as the northern Greater Yellowstone Area. However, by the early 20th century, Yellowstone National Park (YELL) provided sanctuary to approximately two dozen of the only relict, wild and free-ranging bison remaining in the United States. The successful conservation of this bison population to a high near 5,000 animals in 2005 is a conservation epic that has led to an enduring series of societal conflicts and disagreements among various publics and management entities regarding issues of perceived overabundance and the potential transmission of the *Brucella abortus* pathogen to domestic cattle. Park ungulate management policies evolved in 1969 to preclude deliberate culling inside the park and allow ungulate abundance to fluctuate in response to weather, predators, resource limitations, and outside-the-park hunting and land uses. Bison numbers increased rapidly under this policy and, since the 1980s, increasing numbers have moved outside the park during winter where some have been culled by state and federal agencies. These movements and removals led to loosely extrapolated claims that bison were overabundant and had degraded their range. Such claims, in turn, have led to calls for intensive management to limit the abundance and distribution of bison, including fencing, fertility control, hunting, and brucellosis test-and-slaughter programs. Central to this debate is whether bison move outside the park because their abundance has surpassed levels that can be supported by the park’s forage base, and the implications of disease and perceived overabundance for long-term bison conservation.

The park encompasses 9,018 km² in the western United States, including portions of Idaho, Montana, and Wyoming. The bison population consists of central and northern herds that occupy ranges of approximately 1200 km², respectively, with variable plant communities and precipitation patterns along a decreasing elevation gradient (2,400 to 1,600 m). Winters are severe, with snow-water equivalents averaging 35 cm and temperatures reaching -42 C, though windswept areas in the upper portions of the Hayden Valley and patchily distributed geothermal areas reduce snow cover and costs for accessing food, traveling, and thermoregulation. The bison population is chronically exposed and infected with *Brucella abortus*. Since the initial detection of this non-native pathogen in Yellowstone bison in 1917, with transmission presumably from infected livestock, up to 60% of this population has
tested positive for anti-bodies indicating exposure to the brucellosis pathogen. However, only about one-half of these test-positive bison are likely infected. To manage the risk of brucellosis transmission from Yellowstone bison to cattle, the federal government and State of Montana agreed to the Interagency Bison Management Plan (IBMP) in 2000. This plan established guidelines for implementing hazing, test-and-slaughter, hunting, and other actions affecting bison near the park boundary. The IBMP established a primary conservation area of approximately 9,050 km² for the bison population that includes all of YELL and several zones of intensive, adaptive management outside the northern and western boundaries of the park where limited numbers of bison are allowed under various contingencies.

Admittedly, the term carrying capacity is one of the most common and confusing terms used in wildlife management because it denotes a variety of meanings. Ecological carrying capacity has been defined as the natural limit of a population set by resources in a particular environment, or an equilibrium represented by \( K \) of the logistic equation, that populations tend towards via density-dependent effects from lack of food, space, cover, or other resources. Ecological carrying capacity is often simplified to the number of herbivores in dynamic equilibrium with the forage base (i.e., food-limited carrying capacity). Coughenour recently evaluated if Yellowstone bison had reached a food-limited carrying capacity by parameterizing and testing a spatially-explicit ecosystem model for the YELL ecosystem that integrated data from site water balance, plant biomass production, plant population dynamics, litter decomposition and nitrogen cycling, ungulate herbivory, ungulate spatial distribution, ungulate energy balance, ungulate population dynamics, predation, and predator population dynamics submodels. The model simulated the central and northern bison herds, as well as two resident wintering elk herds and summer immigrant elk. When the model was run for 50 years without management removals or migrations outside the park, the northern herd displayed a mean of 2,400 bison, and the central herd displayed a mean of 3,800 bison, for a total of 6,200. The actual maximum total count of Yellowstone bison within a year was 3,531 bison in the central herd and 1,484 bison in the northern herd, for a total of approximately 5,000 during summer 2005, with an estimated sightability of 0.97. Thus, neither the central or northern bison herds have exceeded their estimated mean food-limited carrying capacities in the park, though simulations suggest there should be extensive inter-annual variations in estimated carrying capacity due to variations in weather, forage availability, competition, and other factors.

Seasonal bison movements between central ranges, and movements to lower-elevation winter ranges along the boundary of began when population size increased above 1,500 for the central herd and 550 for the northern herd. These thresholds are well below estimates of food-limited carrying capacity. Thus, bison left the park
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during winter even though their theoretical food-limiting carrying capacity has not been reached, suggesting that density-dependent and independent mechanisms interacted to induce movements. As bison numbers approach a theoretical food-limited carrying capacity, decreasing body condition and vital rates are indications of nutritional stress, suggestive of competition for food supplies, even though total forage is not deleted. Furthermore, as snow depth increases, the available foraging area is reduced to increasingly limited areas at lower elevations and on thermally warmed ground. Residence times in foraging areas is negatively correlated with bison numbers, suggesting that competition increased in high-quality foraging areas as more bison migrate onto the winter range and, in turn, bison travel and redistribution increases. Though bison appear to respond to fine-scale changes in food availability, they also operate at larger scales through migration and dispersal. Migration is defined as movement from one spatial unit to another, with a return component, and conversely, dispersal is defined as movement from one spatial unit to another, without return (at least in the short term). Increases in winter range areas used by the central and northern herds have been characterized as range expansion (i.e., dispersal), even though bison returned to traditional summer ranges in the park (i.e., migration). Several authors have concluded that movements within and outside the park likely enabled bison to maintain relatively stable instantaneous densities (i.e., density equalization) during winter as population size increased. Increases in winter range areas from mid-1980s onwards thus contributed to increased population growth in both herds, and ecological carrying capacity increased once new ranges were found; creating a positive feedback cycle. The effects of road grooming for over-snow vehicle recreation on the demography and movements of bison in the central portion of the park during winter have been debated since the early 1990s. Meagher expressed concern that energy saved by bison traveling on packed snow resulted in enhanced survival and population growth and, in turn, increased movements to boundary areas. Others have concluded that, despite intensive monitoring, that there is no evidence that bison preferentially used groomed roads in central YELL during winter. Bison movements and the spatial distribution of travel corridors are primarily controlled by topographic and habitat attributes such as slope, landscape roughness, habitat, foraging areas, with streams the most influential landscape feature affecting the bison winter travel network. Bison thus move beyond park boundaries in winter in response to interactions between population density, variable forage production driven by growing season precipitation, snow conditions, and competition between bison and elk. During spring, bison also redistribute to obtain green forage at lower elevations in and outside the park, while upper-elevation portions of the winter range are still covered with snow.

Yellowstone bison have not exceeded estimates of their theoretical
food-limited carrying capacity in YELL, but began to migrate to lower elevations in or outside the park during winter as numbers increased and climatic factors (i.e., snow, drought) interacted with density to limit nutritional intake and foraging efficiency. This behavioral response has enabled bison to maintain relatively stable population growth and increase their food-limited carrying capacity as numbers increased. These findings suggest the concept of food-limited carrying capacity is somewhat different for Yellowstone bison because decreased intake or foraging efficiency induces distant movements well below ecological carrying capacity and large-scale starvation of animals. This behavioral response at a lower threshold likely represents the “nutritional” or “foraging efficiency” carrying capacity for bison when intake rates are not meeting their needs or expectations. Bison occupying the Yellowstone and Madison River watersheds historically operated at a scale larger than YELL and recent density-related dispersal movements by Yellowstone bison represent an attempt to operate at this larger scale. These movements are a natural process resulting from successful conservation, but can also serve as a “sink” because bison are generally culled from the population if they resist brucellosis risk management actions (e.g., hazing attempts to return them to the park). People often have a scale of perception that is set by the duration of their experiences, and we imprecisely remember not much more than half a century of experience, which generally extends over relatively small scales of space. Thus, it is not surprising that many people have conveniently forgotten bison are migratory wildlife that once wintered in low-elevation valleys throughout the GYA and beyond. For much of the past 100 years, Yellowstone bison were constrained to 2-3 relatively independent breeding groups that migrated into three discrete wintering areas, but did not regularly and extensively venture outside the park.

The limited spatial scale of this paradigm has reinforced multi-generational societal perceptions that Yellowstone bison should always remain within the boundary of YELL, and is reflected in the status and authority for management afforded to bison adjacent to the park in the GYA states. The Comprehensive Wildlife Conservation Strategies for Idaho, Montana and Wyoming greatly curtail wild bison abundance and distribution outside YELL. For the purposes of brucellosis management, the United States Department of Agriculture considers all bison removed from YELL, for purposes other than consignment directly to slaughter, as alternate livestock. Thus, even if the risk of brucellosis transmission could be eliminated from bison, it is unlikely these massive animals would be tolerated in many areas outside the park due to social and political barriers such as human safety concerns (e.g., motorists), conflicts with private landowners (e.g., property damage), depredation of agricultural crops, competition with livestock grazing, lack of local public support, and lack of funds for state management. Since the evolution of a substantially larger bison conservation area outside of YELL is the
prerogative of the GYA states, the prevailing social carrying capacity of Yellowstone bison is perhaps most limiting.

Freese et al. and Sanderson et al. recently documented that the North American bison is ecologically extinct across its former range and called for urgent measures to conserve the remaining wild and free-ranging bison, and restore the species as wildlife in focal areas across its historic range. Conservation of the migratory and nomadic tendencies of bison, as well as their ecological role (e.g., nutrient redistribution, competition with other ungulates, prey for carnivores, carcasses for scavengers, stimulation of primary production, dispersal of plant seed), is paramount for the perpetuation of the species. Thus, there is strong scientific and management support for managing the Yellowstone population above a minimum conservation target of 2,500 bison. Given the spatial and temporal scales aligned with this primary conservation area, this objective should be possible, with appropriate levels of management-induced dispersal “sink” conditions (e.g., hunting and brucellosis risk management). While evidence indicates the Yellowstone bison population has not exceeded the park’s food-limited carrying capacity, it is also clear that the interactive effects of severe winters with population levels greater than 4,500 induce large-scale migrations of bison to lower-elevation winter range outside YELL. Such migrations would jeopardize brucellosis risk management objectives by overwhelming temporal and spatial separation between bison and cattle. Thus, we propose that a Yellowstone bison population that varies on a decadal scale between 2,500 and 4,500 animals should satisfy the collective long-term interests of stakeholders, as a balance between the park’s forage base, conservation of the bison population and their migratory tendencies, brucellosis risk management, and other societal constraints.

Idaho Review
Dr. Bill Barton, Idaho State Veterinarian, provided an update on brucellosis in Idaho.

Montana Review
Dr. Martin Zaluski, Montana State Veterinarian

In July 2009, Montana was Classified Brucellosis Free, and consequently all 50 states in the Nation have been declared free of brucellosis in livestock. Montana will continue the Brucellosis Action Plan through January 10th, 2010 (6 months following reclassification to Class Free), at which time the area for livestock surveillance and risk mitigation activities will be adjusted. The 2008 elk surveillance (mostly hunter harvest) yielded 880 usable samples. Of the 880 samples, 62 (7%) were seropositive on standard serologic tests, and 13 (1.5%) were determined to be positive on western blot. Western blot positive elk were found in 5 hunting districts (HD) in the 2008 surveillance and in 4 HD
in 2007 surveillance. The road ahead includes continuation of wildlife surveillance, adjustment of the livestock surveillance area, continuation of risk mitigation activities in livestock, and development of objective tools to assess risk of transmission and risk mitigation.

**Wyoming Review**

Dr. Jim Logan, Wyoming State Veterinarian

Wyoming lost its free status in 2004, and we regained our free status in 2006. We had one case of Brucellosis in 2008 that was confined to one herd due to early detection. This herd was depopulated in October 2008. Over 8,000 head of cattle that were tested in relation to this herd all tested negative. We still have our free status. However, if one more case is found anywhere in the state between now and October 2010, our free status will be lost. All of Wyoming’s cases have been confirmed to have been of wildlife origin. All infected herds were located within close proximity to elk feedgrounds and/or calving grounds. Wyoming’s revised Chapter 2 Brucellosis Rules were signed into effect on May 8, 2009 by Governor Dave Freudenthal. These rules require Brucellosis vaccination statewide, with more stringent vaccination requirements within the Designated Surveillance Area (DSA). They also require that all female cattle 12 months of age and over (statewide) be officially identified. The Chapter 2 Rules also require that female cattle 18 months of age and over cattle originating in the DSA must be tested. All tests must be completed within 30 days prior to change of ownership, movement from the DSA, interstate movement, and exit from feeder channels. DSA cattle that are tested during “low-risk” exposure time frames (July 1 through November 1) will be allowed to move within 60 days of the negative test date. DSA cattle that are tested during “high-risk” exposure time frames (November 2 through June 30) will be allowed to move only within 30 days of the negative test date. Tests may be conducted at the ranch prior to movement or at a Wyoming Livestock Auction Market prior to sale. Wyoming recently revised its rules and no longer requires first point testing statewide except for cattle originating within the DSA. 

As a form of strategic surveillance, the Chapter 2 Rules also require Wyoming Custom Slaughter Facilities to collect blood samples from all Bovinae 12 months of age and older at the time of slaughter, and to submit the samples to the Wyoming State Veterinary Laboratory for testing. This surveillance exceeds national standards and requirements. Through Wyoming’s prevention and surveillance efforts, large numbers of animals have been vaccinated and tested for Brucellosis. From July 1, 2008 to June 30, 2009, there were 179,705 Bovinae vaccinated for Brucellosis statewide. 178,940 of those vaccinated were cattle, while the remaining 765 were bison. 179,056 were calfhood vaccinates, and 649 were adult vaccinates. During the same time frame, 82,930 Bovinae were tested for Brucellosis statewide – 82,918 of these animals tested
REPORT OF THE COMMITTEE

negative, while 12 animals from the 2008 infected herd tested positive. These testing numbers include all herds (infected, adjacent, and contact) associated with the case in 2008, as well as from the rest of the state through routine surveillance. In the last 9 years, Wyoming has tested over 800,000 head of cattle for Brucellosis. This includes infected herds, the adjacent and/or contact herds associated with the infected herds, as well as routine testing statewide.

The Wyoming Livestock Board, Wyoming Department of Agriculture, USDA-APHIS, Wyoming State Veterinary Laboratory, and Wyoming Game and Fish personnel held four meetings with producers statewide to discuss the new APHIS concept for the National Brucellosis Program’s future. Wyoming, Idaho, and Montana state veterinarians have provided considerable input to APHIS in the development of this new concept. It is our collective goal to prevent the spread of Brucellosis from wildlife within our DSA's to cattle anywhere in the United States. We do still expect to find sporadic cases of Brucellosis among our cattle herds as long as there is a wildlife reservoir of the disease in our state. Our test and identification requirements provide good surveillance, traceability, and early detection. We expect this, along with wildlife risk mitigation efforts, to prevent the disease from spreading beyond the boundaries of our defined surveillance area. The Wyoming Livestock Board pays the direct costs of Brucellosis testing for required testing within the DSA. The Wyoming legislature has allocated funds for Brucellosis Risk Mitigation Projects to help producers. Such projects include: spaying heifers, voluntary surveillance testing, adult vaccination, strategic fencing, emergency strategic relocation of cattle, authorized strategic bison or elk feeding to prevent commingling, and emergency cattle feeding.

Dr. Terry Kreeger, Wyoming Game and Fish Department (WGFD) veterinarian reported on Brucellosis wildlife risk mitigation authorities in Wyoming. Surveillance activity includes testing of samples submitted by hunters from elk killed in specific hunt areas each year as well as sampling elk trapped or killed in the Designated Surveillance Area annually. This testing has identified increased seroprevalance in Western Park County (east of YELL) which is an area where there are no elk feedgrounds. The test and removal pilot project on three elk feedgrounds in Sublette County is in the fifth and final year. This project has shown a decrease in seroprevalence in elk in each of the past three years and test and removal will remain a tool for future use in strategic locations. Prevention activities included vaccination with strain 19 or 2 of the 23 elk feedgrounds. Elk feeding is one mechanism used to attract elk away from cattle feedlines and to prevent co-mingling. WGFD is shortening the feeding season as weather allows and is experimenting with feeding techniques to attempt to reduce the contamination of elk and to spread them out of the feedground to avoid exposure. Research efforts include Brucella and Yersinia diagnostic chute side test development and vaginal implant transmitter studies. The Wyoming Livestock Board and the WGFD are also working
with the U.S. Fish and Wildlife Service (USFWS) and the Wind River Indian Reservation to conduct surveillance activities on elk on the reservation which is adjacent to Wyoming's Designated Surveillance Area.

Summary of the Panel on the Future of the National Brucellosis Program

Dr. Mike Gilsdorf moderated a panel discussion addressing the future of the national Brucellosis program and the concept paper recently published in the federal register. Panelists were Dr. Lee Anne Thomas, USDA-APHIS-VS, Dr. Tom Roffe, U.S. Geological Survey (USGS), Dr. Terry Kreeger, WGFD, Mr. George Teagarden, Kansas Animal Health Official, and Dr. Bill Barton, Idaho State Veterinarian. The panel agreed that it is time to make appropriate changes to the national program for *Brucella abortus* in cattle while recognizing that it is important to mitigate exposure risks from infected wildlife in the GYA. Pertinent comments and questions brought forth by the panelists and meeting participants included: 1.) Slaughter surveillance and timely reporting of results to the state veterinarians should continue to be a part of the program; 2.) Brucellosis does not really have a negative effect on elk population. We do not currently have the necessary tools to eradicate the disease from wildlife populations, but we do need to continue working together to mitigate exposure risks and manage wildlife to prevent transmission from wildlife to livestock; 3.) Vaccine research is necessary for both wildlife and cattle and this must include vaccine delivery system development; 3.) Better diagnostics are necessary and research funding must be secured; 4.) Legal constraints and agency authorities are limiting factors in our ability to deal with the wildlife issues; 5.) Public education about the issue is of paramount importance; and Wildlife (elk and bison) population must be kept at objective to efficiently manage brucellosis.

State animal health officials have concerns including: 1.) Continued adequate surveillance nationwide needs to be funded even when resources are redirected to where the risks in greatest; 2.) State veterinarians need to be involved in assessing the adequacy of stat program’s ability to prevent the spread of brucellosis from the GYA; Implementing an oversight committee composed of GYA state veterinarian, GYA producers, non-GYA state vet, non-GYA producer, APHIS-VS personnel and others to be determined would help maintain the validity of a state’s program; 3.) APHIS does not intend to “walk away from” the brucellosis issue in the GYA; There will be continued reliance on state’s authority to issue quarantines and require surveillance, prevention, movement restrictions, and animal identification; Traceability is a critical component of the program’s success; 4.) Regulatory performance standards to provide a “level of comfort” for trading partners; 5.) Idaho, Montana, Wyoming will continue to enforce their current brucellosis regulations to protect their states and all other stated from spread of brucellosis whether this concept goes forward or not; 6.) Funding for abortion serology surveillance should be maintained;
and 7.) There is concern about decreasing first point testing nationwide due to surveillance adequacy and also animal identification capabilities pertaining to traceability. There was general agreement that providing flexibility in the national program and utilizing targeted surveillance with traceability is an appropriate direction for the program at this time.

Committee Business:
The Committee reviewed and passed five resolutions, which were submitted to the Committee on Nominations and Resolutions for review.
BRUCELLOSIS
REPORT OF THE SCIENTIFIC ADVISORY SUBCOMMITTEE ON BRUCELLOSIS

Chair: Dr. Philip Elzer

Subcommittee Chair Phillip Elzer, Brucellosis Researcher, Louisiana Annual State University (LSU), convened the Subcommittee at 12:00 p.m., October 12, 2009. Subcommittee members present included Don Davis, Phillip Elzer, Don Evans, Barb Martin, Steve Olsen, and Jack Rhyan. There was one scientific issues referred to the Subcommittee during the year. There were 23 visitors also in attendance.

Don Evans presented on new suspect range for the fluorescence polarization assay (FPA) for cattle based on the data provided by Texas and Missouri. The committee recommends that Veterinary Services amend the 9CFR and UM&R to change the suspect range from -20 delta milipolar units to -40 as long as the animal is complement fixation negative. Don Evans presented data that was used to originally evaluate swine brucellosis serology from 1999. Swine Health Staff requests that the Brucellosis Scientific Advisory Committee review available data and provide a recommendation on a surveillance (not diagnostics) testing algorithm to be used for swine brucellosis. Dr. Plumb charged the Subcommittee to evaluate the above request. Based on the data from 1999 the committee recommends the FPA test followed by Complement fixation on all FPA positive samples. Steve Olsen is communicating with the scientists in Russian regarding the S82 vaccine in order to develop a review paper and once this information is conveyed, Dr. Olsen will present it to the committee.

Frank Galey, University of Wyoming, introduced the Consortium for the Advancement of Brucellosis Science (CABS) which is a follow up on the Laramie Agenda. CABS is a cooperative effort among scientists and stakeholders to evaluate current brucellosis research, indentify gaps, and develop research protocols for funding partners for the advancement of brucellosis science for both domestic and wild animals. A resolution to support CABS was presented to the Subcommittee and the Subcommittee unanimously endorsed the resolution and it was given to Dr. Logan for presentation to the Committee. The Subcommittee discussed the decline in our ability to do scientific research in the field of brucellosis due to the select agent rules and regulations. This is so dramatic that the national capacity to do large animal research has evaporated. This is apparent by the total lack of scientific presentations to the USAHA general assembly on brucellosis. In the past it was possible to do large ungulate brucellosis research in the following states: Colorado, Idaho, Iowa, Louisiana, Texas, and Wyoming. During that time any one facility could conduct research using 30 -300 large ruminant species. As of this date Iowa can 24 cattle or perhaps elk in the current facilities. In the future assuming commissioning,
accreditation and all other approvals are met the Iowa and Louisiana facilities can conduct large animal brucellosis research in indoor facilities. The Subcommittee still encourages USDA and Centers for Disease Control and Prevention (CDC) to support the outdoor brucellosis research facilities check list to aid in the expansion of the much needed brucellosis research in wild ungulates. VS requested that the Brucellosis Scientific Advisory Subcommittee evaluate the use of \textit{Brucella abortus} Strain RB 51 vaccine in bison between the age of 12 and 18 months. If this Subcommittee recommends the use of this vaccine in this age of animal, the Center for Veterinary Biologics will evaluate the recommendation. Data was presented by Dr. Olsen regarding serological responses in bison calves vaccinated with RB 51 between the ages of 12 to 24 months. Bison calves vaccinated during this time frame remained sero-negative after vaccination. The committee recommends that Veterinary Services expands the use of RB 51 vaccination in bison calves to the age of 12 to 24 months.

Dr. Walt Cook, Wyoming asked the Subcommittee for their opinion on the role of wolves and the transmission of brucellosis to wild or domestic animals. The Subcommittee had an active discussion regarding this issue and the committee resolves that canids are not a significant source for the transmission of brucellosis based on scientific research, published data and historical experiences. The Brucellosis Scientific Advisory Subcommittee unanimously endorsed the resolution developed by the Subcommittee on Brucellosis in the GYA, regarding the review of select agent status for \textit{Brucella abortus}.
The Subcommittee met on Sunday, October 11, 2009. Twenty-three persons were in attendance at the meeting, including 10 members of the Subcommittee. Reports were provided on a number of disease issues of interest to USAHA and its members. A summary of the reports is included below.

Dr. Joseph L. Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, provided an update on the National Feral Swine Mapping System (NFSMS). SCWDS produced nationwide feral swine distribution maps in 1982, 1988 and 2004 by working directly with state and territorial natural resources agency personnel. In 1982, 17 states reported feral swine in a total of 475 counties. In 2004, 28 states reported feral swine in 1014 counties. With support from USDA-APHIS-Veterinary Services (VS) the SCWDS has now developed the National Feral Swine Mapping System (NFSMS), an interactive data collection system to be used to collect and display real time data on the distribution of feral swine in the United States. The real time feral swine distribution maps are produced using data collected from state and territorial natural resources agency personnel and from USDA-APHIS-Wildlife Services (WS). The real time map is available to be viewed by the public on the NFSMS home page. Distribution data submitted by agency personnel are evaluated by SCWDS on a continual basis, and the real time distribution map updated with verified additions on a monthly basis. Feral swine populations and/or sightings are designated on the map either as established and breeding populations, or as sightings. The 2008 map revealed that feral swine are currently in 5 states. The NFSMS is accessed via the internet at http://www.feralswinemap.org/.

Mr. Seth Swafford, USDA-APHIS-Wildlife Services (WS) gave an update on Wildlife Services. Wildlife Services has conducted projects on trap monitors, feral swine barriers and experimental foot-and-mouth disease (FMD) infection in feral swine at the Foreign Animal Disease Diagnostic Laboratory (FADDL). They worked on projects in North Carolina, Nebraska and Kansas in addition to depopulation projects in Michigan, Tennessee and Pennsylvania. Wildlife Services conducted Comprehensive Disease Surveillance for classical swine fever (CSF), FMD, brucellosis, pseudorabies virus (PRV), trichinae and toxoplasmosis in feral swine.

Dr. Greg Hawkins, Texas Animal Health Commission reported on Brucella suis infection in cattle in Texas. There have been 46 head of cattle in 31 herds infected with B. suis from 1998 through 2009. They are concerned that there may be cow to cow transmission of B. suis.
With termination of first point testing these animals will be detected at slaughter and the state will not be able to determine if *B. suis* is the cause of the titer.

Dr. Troy Bigelow, USDA-APHIS gave an update on the swine programs. USDA is funding the SCWDS feral swine mapping project and Wildlife Services feral swine disease surveillance project. Dr. Bigelow reported that there were three transitional swine herds infected with swine brucellosis (SB) in Georgia. All states are SB Free except Texas which is stage 2. All states are Stage V (Free) for PRV. Dr. Bigelow also reported on the new surveillance system that will be conducted at the NAHLN and Regional laboratories. USDA is also working on swine diseases regulatory changes and updates. Dr. Edwin Hahn, University of Illinois, reported on his studies of pseudorabies viruses from feral origin and domestic origin. Most strains that have surfaced in transitional outbreaks can be distinguished by sequencing within the gene for gC. Virus strains from feral swine in the South Central States showed the greatest variation in gC sequence. Sixty-three feral samples were also tested for the viral gene for gE. Absence of the marker gE gene would be an indication of the presence of marker vaccine virus. No evidence of marker vaccine was found in feral swine samples, suggesting that vaccines were not circulating. Detection of viral DNA in most feral pig oral tissues suggests that the virus uses oral spread as part of the transmission mechanism in addition to what has been shown about venereal transition. Highest virus load was in tonsils, but viral DNA was also found in salivary glands, taste buds and mucosa near the tusks. The development of a real time PCR assay to quantify the actual number of genome copies in a tissue was described that represents a powerful tool for both detection and research in viral pathogenesis. There was one resolution presented and passed concerning SB and is forwarded to the Committee on Brucellosis.
The purpose of the Subcommittee on Brucellosis in the Greater Yellowstone Area (GYA) is to provide support and recommendations to the Committee on Brucellosis for disease transmission risk management and the eventual elimination of the disease in the Greater Yellowstone Area. Arising from the highly successful national brucellosis eradication program among domestic livestock and captive wildlife, free-ranging wild elk and bison in the GYA are now recognized as the last reservoir of *B. abortus* in the United States. The Subcommittee on Brucellosis in the Greater Yellowstone Area serves as a forum and clearing house for ideas and proposals that have been submitted to it by state and federal members, industry representatives, researchers, wildlife interests and others. Members present included Marty Zaluski, Terry Kreeger, Michael Gilsdorf, P.J. White, Neil Anderson, Jim Logan, Bill Barton, and Dave Hunter. Brian McCluskey, DVM, Director, Western Region USDA-APHIS described an effort to quantify risk of brucellosis transmission based on herd management practices that include vaccination, biosecurity, testing and traceability. Brant Schumaker, Candidate PhD, University of California, Davis, spoke about his project to model the geography of risk of transmission in the Northern GYA. The project aimed to characterize spatio-temporal shedding probabilities on the northern GYA landscape from bison and elk populations. Through this project, Brant assessed the probability of shedding in two-month intervals from January to June based on mild, average, and severe winter snowfall patterns. Shedding maps will show the varying probabilities by season, snowfall and across the landscape. Glenn Plumb, PhD, Chief of Natural Resources, Yellowstone National Park spoke about the carrying capacity for bison in the park and indicated that the target for bison population abundance in Yellowstone National Park should be between 2,500 and 4,500 animals (see full presentation below). Kelly Proffitt, PhD, Wildlife Research Biologist, Montana Department of Fish Wildlife and Parks, spoke about elk-wolf interactions in the Greater Yellowstone Area (GYA). In the GYA, elk responses to predation risk have received considerable attention since reintroduction of wolves. Elk responses to predation risk have included changes in group size, vigilance, movement rates, and habitat selection. Dr. Proffitt discussed how these responses may affect elk to elk and elk to livestock brucellosis transmission risk. Dr. Dave Hunter, Wildlife Veterinarian, Turner Enterprises, Inc., spoke about the challenges of operating a large domestic bison operation within the brucellosis surveillance area of Montana.
REPORT OF THE COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

Chair: Michele A. Miller, FL
Vice Chair: Robert Hilsenroth, FL

Wilbur B. Amand, PA; Paul L. Anderson, MN; Mark W. Atkinson, NV; Daniel R. Baca, TX; Scott C. Bender, AZ; Warren Bluntzer, TX; Deborah L. Brennan, MS; Charles S. Brown, NC; Kristina Brunjes, KY; Beth W. Carlson, ND; William H. Clay, DC; Donald S. Davis, TX; Mark L. Drew, ID; Tim J. Feldner, MT; John R. Fischer, GA; Nancy A. Frank, MI; Richard A. French, NH; Tam Garland, TX; Robert F. Gerlach, AK; Paul Gibbs, FL; Colin M. Gillin, OR; Michael J. Gilsdorf, MD; Chester A. Gipson, MD; Dean E. Goeldner, MD; James R. Hail, OK; Greg N. Hawkins, TX; Sam D. Holland, SD; David L. Hunter, MT; John P. Huntley, NY; Sherman W. Jack, MS; Kevin Keel, GA; Karl G. Kinsel, TX; Patrice N. Klein, MD; Terry J. Kreeger, WY; Carolyn Laughlin, OH; Steve K. Laughlin, OH; Konstantin Lyashchenko, NY; John R. MacMillian, AR; Phillip M. Mamer, ID; David T. Marshall, NC; Leslie A. McFarlane, UT; Robert G. McLean, CO; Robert M. Meyer, CO; Andrea Mikolon, CA; L. Devon Miller, IN; Jeffrey T. Nelson, IA; Janet B. Payeur, IA; William R. Pittenger, MO; Michael R. Pruitt, OK; Chris V. Rathe, WA; Emi K. Saito, CO; Shawn P. Schafer, ND; David D. Schmitt, IA; Dennis L. Schmitt, MO; Stephen M. Schmitt, MI; Roy A. Schultz, IA; Andy L. Schwartz, TX; Charly Seale, TX; Daryl L. Simon, MN; Jonathan M. Sleeman, WI; Joe Starcher, WV; Cleve Tedford, TN; Robert M. S. Temple, OH; Brad Thurston, IN; Kimberly K. Wagner, WI; Rick Wahlert, CO; Kenneth Waldrup, TX; Ray Waters, IA; Kyle W. Wilson, TN; Richard W. Winters, Jr., TX; Jill Bryar Wood, TX; Taylor H. Woods, MO; Glen L. Zebarth, MN.

The Committee met on October 11, 2009 at the Town and Country Hotel, San Diego, Calif., from 12:30 to 5:00 p.m. There were 37 members and 21 guests present.

Update on Animal Care, USDA
Dr. Chester Gipson
USDA-APHIS; Animal Care (AC).

Animal Care is the unit within USDA's Animal and Plant Health Inspection Service (APHIS) responsible for enforcement of the Animal Welfare Act (AWA) and the supporting regulations, as well as the Horse Protection Act (HPA) and the supporting regulations. There are several regulatory changes proposed with the intent to address issues and improve the welfare of animals covered by the AWA. Some of the proposed changes are: contingency plan requirement for licensee to better prepare for disasters; safe handling requirements for certain species to address safety issues when handling potentially dangerous species by requiring a shift cage; minimum age requirement for the transport of
animals to address the dangers and health risk to animals transported without the mother at too young an age; submission of itineraries so USDA will know the location of animals with traveling exhibitors; removal of the acclimation certificate and require the owner to sign the certificate rather than a veterinarian; veterinary medical records be kept for each animal; standards for birds that are now covered by the AWA; amendment to the regulations to prohibit the importation of dogs less than 6 months of age with exception for the state of Hawaii as long as they are not imported for resale at less than 6 months of age. The Department is also evaluating a petition received from In Defense of Animals to promulgate regulations to address space requirements and hoof care for elephants.

There has been a policy change on the tuberculosis (TB) test guidelines for elephants. At the 2008 USAHA meeting, the TB test guidelines were updated and approved and USAHA requested that APHIS adopt the updated version. The updated guidelines incorporate a new blood test, the elephant TB Stat-Pak and the MAPIA, in addition to the trunk wash protocol. Testing and implementation protocols are under review and guidelines, when finalized, can be found at: www.aphis.usda.gov/animal_welfare/ under “Publications and Reports.”

APHIS has collaborated with the Lincoln Park Zoo’s Davee Epidemiological Center to develop a surveillance and outbreak management plan for Foreign Animal Diseases (FADs) in zoos that might affect the zoo’s collection. The Davee Center has organized an operation unit to administer surveillance and outbreak plans for HPAI and other reportable diseases that could affect zoo collections. The Center has also developed training modules for surveillance of HPAI and other FADs. Pilot surveillance programs are expected to begin in zoos this fall.

APHIS has established a Center for Animal Welfare located in Kansas City, Missouri. With the increased public awareness and emphasis placed on animal welfare, the Agency recognized the need to provide better support to the regulated community. A few of the activities the Center will engage in are these: provide experts in the field of animal welfare to serve as both a national and international resources; assist states and organizations with performing an analysis of their animal welfare regulations; conduct field studies, including the evaluation, development, and appropriate use of technology, to support the well-being of animals; identify and track emerging issues related to animal welfare and where appropriate, analyze and develop policy related to those issues; engage in capacity building in the international community for animal welfare; and provide Center personnel to work with universities, federal, state and local governments, industry, and animal advocacy groups to create partnerships and joint programs. We anticipate the Center being fully operational in 2010.

**Chronic Wasting Disease National Program Update**

Dr. Dean Goeldner

National Center for Animal Health Programs, USDA-APHIS-VS

In FY 2009 APHIS received approximately $17 million in appropriated
chronic wasting disease (CWD) funding, including $1.5 million in congressional earmarks.

**APHIS-VS Program for Captive and Farmed Cervids**

CWD rule update: The proposed supplemental rule for CWD was published for comment in the Federal Register on March 31, 2009. The proposed rule preserved the principle of federal preemption regarding interstate movement restrictions for CWD but did not affect state movement restrictions for other reasons. It also increased the surveillance requirement for interstate movement to 5 years, or certified status in the program. Finally, it proposed to create a 25 mi/40 km proximity standard to occurrences of CWD in wild cervids for those states seeking additional risk mitigation. Other issues such as inventory, quarantine, DNA comparison and wildlife surveillance requirements were also addressed.

APHIS is drafting responses to the comments received and is discussing internally what direction the revised final rule will take. Issues that may impact the revised final rule include the president’s memo on federal preemption dated May 20, 2009; budgetary constraints; the 2015 vision for Veterinary Services; and the need to create a truly cooperative state-industry-federal program that works for all stakeholders.

APHIS intends to publish and implement the revised final CWD rule in 2010.

Testing: In FY 2009, 2,652 farmed and captive cervids were tested for CWD using immunohistochemistry. This continues an increasing trend that is likely the result of industry growth and stricter enforcement of state regulatory programs.

Status: Five positive farmed cervid herds were detected in FY 2009: Two white-tailed deer herds in Wisconsin, one elk herd in Minnesota, and two elk herds in Colorado. The Wisconsin and Minnesota facilities have been depopulated. This brings to 47 the number of positive herds that have been identified since 1997. At this time, six positive elk herds remain in Colorado. Also, CWD was detected at slaughter for the first time in FY 2009. VS continues to offer indemnity and cover depopulation, disposal and testing costs for CWD-positive and exposed herds and trace animals.

**Sensitive Detection of PrP<sub>CWD</sub> in Rectoanal Mucosa-Associated Lymphoid Tissue from Preclinical White-Tailed Deer**

Dr. David Schneider

USDA- Agriculture Research Service (ARS)

Diagnosis of transmissible spongiform encephalopathies relies upon sensitive detection of disease-associated prion protein (PrP<sup>d</sup>) in brain or lymphoid tissues [for example, the obex and medial retropharyngeal lymph node (RPLN), respectively]. Live animal testing for scrapie disease in sheep has included evaluation of biopsy samples of the tonsil, third eyelid lymphoid tissue and rectoanal mucosa-associated lymphoid tissue (RAMALT). Similarly, diagnosis of chronic wasting disease (CWD) in live...
elk by detection of PrPCWD in biopsy samples of RAMALT has recently been described. This report summarizes the comparative diagnostic performance of postmortem RAMALT sampling in four white-tailed deer test populations: from Wisconsin, 210 free-ranging deer and a captive herd of 76; and from Saskatchewan, Canada, two captive herds (122 and 385, respectively). Deer were diagnosed as CWD-positive if PrPCWD was detected in any nervous system or lymphoid tissue. The apparent prevalence of disease in these test populations ranged from 6% in the sampled free-ranging deer to 21-79% in the captive herds. None of the deer were demonstrating signs consistent with CWD.

The overall tissue-specific test sensitivities were (simple mean ± sd, n = 4 test populations): RPLN, 0.95 ± 0.05; tonsil, 0.86 ± 0.10; RAMALT, 0.80 ± 0.09; obex, 0.66 ± 0.18. Test sensitivities were generally lower for captive herd deer having at least one PRNP G96S allele (n = 3): RPLN, 0.87 ± 0.18; tonsil, 0.66 ± 0.15; RAMALT, 0.58 ± 0.10; obex, 0.34 ± 0.15. False negative RAMALT results were associated with early disease progression (n = 4), as assessed by PrPCWD accumulation scores in RPLN or obex, and/or the PRNP G96S allele (n = 2 of 3). As determined in two of the captive herds, the proportion of CWD-positive RAMALT follicles were generally lowest in deer early in disease progression and/or heterozygous at PRNP codon 96. And, as expected, variation in the proportion CWD-positive RAMALT follicles was inversely related to the total number of observable follicles per sample.

For general usage these comparisons for samples collected postmortem suggest diagnostic evaluation of RAMALT samples in white-tailed deer would have intermediate test sensitivity as compared to evaluation of RPLN and obex. While many factors may influence actual test performance, early stage of disease progression and the PRNP G96S allele are two that were associated with lower test sensitivities.

Resistance of Fallow Deer (Dama dama) to Chronic Wasting Disease Under National Exposure in a Heavily Contaminated Environment
Dr. Jack Rhyman
USDA-APHIS

Between 2000 and 2007, 25 fallow deer were placed in a CWD contaminated pasture and exposed to CWD infected mule deer. Eighteen fawns were born in 2002. Of the 41 mule deer that rotated with the herd during this time, 35 were diagnosed with CWD. None of the 43 fallow deer were found to have CWD. This study suggests that fallow deer appear to have resistance to CWD infection under natural exposure in a heavily contaminated environment.
REPORT OF THE COMMITTEE

Scimitar-Horned Oryx Project Senegal Update
Mr. Charly Seale
Exotic Wildlife Association (EWA)

History of the Game Ranching Industry: The newly emerging exotic animal business was a way during the drought of the 50’s and falling cattle, sheep, and goat prices to save many failing ranches. The term exotic rancher began to catch on as many ranchers/farmers across Texas and many states throughout the U.S. began to see this new industry as a way to cash in and diversify their traditional livestock ranches and farms. In the early 1970’s the Texas Legislature, through lobbying from the EWA, classified Exotic Hoofstock as livestock. What this did was to take the regulatory authority away from the Texas Parks and Wildlife Dept. and place it under the Texas Animal Health Commission. This gave the ranchers the ability to buy, sell, and trade these animals without the undo burden of governmental regulations. This caused these animals to flourish in a landscape and environment that was very similar in nature to their own native lands.

Beginning of Game Ranching/Farming: The first exotics and game ranching in the United States began as far back as the 1700’s when George Washington began to raise fallow and red deer on his plantation in Mount Vernon along the Potomac River, just outside the District of Columbia. First exotics in Texas date as far back as the 1800’s when the United States Calvary brought Camels to Camp Verde, Texas as an experiment in apprehending Comanche Indians. The actual first conservation efforts by private individuals dates back to the late 1800’s and early 1900’s when the U.S. government turned the propagation of the American Bison over to private individuals. With the government out of the way, the decimated herds of Bison were brought back from near extinction to the millions of animals that exist today.

Modern Day Conservation Efforts-Exotic Wildlife Association/Sahara Conservation Fund: Early 1970’s over 00 blackbuck antelope and axis deer were shipped back to their native land of India and Pakistan for propagation. This was one of the first conservation efforts of the Exotic Wildlife Association.

Dubai project-Nov 200: Negotiation efforts with the country of Dubai - January-February 2005-acquired 44 Dama Gazelle, 40 Addax, 35 Markhor, 10 Scimitar Horned Oryx-captured from private Texas ranches, crated and readied for shipment to the country of Dubai. 15 Hour flight once animals were loaded on a plane in San Antonio, Texas to New York and then on to their final destination at a game preserve in Dubai. All animals were in excellent condition upon their arrival in Dubai. The shipment was accompanied by our EWA Conservation Project Chairman, Sahara Conservation Fund representative, and a specially selected veterinarian.

Senegal Project-December 2005: April 2007-Exotic Wildlife Association and the Sahara Conservation Fund sign Memorandum of
Understanding to become partners in the Senegal project and future repatriation projects. July 2007 negotiations begin with the officials of the Senegal government totally bypassing the mediator for the director of preserves-it is learned at this time that he really had no negotiating power anyway. September 2007 Conservation Project Chairman and CEO of Sahara Conservation Fund travel to Dakar, Senegal to negotiate directly with Senegal government officials, attempt to secure permits from their government, and tour two preserves where U.S. animals will be taken. The Guembeul Preserve consists of approximately 1500 acres. There are no pens and the animals, which consist of several different species, are allowed to free-range within this enclosure. The second preserve located in St. Louis, Senegal is the Katane Preserve which is also an open high fenced preserve consisting of 1200 acres. The Senegal Government accepted EWA's proposal, which consists of: 12 Scimitar Horned Oryx all DNA tested for purity; enough money to feed the animals for three years; and issues with the import permits. However, it will take another six to nine months for U.S. Fish and Wildlife to issue the export permits. Because the animals in both the Guembeul and Katane Preserves are open preserves where the animals are allowed to roam together, EWA proposed fencing the interior where the animals could then be separated by species.

Phase I Begins - Fencing the Guembeul and Katane Preserves: Details had to be worked out locating the exact areas to be fenced within Guembeul and Katane Preserve. Once the locations of the fence was located the proper governmental permits had to be obtained. Fencing supplies were either purchased for the project or were donated by American suppliers. The fencing supplies were carefully selected for durability and had to be properly loaded and cared for during shipment. All supplies were inventoried and packed into steel shipping crates. Security and a complete inventory were essential to this project because of the cost of materials. EWA officials made an accurate accounting of the materials before they were shipped and then checked each loaded crate once it arrived in Saint Louis, Senegal.

A representative for the Exotic Wildlife Association and Sahara: Conservation Fund stayed on site training local workers and overseeing the construction of the fencing project. Instructing the local work force in the proper procedure for building the fence was the toughest part of the job. The strict parameters set out by the Senegal Government concerning the construction of the fence were stringently enforced. Four months after the project began the first phase was finally completed. The second phase, actually sending animals back to the preserve, will begin in the coming months. This will be the most expensive part of our conservation efforts but will hopefully be the groundwork for many conservation programs with the Senegal as well as other African governments.

U.S. Captive Bred Species: The Exotic Wildlife Association, which has over 3700 members, raises more numbers of rare and endangered hoofstock than any other association in the world. Exotic Game Ranching
REPORT OF THE COMMITTEE

in Texas is a $1.3$ million dollar business per year and Texas ranchers propagate approximately $100$ different species of exotic hoofstock. The number of exotic hoofstock owned by private individuals within the state of Texas is estimated between $275,000$ to $300,000$ animals. The future of this industry, as well as the captive animal industry, is very bright with one caveat. The threat from sportsmen in this country who are simply misinformed about captive breeding as well as Animal Right's Activists who simply want to impose their beliefs on private citizens are the two primary causes that will bring this industry down and destroy the very animals they want to protect. We should have learned our lesson from the protectors of the American Bison and see what happens when conservation is left in the hands of the private sector. The endangered species act, which was originally passed to protect rare and endangered animals, is actually causing the demise of many of the species it was designed to protect. This law is in dire need of major overhauling. Unfortunately the U.S. Congress, when passing the ESA, did not take into account U.S. captive bred animals and private breeders when passing the act. Many of the countries that are home to these endangered species no longer care about their existence. They can barely feed their own people much less the animals. Most agree many of these species are extinct or on the verge of extinction in their native lands but flourish by the thousands in this country because of private ownership. This is why we need the exemption from the endangered species act for all U.S. captive bred animals. U.S. breeders have shown what can be accomplished when conservation is left in the hands of the private sector. The Scimitar Horned Oryx, extinct in the wild in its native land, has flourished in the U.S. There are over $8,000$ in Texas alone. Give animals value and they will flourish. Make the bureaucratic red tape so cumbersome for raising these animals and you will see their eventual demise.

Use of Non-Serological Samples for Rapid TB Diagnostic Tests

Dr. Konstantin Lyashchenko
Chemobio Diagnostics, Inc.

Antibody detection assays constitute an attractive alternative to the existing methods of testing for tuberculosis, such as the tuberculin skin tests, to quickly identify infected animals. In certain situations, however, fresh blood samples cannot be collected for various reasons. Human tuberculosis research demonstrated the feasibility of antibody detection from other than blood-derived specimens. Our pilot study using several immunoassay formats (Rapid Test, Dual Path Platform, and Multiantigen Print Immunoassay) shows that antibodies against multiple proteins of *Mycobacterium bovis* can be easily found in extracts obtained from muscle tissue or lymph nodes of experimentally infected cattle or deer, but not in saliva, urine, bile, or aqueous humor. The antibody levels and antigen recognition patterns found in these alternative specimens were comparable to those observed in serum samples from the same animals. The utility of
CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

this approach was further validated using lung fluid from a captive Asian elephant which died of *M. tuberculosis*, lung and pericardial fluids from wild lions infected with *M. bovis*, and thoracic samples obtained from badgers found dead. The use of non-serological specimens for antibody-based assays may be a useful option for wildlife surveillance/diagnosis in multiple species when blood is not available or cannot be obtained.

Response of Sensitized Elk to Single Cervical Tuberculin (SCT) and Comparative Cervical Tuberculin (CCT) Tests
Dr. Shylo Johnson
National Wildlife Research Center (NWRC), USDA-APHIS

Elk, *Cervus elaphus*, are subject to the regulations concerning intradermal tuberculin testing under the USDA’s uniform methods and rules for the eradication of bovine tuberculosis. Though the single cervical tuberculin (SCT) and comparative cervical tuberculin (CCT) tests are approved methods of anti-mortem detection of *Mycobacterium bovis* infection, few studies quantify the response of elk to these tests. Furthermore, results are acquired after the injection sites are palpated and measured at 72 hours post injection requiring rehandling of the animals. Infrared thermography, the remote measure of surface temperature, may be able to reduce the time to results and eliminate the second handling of the animals by measuring temperature changes associated with inflammation at injection sites. Our objective was to examine the response of sensitized and non-sensitized elk to the tests by palpation, skin thickness measurement and IRT.

To this end, 10 elk were sensitized to *M. bovis*, 9 elk were sensitized to *M. avium* and 19 elk were not sensitized. The sensitized elk were tested 119 or 120 days after injection of 0.1 ml derivatives of the selected bacterium. The animals from the three different groups were randomly divided into two blocks; block 1 received 0.1 ml of 2 mg/ml of the purified protein derivative (PPD) and block 2 received 0.1 ml of 1 mg/ml of the PPD for the SCT test. Testing of block 1 was offset by one day from block 2 testing. The SCT and the CCT were conducted concurrently on each animal on the right side and left side of the neck, respectively. In addition to the PPD injections sites which were measured for skin thickness and palpated, two additional sites for the SCT and CCT were measured and palpated, a saline injection site and a control site. IRT images were taken at 0, 24, 48, and 72 ± 3 hrs post injection of all sites.

No significant difference (χ²=1.09. P=0.78) for detecting a response occurred between the two different concentrations of the PPD for the SCT. Increase in skin thickness for the SCT ranged from 0.0 mm to 8.5 mm and the mean for sensitized animals at the PPD injection site was 3.0 mm (± 0.5 SE). Based on palpation results, 78.9% of the sensitized elk and 36.8% of the control elk had a response to the PPD injection on the SCT. For the CCT, skin thickness increased from 0.0 mm up to 10.0 mm. The mean at the bovine PPD site was 4.1 mm (± 0.9 SE) for *M. bovis*
sensitized, 1.8 mm (± 0.4 SE) for *M. avium* sensitized, and 0.9 mm (± 0.1 SE) for the control elk. Ninety percent (9 of 10) of *M. bovis* sensitized were suspects or reactors. Of the 9 elk that had *M. avium* sensitogen and of the 19 elk that were controls, 26 plotted in the negative zone for *M. bovis* and 2 of the control elk plotted in the suspect zone for 92.9% specificity. Preliminary IRT analysis has not indicated any significant temperature changes associated with the different sites.

The changes due to the PPD injections are often small and changes in the concentration of the PPD for the SCT did not result in significant changes in detecting a response. The small changes, however, may mean less inflammation that could be masked by ambient conditions making IRT difficult to use on elk.

**Anthrax Outbreak – An Unexpected Predator**

Dr. David Hunter  
Turner Enterprises Inc.

In July 2008, an outbreak of anthrax occurred in a herd of 5000+ bison on an 18,000 acres pasture in Montana. Primary findings were acute death and splenomegaly on necropsy. Rutting bulls had the highest rate of mortality (39%) with a total herd mortality of 5%. In addition to bison, bull elks were also found dead on the ranch. A rapid field test for biological weapons was used to confirm diagnosis in the bison.

Dead bison were buried and decontaminated. The affected pasture was fenced off and remaining bison moved and fed medicated feed. Bison were vaccinated with an attenuated live anthrax vaccine (double dose) using a pneumatic injector in the neck. Serum titers peaked at two months post-vaccination but persisted for 10 months above baseline.

**Epizootic Hemorrhagic Disease – An Update**

Dr. David Stalknecht  
University of Georgia.

Dr. Stalknecht gave an update on bluetongue and epizootic hemorrhagic virus isolations during 2008 and 2009. In 2008, isolations were made from wild and captive white-tailed deer in Arkansas (BTV-3), Indiana (EHDV-2), Kansas (EHDV-2, EHDV-6), and Texas ((EHDV-1, EHDV-2, EHDV-6, BTV-12, BTV-17). As of October 9 this year (2009), viruses have been isolated from white-tailed deer in Florida (EHDV-2), Kansas (EHDV-2), Louisiana (EHDV-2), Michigan (EHDV-6), Missouri (EHDV-2), Tennessee (EHDV-2), and Texas (BTV-17). BTV-3, BTV-12, and EHDV-6 all represent viruses that were not know to occur in the United States prior to 1999 (BTV-3), 2006 (EHDV-6), and 2008 (BTV-12). There have been multiple isolations of BTV-3 and EHDV-6 suggesting that these viruses are established.

**Committee Business:**

No resolutions or other business was brought to the Committee.
REPORT OF THE COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

Co-Chairs: Bob Frost, CA
Bennie I. Osburn, CA

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The Committee on Diagnostic Laboratory and Veterinary Workforce Development (CDLVWWD) met on October 2, 2009 at the Town and Country Hotel, San Diego, Calif., from 7:00 to 0:50 p.m. There were 22 members and 20 guests present. Co-chair Bennie Osburn along with a few Committee members and invited panelists were not able to attend due to their participation in the second annual World Animal Health Organization (OIE) meeting “Evolving Veterinary Education for a Safer World”, scheduled in Paris, France at the exact same time as the United States Animal Health Association’s (USAHA) meeting.

This is the final year for Bob Frost and Bennie Osburn as Co-chairs. Those who are interested in leading the Committee are asked to contact either Executive Committee liaison Bill Hartmann or President-Elect Rich Breitmeyer.

The Committee sent out four “Call to Action” electronic News Flashes to the USAHA membership in the weeks prior to the meeting to alert members and stakeholders about upcoming veterinary workforce shortage issues and pending or current Congressional legislation. News Flash No. 1, H.R. 2999 the Veterinary Health Workforce and Education Act; No. 2, Shortages in the Federal Veterinary Workforce; No. 3, Veterinary Medicine Loan Repayment Program; No. 4, the Veterinary Services Investment Act.

Over the last few years the Committee has worked on important national issues pertaining to diagnostic laboratories and veterinary
workforce shortage. This year, the Committee hosted a panel of experts who had recently testified before Congressional Committees or have spent a number of years researching data for veterinary workforce congressional issues. International panelists were included to portray a global veterinary workforce perspective and emphasize the need for U.S. leadership and a robust veterinary workforce. The panelists assisted the Committee with background information, resolution language and specific target/timing information for resolutions pertaining to the veterinary workforce shortage legislation.

Mary Denigan from the U.S. Government Accountability Office (GAO) informed the Committee that Congress requested the study of federal agencies utilizing a veterinary workforce. Twenty-four federal agencies were interviewed in the study that probed what federal agencies are doing about the shortfall. Findings revealed that some agencies are looking at needs but lack a coordinated program with the example of United States Departments of Health and Human Services (DHHS) and the Department of Agriculture (USDA) not working together. The study found there is a lack of substantive facts and numbers to understand how many veterinarians are needed for routine and surge capacity. Congress is aware of the veterinary workforce deficiencies but reluctant to fund without accurate input. The Committee and panel discussed topics from veterinary pay scale to the ability of veterinarians to be helpful in catastrophic events where there might be a shortage of human physicians.

The complete list of the panelists and Congressional testimonies along with an overview of four USAHA “Call to Action - News Flashes” are included at the end of this report.

Dr. Neville Clark, director of the Center for Foreign and Zoonotic Disease Defense's (FAZD Center) reviewed the FAZD Center “Top Products” and the need for renewed funding. Dr. Clark’s report in its entirety is at the end of this report.

Dr. William Wilson gave a report on the relocation of “The Arthropod-Borne Animal Diseases Research Laboratory: Research Program Update and Current Status”, William Wilson, Barbara S. Drolet, Kristine Bennett, Myrna Miller, and James Mecham; USDA, Agriculture Research Services, Arthropod-Borne Animal Diseases Research Laboratory, Laramie, WY 82071. Dr. Wilson’s report in its entirety is at the end of this report.

Co-Chair Bob Frost reported on the current status of Wildlife Services (WS), National Wildlife Research Center’s (NWRC) Wildlife Disease Research Building (WDRB) located in Fort Collins, Colorado. USAHA resolutions supporting the WDRB in 2005 and 2007 were met.
with affirmation by USDA–APHIS leadership stating the importance of increased Biosafety Level – three facilities to both conduct wildlife research and to carry out critical wildlife disease diagnostics in support of biosafety to humans, domestic animals and wildlife. The WDRB will provide support for diagnostic methods development, vaccine development, risk assessments, and wildlife disease surveillance and monitoring activities. The infrastructure of the new WDRB will include diagnostic and testing capabilities in the areas of mycology, virology and bacteriology, and allow WS to make critical contributions toward minimizing the impacts of wildlife disease. For example, diagnostic methods development will include rapid diagnostics for diseases in wildlife (e.g., avian influenza, histoplasma, rabies, tuberculosis, West Nile virus). In addition, activities will focus on development of diagnostic and screening assays for multiple diseases from single samples. The ability to process large numbers of samples for multiple diseases in any surveillance effort will require expanded capabilities for high throughput testing (robotic processing) of samples and controlled biosafety environments for development and validation of multiplex diagnostic methods for zoonotic and animal pathogens. These approaches are geared toward making wide scale surveillance in wildlife cost-effective.

Just prior to this meeting the NWRC put out technical bidding documents and will begin negotiations with developers in early 2010.

Committee Business:
The Committee passed the following eight Resolutions and forwarded to the Committee on Nominations and Resolutions:

• Support for Section 1433 Formula Funds for Animal Health and Research
• Support for Regional Centers of Excellence in Food Systems Veterinary Medicine
• Support for Food Animal Residue Avoidance Databank (FARAD)
• Increased Funding for Expanded Research for the Department of Homeland Security National Center for Foreign Animal and Zoonotic Disease Defense
• Review of Compensation for Research and Diagnostic Veterinarians
• Veterinary Medicine Loan Repayment Program (VMLRP)
• Veterinary Public Health Workforce and Education Act
• Veterinary Services Investment Act
REPORT OF THE COMMITTEE

Committee on Diagnostic Laboratory and Veterinary Workforce Development
Panel on Veterinary Workforce

Bonnie Buntain
Assistant Dean, Government and International Relations
University of Calgary Faculty of Veterinary Medicine
Calgary, Canada
Former Chief Public Health Veterinarian for Food Safety and Inspection Services (FSIS)

Vincenzo Caporale
President of the Biological Standards Commission
The World Organization for Animal Health (OIE)
Paris, France

Mary Denigan
Assistant Director
U.S. Government Accountability Office
Natural Resources and Environment
Washington, DC

Michael Gilsdorf
Executive Vice President
National Association of Federal Veterinarians (NAFV)
Washington, DC

Juan Lubroth
Chief Veterinary Officer
Food and Agriculture Organization (FAO) of the United Nations
Rome, Italy

Hugh Mainzer
Chief Veterinary Officer
United States Public Health Services (USPHS)
Office of the Surgeon General
United States Department of Health Human Services

Tom McGinn
Chief Veterinarian
Office of Health Affairs
Department of Homeland Security (DHS)
Washington, DC
DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

Gay Y. Miller
National Center for Animal Health Emergency Management (NCAHEM)
U.S. Department of Agriculture
Animal and Plant Health Inspection Service (APHIS)
Veterinary Services (VS)
Riverdale, Maryland

Gary Sherman
National Program Leader
Veterinary Medicine
National Institute of Food Agriculture (NIFA)
U.S. Department of Agriculture (USDA)
Washington, DC

Preben Willeberg
Chief Veterinary Officer, Denmark 1999-2007
Secretary General of the OIE Scientific Commission for Animal Diseases 2006-2009
Veterinary Global Health Specialist, School of Veterinary Medicine, UC Davis

Norman Willis
Past-President of the OIE International Committee 1997-2000
The Norm Willis Group
Ottawa, Ontario
Canada

Panelists unable to attend who sent statements of support:

Ron DeHaven
CEO/Executive Vice President
American Veterinary Medical Association (AVMA)
Schaumburg, IL

Marguerite Pappaioanou
Executive Director
Association of American Veterinary Medical Colleges (AAVMC)

Bernard Vallat
Director General OIE
Paris, France
REPORT OF THE COMMITTEE

PANEL – Congressional Testimony

- Mary Denigan – Government Accountability Office (GAO)
- Brian Smith for Marguerite Pappaioanou - HR 2999 and 1433 Centers of Excellence (COE)
- Ashley Shelton/David Scarfe for Ron DeHaven Veterinary Services Investment Act (VSIA) – Veterinary Medical Loan Repayment Program (VMLRP) – Food Animal Residue Avoidance Databank (FARAD)
- Mike Gilsdorf – Federal Veterinary Compensation
News Flash No. 1 - Call for Action
HR 2999 - The Veterinary Public Health Workforce and Education Act

The Committee on Diagnostic Laboratory and Veterinary Workforce Development (CDLVWD) has worked for a number of years on the important national issue of veterinary shortages in the U.S. New legislation has recently been introduced that may have significant impact on addressing this. HR 2999, the Veterinary Public Health Workforce and Education Act, is important legislation providing critically needed investments in veterinary public health and veterinary education infrastructure to support our national security and preparedness as well as ensure a safe food supply. The legislation also provides new avenues and incentives for veterinarians to serve in public sector roles where their expertise helps protect human and animal health.

News Flash No. 2 - Call for Action
Shortages in the Federal Veterinary Workforce

The Government Accountability Office (GAO) “report” states that veterinarians are a small but vital part of the federal workforce, playing important roles in protecting people from zoonotic and foodborne diseases, ensuring the health and humane treatment of food animals and helping to keep America’s food system safe. The growing shortage of veterinarians is affecting federal agencies and some have already identified insufficiencies in their veterinary workforces. At the Food Safety and Inspection Service (FSIS), for example, the veterinary workforce is finding it difficult to adequately carry out its responsibilities for ensuring food safety and the humane treatment of animals.

Significant changes in recruitment and retention authorities are needed to ensure that this vital workforce is maintained to adequately prevent and respond to significant animal disease incursions and emerging disease threats. Currently the Office of Personnel Management (OPM) along with federal agencies and veterinary associations are jointly working on assessing and improving the federal veterinary workforce. They have identified the following as issues that need to be resolved: pay, recruiting and retention flexibilities, emergency planning, workforce analysis and planning, talent management and growing veterinary shortages. The number one recruitment tool identified in surveys is greater starting pay flexibility, followed by increased access to student loan repayment. The number one retention tool identified was a more competitive compensation package.
News Flash No. 3 - Call to Action
Veterinary Medicine Loan Repayment Program (VMLRP) - 50 State Animal Health Officials
Must Identify Veterinary Shortages - Anticipation Builds for the United States Department of Agriculture (USDA) Call for Shortage Situation Nominations

About 40 veterinarians will be selected by the USDA, Cooperative State Research, Education, and Extension Service (CSREES) to participate in the (VMLRP) (7 USC 3151a) in early 2010. However, before the inaugural awards cycle can begin later this year, each state’s State Animal Health Official will need to identify veterinary shortage situations and nominate them to be considered for designation as a veterinary shortage situation by the USDA. Only shortage situations that are officially designated by USDA as having a critical shortage of practicing veterinarians will be eligible for the VMLRP participants. The USDA-CSREES is expected to issue a call for nominations some time later this month, likely mid to late September, in the Federal Register. Once the notice is available, USAHA’s CDLVWD, the American Veterinary Medical Association (AVMA) and other stakeholders will alert their members.

News Flash No. 4 - Call to Action
Legislation to Help Solve Veterinary Needs In Key parts of the Nation
VSIA - The Veterinary Services Investment Act will be introduced in the Senate the week of September 20th

This Nation’s veterinary workforce is the front line of food safety/security, animal and public health and homeland security. However, we face a shortage of veterinary services in key parts of the country. The VSIA, which will soon be introduced in the Senate, aims to tackle and solve these problems by helping states to address their most pressing veterinary workforce needs. VSIA will bolster sectors of veterinary shortages across the nation in the public, private, industrial and academic sectors. This legislation would authorize grants to bolster veterinary services and relieve shortage situations in key parts of the country. Awards under the new grant program, which will be administered by the USDA, may be used to support a wide array of activities including:

- recruit and retain practicing veterinarians and veterinary technicians
- increase knowledge in food safety/protection and food animal medicine
- establish mobile and portable veterinary clinics
- conduct assessments that will be needed to designate veterinary shortage
- surveillance of zoonotic and food animal disease
DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

- establish, expand and support veterinary residency, internship and externship programs
- provide continuing education to veterinarians and veterinary technicians

Highlights of Government Accountability Office (GAO) Report on Veterinary Workforce and Congressional Testimony of GAO of Lisa Shames, Director of Natural Resources and Environment, GAO

Mary Denigan
Natural Resources and Environment
U.S. Government Accountability Office
REPORT OF THE COMMITTEE

February 2009

VETERINARIAN WORKFORCE
Actions Are Needed to Ensure Sufficient Capacity for Protecting Public and Animal Health

What GAO Found
The federal government lacks a comprehensive understanding of the sufficiency of its veterinarian workforce. More specifically, four of five component agencies (GAO reviewed) have assessed the sufficiency of their veterinarian workforce to perform routine activities and have identified current or future concerns. This includes USDA's Animal and Plant Health Inspection Services (APHIS), Food Safety and Inspection Service (FSIS), and Agricultural Research Service (ARS); and DoD's Army. Current and future shortages, as well as noncompetitive salaries, were among the concerns identified by these agencies. HHS's Food and Drug Administration (FDA) does not perform such assessments and did not identify any concerns. In addition, at the department level, USDA and HHS have not assessed their veterinarian workforce across their component agencies, but DoD has a process for doing so. Moreover, there is no governmentwide effort to search for shared solutions, even though 1 of the 21 federal entities that employ veterinarians raised concerns about the sufficiency of this workforce. Further exacerbating these concerns is the number of veterinarians eligible to retire in the near future, GAO's analysis revealed that 27 percent of the veterinarians at APHIS, FSIS, ARS, Army, and FDA will be eligible to retire within 3 years.

Efforts to identify the veterinarian workforce needed for a catastrophic event are insufficient. Specifically, agencies' plans lack important elements necessary for continuing essential veterinarian functions during a pandemic, such as identifying which functions must be performed on-site and how they will be carried out if absenteeism reaches 10 percent—the rate predicted at the height of the pandemic and used for planning purposes. In addition, one federal effort to prepare for the intentional introduction of a foreign animal disease is based on the unrealistic assumption that all affected animals will be slaughtered, as the United States has done for smaller outbreaks, making the resulting veterinarian workforce estimates irrelevant. A second effort lacks crucial data, including data on how the disease would spread in wildlife. If wildlife became infected, as they have in the past, response would be greatly complicated and could require more veterinarians and different expertise.

Officials from federal and state agencies involved in four recent zoonotic disease outbreaks commonly cited insufficient veterinarian capacity as a workforce challenge. However, 10 of the 17 agencies that GAO interviewed have not assessed their own veterinarian workforce's response to individual outbreaks and are thus missing opportunities to improve future responses. Moreover, none of the entities GAO reviewed has looked across outbreaks to identify common workforce challenges and possible solutions.
VETERINARIAN WORKFORCE

The Federal Government Lacks a Comprehensive Understanding of Its Capacity to Protect Animal and Public Health

Statement of Lisa Shames, Director
Natural Resources and Environment

GAO-09-424T
Mr. Chairman and Members of the Subcommittee:

I am pleased to be here to discuss our report on the federal veterinarian workforce and the actions needed to ensure a sufficient capacity for protecting public and animal health, which you recently released. As you know, veterinarians play a vital role in the defense against animal diseases—whether naturally or intentionally introduced—and these diseases can have serious repercussions for the health of animals, humans, and the economy. However, there is a growing shortage of veterinarians nationwide—particularly those veterinarians who care for animals raised for food, serve in rural communities, and are trained in public health. This shortage, according to the American Veterinary Medical Association, could hinder efforts to protect humans from zoonotic diseases, which are diseases that spread between animals and humans. The shortage is expected to worsen—as a result of space constraints at the country’s 28 veterinary colleges, which can graduate only about 2,500 students a year combined—yet the demand for veterinarians is expected to increase.

Veterinarians play a critical role in ensuring the safety of the U.S. food supply. However, the staffing levels at the Department of Agriculture’s (USDA) Food Safety Inspection Service (FSIS)—where veterinarians help ensure the safety of meat and poultry and the humane treatment of animals during slaughter—have declined since 1989 despite an increasing budget. In addition, in 2007, we designated the federal oversight of food safety as a high-risk area of government operations because the current fragmented system has resulted in inconsistent oversight, ineffective coordination, and inefficient use of resources.

In this context, I will focus my testimony today on two key points. First, the Office of Personnel Management (OPM), whose mission is to ensure the federal government has an effective civilian workforce, has not conducted a governmentwide effort to address current and future shortages of federal veterinarians even though 16 of 21 component

agencies that employ veterinarians reported concerns about the sufficiency of their veterinarian workforce. Second, USDA and the Department of Health and Human Services (HHS), which together employ 68 percent of the federal veterinarian workforce, have not assessed the sufficiency of their veterinarian workforce departmentwide even though their component agencies that employ mission-critical veterinarians are currently experiencing shortages of veterinarians or anticipating shortages in the future.

My statement is based on the work we conducted for our recently released report, *Veterinarian Workforce Actions Are Needed to Ensure Sufficient Capacity for Protecting Public and Animal Health*. Among other things, we surveyed federal departments and their component agencies employing veterinarians to determine the number, salaries, roles, and responsibilities of veterinarians, as well as any concerns these agencies had about the sufficiency of their veterinarian workforce. We then determined the extent to which the departments that employ about 95 percent of federal veterinarians, including USDA and HHS, have assessed the sufficiency of their veterinarian workforce. In addition, we interviewed OPM officials to identify any initiatives it has conducted to address the sufficiency of the federal veterinarian workforce. We conducted our work in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

**OPM Has Not Conducted a Governmentwide Effort to Address Current and Future Federal Veterinarian Shortages.** OPM has not conducted a governmentwide effort to address current and future veterinarian shortages. The lack of a governmentwide initiative is problematic because the majority (67 percent) of the 23 component agencies that employ veterinarians told us they have concerns about the sufficiency of their veterinarian workforce. For example, USDA’s FSIS has not been fully staffed over the past decade, and veterinarians working in its slaughter plants told us that this shortage has impaired the agency’s ability to meet its food-safety responsibilities. Similarly, USDA’s Agricultural Research Service (ARS) has experienced difficulty attracting and retaining veterinarians who also have a Ph.D. to conduct critical animal disease research, such as detecting avian influenza and developing vaccines against it. In addition, USDA’s Animal and Plant Health Inspection Service (APHIS), whose veterinarians help maintain the health of the nation’s livestock and poultry, has identified a potential future...
shortage of veterinary pathologists. Furthermore, NIH's National Institutes of Health (NIH) faces challenges recruiting veterinarians that specialize in laboratory animal medicine and pathology. These challenges can be serious because regulations require that veterinarians be available to ensure the proper care of research animals.

Such challenges are likely to worsen as a large number of federal veterinarians become eligible to retire in the near future. For example, APHIS reported that 30 percent of its veterinarians will be eligible to retire by the end of fiscal year 2011. As the shortage grows, those federal agencies that pay veterinarians higher salaries are likely to gain a recruitment advantage. Salaries for individual veterinarians range from $35,000 for those in the residency program at the National Zoo to $80,000 for the highest paid veterinarian at NBL. As figure 1 illustrates, mean veterinarian base salaries vary widely across the federal government, from just under $70,000 at the Department of the Interior's National Park Service to about $122,000 at the Department of Homeland Security's (DHS) Office of Health Affairs.
Figure 1: Mean Veterinarian Base Salaries at 19 Federal Departments or Component Agencies in Fiscal Year 2008

Note: Salaries do not include locality pay and expenses. In addition, we have not included mean salaries for those agencies with fewer than four veterinarians: the Departments of Energy and Justice, HHS’s Office of the Assistant Secretary for Preparedness and Response, and DHS’s Directorate for National Protection and Programs. In addition, HHS’s Office of the Assistant Secretary for Preparedness and Response is included to provide base salary information before all workforce report steps issued and, therefore, is not included.

We relied on officials from those federal departments or component agencies to identify mean salaries of all veterinarians employed, including civil and military service employees, and contractors, regardless of job title. Because data are means reported by agencies, we could not assess the underlying distribution for outliers or nonresponse.

This does not include the salaries of the United States Public Health Service Commissioned Corps veterinarians assigned to these component agencies. The Commissioned Corps is a uniformed service that belongs to HHS but fills public health leadership and service roles at several federal agencies.

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Neither USDA nor HHS Has Assessed the Sufficiency of Its Veterinarian Workforce across Its Component Agencies

Even though all but one of their component agencies that employ mission-critical veterinarians are currently experiencing shortages of veterinarians or anticipating shortages in the future, officials from both USDA and HHS told us that they have not undertaken a departmentwide assessment of their workforces to gain a broader perspective on trends and shared issues. While USDA regularly reflects veterinarian workforce data from its component agencies that employ veterinarians, it does not use this information to assess the sufficiency of the veterinarian workforce departmentwide. According to department officials, workforce assessment is the responsibility of the agencies. However, because USDA delegates this responsibility, it appears to be unaware of the scope of the workforce problems facing its agencies. For example, in its fiscal year 2007 human capital management report, USDA reported that its agencies had met or surpassed certain veterinarian workforce goals but made no mention of the shortages that FSIS and ARS identified in their workforce reports.

One result of this lack of department-level involvement is that USDA agencies compete against one another for veterinarians instead of following a departmentwide strategy to balance the needs of the agencies. According to FSIS officials, APHIS is attracting veterinarians away from FSIS because the work at APHIS is more appealing, opportunities for advancement are greater, and the salaries are higher. In fact, the mean annual salary for veterinarians at FSIS in 2007 was about $75,000, the lowest among the three key USDA agencies (see fig. 2), whereas the mean...
annual salary for APHIS was about $91,000 that same year. According to an APHIS human resources official, the agency hired 75 veterinarians from FSIS between fiscal years 2003 and 2007, 17 percent of all new APHIS veterinarians hired.

Figure 2: Mean Veterinarian Salaries at Three Key USDA Component Agencies, Fiscal Years 2003-2007

In responding to a draft of our veterinarian workforce report, USDA said that because APHIS and FSIS employ the majority of veterinarians within the department, these component agencies will work together, with departmental consultation, as needed, to develop solutions to shared problems. We continue to believe that a departmentwide assessment is necessary.

Similarly, HHS has neither assessed veterinarian workforce needs departmentwide nor instructed any of its component agencies that employ veterinarians—Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDC), and NIH—to assess their own workforces.
HHS is thus not fully aware of the status of the veterinarian workforce at these component agencies and cannot strategically plan for future veterinarian needs. For example, senior HHS strategic workforce planning officials we spoke with were unaware of a 2007 report by an FDA advisory committee that found that FDA cannot fulfill its mission because of an insufficient scientific workforce. More specifically, the report stated that FDA's Center for Veterinary Medicine is in a state of crisis. This center employs nearly two thirds of FDA's 152 veterinarians and is responsible for ensuring the safety of veterinary drugs and regulating animal feed, among other things.

HHS officials told us that department-level leadership in workforce planning is important. In fact, in commenting on a draft of our veterinarian workforce report, they said that all HHS operating and staff division heads are now required to have workforce plans in place for their organizations by September 2009. According to these officials, the HHS Office of Human Resources will review these plans to identify opportunities for department-wide collaboration with regard to strategic recruitment, development, and retention.

Our work also revealed other areas in which the federal government lacks information about the sufficiency of its veterinarian workforce. For example, despite reports of insufficient veterinarian capacity during four recent disease outbreaks, many federal and state agencies have not assessed their workforce response to these outbreaks, and none of these agencies have looked across outbreaks in order to identify workforce challenges that they may have had in common. Without such understanding, the nation's veterinarian workforce may be unprepared not only for future routine outbreaks, but also for catastrophic events. In fact, we found that federal efforts to identify the veterinarian workforce that would be needed during two types of catastrophic events—a pandemic influenza and multiple intentional introductions of foot-and-mouth disease—are insufficient. For example, part of HHS's effort to identify the necessary workforce to respond to a foot-and-mouth disease outbreak lacks crucial data, such as how the disease would spread in wildlife. If wildlife become infected, as they have in the past, the response would be greatly complicated and could require more veterinarians and different types of expertise.

GAO made numerous recommendations in its veterinarian workforce report to help ensure sufficient veterinarian capacity to protect public and animal health. Among these, we recommended that the Secretary of Agriculture direct FSIS to periodically assess whether its level of
inspection resources dedicated to food safety and humane slaughter activities is sufficient. We also recommended that the Secretaries of Agriculture and Health and Human Services conduct department-wide assessments of their veterinarian workforces to identify current and future workforce needs (including training and employee development) and department-wide solutions to problems shared by its agencies. We further recommended that the Director of the Office of Personnel Management determine, based on USDA's and HHS's department-wide veterinarian workforce evaluations, whether a government-wide effort is needed to address shortcomings in the sufficiency of the current and future veterinarian workforce.

In conclusion, the nation is facing a growing shortage of veterinarians, and component agencies have already identified insufficiencies in their veterinarian workforces. Unless USDA and HHS conduct department-wide assessments of their veterinarian workforces, they will not fully understand the size and nature of the challenges they face in recruiting and retaining veterinarians with the appropriate skills. This will leave their component agencies without a high-level solution to problems they have so far been unable to solve on their own. Moreover, without department-wide assessments, OPM will not have the information it needs to assess current and future veterinarian workforce needs government-wide, and the federal government will be missing opportunities to find common solutions for attracting veterinarians into federal service. If the federal government as a whole does not proactively assess current and future veterinarian workforce needs—for both routine and catastrophic events—it will continue to undermine its ability to protect the health of people, animals, and the economy.

Mr. Chairman, this concludes my prepared statement. I would be happy to respond to any questions that you or Members of the Subcommittee may have at this time.

GAO Contact and Staff

For further information about this testimony, please contact Lisa Shames, Director, Natural Resources and Environment, at (202) 512-5811, or shamesl@gao.gov. Key contributors to this testimony were Mary Denigan-Macaulay and Michelle K. Treistman, Kevin Bray, Nancy Crothers, and Carol Kojan. Other important contributors were the Offices of Congressional Relations and Public Affairs. The last page of this testimony may be found on the last page of this testimony.
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Washington, DC 20548
Good morning, Chairman Akaka and Members of the Committee. I am Marguerite Pappaioanou, a veterinarian and Executive Director of the Association of American Veterinary Colleges (AAVMC), which represents all 28 colleges of veterinary medicine and several departments of veterinary science and comparative medicine in the United States, as well as several other veterinary medical educational institutions in the U.S. and abroad. AAVMC provides leadership for and promotes excellence in academic veterinary medicine to prepare the U.S. veterinary workforce with the scientific knowledge and skills, and other essential competencies required to meet societal needs through the protection of animal health, the relief of animal suffering, the conservation of animal resources, the promotion of public health, and the advancement of medical knowledge. Prior to joining AAVMC, I was Professor of Infectious Disease and Epidemiology in the School of Public Health, with a joint appointment in the College of Veterinary Medicine at the University of Minnesota. For 2 ½ years spanning the period from 1983 through 2004, I was a Commissioned Officer of the U.S. Public Health Service, assigned to the U.S. Centers for Disease Control and Prevention as an epidemiologist.

As a federal veterinarian working at CDC, I conducted research on malaria prevention and control, designed and led implementation of disease surveillance for HIV infections, and guided and supported the development of the US Guide to Community Preventive Services, in addition to serving as Associate Director of Science and Policy in CDC’s Office of Global Health.

I appreciate the opportunity to testify today, with the invitation to respond to the GAO report “Veterinary Workforce—Actions are Needed to Ensure Sufficient Capacity for Protecting the Public and Animal Health”. In particular, I will elaborate on the educational, recruiting and retention challenges facing the Federal veterinarian workforce, on past efforts to improve the ability of the Federal veterinarian workforce—which is an essential, but often unrecognized and underappreciated component of the U.S. public health workforce—to prevent and control diseases impacting...
on human, animal, and environmental health. In particular I will briefly describe all that the U.S. colleges of veterinary medicine are doing to recruit and educate our veterinary workforce to be prepared to serve at local, state, and federal levels to protect human and animal health. I will also provide several suggestions on actions that in my opinion are needed to ensure sufficient U.S. capacity at the federal levels for protecting our public and animal health.

AAVMC commends the Committee, the GAO, and the Federal agencies that contributed to the report for investigating the veterinarian workforce shortage in the federal government and for producing a report with a high level of thoroughness, quality, and offering specific recommendations to address the workforce shortage, which is putting our nations public, animal, and environmental health at risk. We agree with all of the recommendations of the GAO report, and ask that Congress, in its oversight role of the federal workforce, take steps to ensure that the recommendations are implemented fully. It is critical that there be an ongoing, comprehensive assessment and understanding of the sufficiency of our federal government-wide veterinarian workforce, and that there be a plan in place to ensure that the need is met.

AAVMC believes that Congress must provide continued leadership and be actively engaged and involved in implementing solutions recommended in the GAO report to overcome the challenges that are leading to this critical public, animal, and environmental health workforce shortage.

One of the greatest obstacles the veterinarian profession faces is the public's perception of the role and contribution of veterinarians to society. In addition to the important contributions to our nations mental and physical health through the promotion and protection of the health of our beloved companion animals, largely unrecognized are the important contributions veterinarians make to society and public health as outlined in the GAO report.

The opening letter of the GAO report accurately states that veterinarians, and specifically veterinarians employed by the federal government, play a vital role in the defense against animal diseases - whether naturally or intentionally introduced. Veterinarians are essential for diagnosing, controlling, and eradicating diseases which are spread between animals and humans such as avian influenza, tuberculosis, and salmonella, just to name a few. Veterinarians play a critical role in ensuring the safety of the US food supply and help prevent foodborne illness and assure the humane treatment of animals in the marketing and slaughter process. Veterinarians, especially those in the federal government, are leading the way on cutting edge research that benefits humans, animals, and other living things. For example, USDA's Agricultural Research Service employs veterinary researchers to find new and improved ways to detect and prevent such important diseases as avian influenza,
tuberculosis in cattle, West Nile virus in birds, and bovine spongiform encephalopathy or mad cow disease - all of which can and have infected humans.

The recently published Institute of Medicine Report - HHS in the 21st Century: Charting a New Course for a Healthier America - identified the nation's top health challenges. Among them were developing prevention and treatments methods for diseases that currently lack them (requiring biomedical research scientists - veterinarians - well versed in comparative medicine and animal models), global threats to health including pandemics, emerging infections often originating in animal populations, bioterrorism (with over 80% of bioterrorism agents of concern spread in nature from animals to humans), natural disasters (which often require preparedness and response of both human and animal health experts), and climate change (requiring a workforce having a broad perspective of the relationship among humans, animals, and the environment), the crumbling public health infrastructure (which is impacting on education of a sufficient veterinary workforce), and social, environmental and behavioral factors affecting health (many of which involve a safe food supply, the human-animal bond, international trade of livestock, poultry, and other factors). As the GAO report and my fellow panelists have documented, without question veterinarians are essential to the multiple agencies within USDA, HHS, DHS, and other Federal departments listed in the report, and therefore, to the Departments at large in fulfilling their missions.

AAVMC, the American Veterinary Medical Association (AVMA), and other institutions have recognized for some time that there is a growing veterinarian workforce shortage that is impacting on the numbers of veterinarians going into federal service to meet the critical public, animal, and environmental health needs being discussed today. The shortage of veterinarians in the federal public and animal health workforce -- the only health professionals educated to address the health needs comparatively, across all species - is just one component of the serious problem facing all segments of the veterinary profession. In fact, there is a significant shortage of veterinarians nationwide, particularly those practicing food supply veterinary medicine (ensuring the health of livestock and poultry pre-slaughter, where the safety of our food supply begins), rural medicine, public health at local and state levels, diagnostic laboratory medicine, and biomedical research.

Veterinary medicine is a small - and at this point, we would maintain too small - profession. As the size of the need is considered, realize that if you assembled all of the veterinarians in the U.S. you would not fill the FedEx football field just outside Washington, DC!

In contrast to virtually all the other major health professions, where the number of educational institutions has increased with time to match increases in population and societal need, the number of our U.S. colleges of veterinary medicine (28 colleges in 26 states) has not changed over the
past 25-30 years, save for a single new college established with private funding in the late 1990s in California. Therefore, the number of graduates nationally has remained at approximately 2600 over the past 30 years despite an increase in the U.S. population by 78 million people, with the associated increase in need for dietary animal protein, new relationships among human, domestic animals and wildlife, and with an increasing companion animal population. The GAO report states that the U.S. Bureau of Labor statistics predicts that demand for veterinarians will increase by 35 percent, or an increase of 24,000 jobs, from 2006 to 2016. Where will all of these new veterinarians come from?

To meet this increased need, either new colleges of veterinary medicine should be established, or the size of our classes in our colleges of veterinary medicine should be increased by substantial numbers. This latter option, although requiring new facilities because current facilities are maxed out in the numbers of students that can be accommodated, is considered the most cost-effective approach. We have impressive numbers of students applying to our colleges each year—with approximately 6,000 students applying for 2500-2600 freshman class slots nationwide each year—but we are turning many qualified, extremely interested and committed, bright, aspiring veterinary students away! The educational facilities needed to educate veterinary medical students are unique.

Specialized teaching, research, and animal care and handling buildings to meet the increasing demand for additional graduates are needed. Over the past three Congresses, AAVMC and the AVMA have advocated for federal support to match and or complement state funding to ensure these educational and research facilities are built in order to meet national preparedness and security needs. Veterinary medical education is a national resource with the 28 colleges in 26 states providing veterinarians, and protecting human and animal health for all of the states and U.S. territories. The AAVMC has compiled the needs of all our colleges to increase class enrollment and has a list of “shovel ready” projects that could help alleviate this critical situation. Federal stimulus money would provide construction jobs and long-lasting employment opportunities at our colleges. Increases in our veterinary workforce at large would also lead to employment of veterinary technicians, and other people. AAVMC is ready to work with the federal government to see that this happens.

Currently our U.S. colleges of veterinary medicine are doing their best with very limited resources to increase class enrollment. They are also working with private and public sector partners to increase awareness of and promote student interest in careers in food safety, public health, animal health prevention and control programs, and biomedical research. These efforts, of which I will briefly describe several exciting programs, have shown that there is no shortage of interest by our veterinary medical
students in these key areas.

Currently, 22 of our 28 colleges of veterinary medicine are providing programs and/or joint degree programs in public health. These programs are well subscribed, although the approximate $35,000-$50,000 cost of an added year of public health education to the average debt load of $120,000 accrued during the four year DVM program prevents interested veterinary medical students from pursuing this option. And the low salaries offered by the federal government to veterinarians graduating from these programs makes this option even less viable from a financial perspective.

In other programs, AAVMC continues to partner with the Centers for Disease Control and Prevention (CDC) to sponsor Veterinary Medical Student Day at CDC. Every other year over 300 veterinary medical students and their faculty mentors from all of our 28 colleges of veterinary medicine travel to CDC in Atlanta. There they learn about opportunities and careers in public health, public health disease surveillance, how to conduct outbreak investigations, prevention and control programs, and engage in public health exercises.

In another important partnership, AAVMC and its member institutions collaborate with industry, NIH, and other research institutions to sponsor a Veterinary Summer Scholars Research Program. Each year, between 300-400 veterinary students carry out research projects, and in early August they convene at one of our colleges of veterinary medicine to present their findings, and to learn about opportunities in biomedical research.

In a third important partnership with USDA, our colleges of veterinary medicine each year submit nominations of veterinary medical students to the USDA sponsored Smith-Kilborne Program, which acquaints veterinary medical students with various foreign animal diseases which potentially threaten our domestic livestock animal population. The program includes both classroom presentations on diseases and their implications combined with laboratory experiences. Following the seminar, students share their new knowledge with other students back at home. The Smith-Kilborne Program is conducted at the Cornell College of Veterinary Medicine in Ithaca, New York and the Plum Island Animal Disease Center, Plum Island, New York. AAVMC welcomes opportunities to partner with other federal government agencies to better highlight the multitude of career options available to veterinary medical students.

AAVMC also partners with AVMA, the National Association of State Public Health Veterinarians, and others in hosting a career fair at our annual meeting to present aspiring veterinary students with information on the spectrum of career opportunities in veterinary medicine, focusing on the areas under discussion today.

Despite great interest shown by our students in these areas however, it is as they consider and compare the benefits and costs of different career options, that we lose them to clinical companion animal practice.
REPORT OF THE COMMITTEE

In graduating with the on average $120,000 debt load that they incur, with the low salaries offered to veterinarians entering the federal workforce and which continues over time, many graduates feel that they have no choice but to go into clinical practice, or to work in industry, or seek academic research positions that will provide significantly greater salary and benefits, which will allow them to pay back their student loans and to raise families with a reasonable quality of life.

In conclusion, the colleges of veterinary medicine are offering many programs and providing important education and special opportunities to prepare and alert students to career opportunities in food safety, public health, environmental health, and biomedical research at federal, state, and local levels. But we emphasize that awareness and education alone are not enough to address the workforce shortage documented in the GAO report. It is the attractiveness of the career programs and the level of salary, grade, benefits, opportunities for advancement, and professional growth that are commensurate with the education that veterinarians receive that in the end will be the most important driving factors.

Therefore, we ask Congress to consider the following actions to address the veterinarian workforce shortage putting U.S. public, animal, and environmental health at risk.

We ask the support of Congress to strongly urge the Department of Health and Human Services (HHS) to include veterinarians in their planned strategic department-wide approach to assessing and meeting workforce needs. Veterinarians are critical for HHS to meet its mission given the increasing number of emerging zoonotic diseases, the threat of pandemic influenza and bioterrorism events, food-borne outbreaks involving the human and pet food supply, the impact of the human-animal bond on emergency preparedness and response, and the need for expertise in laboratory animal medicine, animal welfare, and animal models used in finding new cures and therapies. It is because the veterinary profession is small (a consequence of stagnant numbers of veterinary schools and class sizes from lack of adequate investments in veterinary public health infrastructure) that the number of veterinarians employed by HHS overall fails to meet the department threshold number required to be considered (as stated in the GAO report). We maintain that number of veterinarians employed alone is an inappropriate criterion for inclusion—it is having the basic expertise on staff that should be addressed.

We ask that Congress step forward and provide meaningful financial resources to our U.S. colleges of veterinary medicine in ways that will permit meaningful increases in class size sufficient to meet public and private veterinary workforce needs. We greatly appreciate passage of the Higher Education Opportunity Act, enacted in 2008, which was intended to increase capacity at veterinary colleges - but the bill in providing for minor renovations only, will not allow veterinary colleges to build the facilities
needed to significantly increase class sizes.

We ask that Congress appropriate much higher levels of funding to the National Veterinary Medical Services Act, enacted originally in 2003, at levels that would allow repayment of a significant portion of debt loads accrued by veterinarians, to a significant number of veterinarians, as a real incentive to attract veterinarians into working in underserved areas, USDA is expected to implement the program this year, and therefore, would be ready to receive increased levels of funding.

We recommend that Congress provide funding for scholarships to support veterinary medical students working toward a degree in public health, or joint or post-doctoral masters or doctoral research degrees needed for careers in biomedical research. Too frequently, scholarship programs aimed at increasing our nation’s research capacity, including several by NIH, are restricted to physicians only.

We ask that Congress enact legislation that would ensure that the personnel system grades, salaries, incentive and retention pay of veterinarians working in the federal government be significantly increased - to levels comparable to what veterinarians can earn in private clinical companion animal practice - in order to attract and retain our best and brightest veterinarians to federal service in protecting and promoting our nation’s public, animal, and environmental health.

Mr. Chairman, thank you for this opportunity to visit with you and your subcommittee about the need to assure sufficient capacity for protecting public and animal health by an appropriate staffing level of veterinarians across the federal government and in the private sector. The AAVMC and all veterinary medical colleges in the U.S. are keenly aware of the shortage of veterinarians in our federal public and animal health work force and stand ready to partner with Congress to address this issue that affects the health and safety of all Americans.

Sincerely,
Marguerite Pappaioanou, DVM, MPVM, PhD, Dip ACVPM
Executive Director
Association of American Veterinary Medical Colleges
REPORT OF THE COMMITTEE

Shortages in the Federal Veterinarian Workforce

Michael J. Gilsdorf, DVM, MS, BS
National Association of Federal Veterinarians

Background

The National Association of Federal Veterinarians (NAFV) and the American Veterinary Medical Association (AVMA) have been working on ways to improve the recruitment of veterinarians into federal service and retention of federal veterinarians for more than two years. NAFV strives to serve both veterinarians and the agencies they work for by facilitating communication, making suggestions for improvements, and working collaboratively to address issues of concern. The AVMA represents more than 78,000 member veterinarians engaged in every aspect of veterinary medicine. As an advocate for veterinarians in federal service, NAFV and AVMA feel veterinarians are a vital part of the federal workforce, playing important roles in protecting people from zoonotic and foodborne diseases, ensuring the health and humane treatment of food animals, and helping to keep America’s meat and poultry safe to eat.

The Government and Accounting Office (GAO) conducted an audit of the Federal veterinary capacity and released a report in February 2009. The report, “Veterinarian Workforce: Actions are needed to Ensure Sufficient Capacity for Protecting Public and Animal Health”, identified issues of veterinary shortages in the Federal sector and concerns about the Federal government’s ability to respond to pandemic and zoonotic threats. Senators Akaka and Voinovich held a hearing on the shortages within federal Veterinarian Workforce in February and asked the federal agencies to develop a plan to resolve future shortages within 6 months. The Office of Personnel Management (OPM) facilitated the creation of Veterinary Medical Officer (VMO) task groups composed of federal agencies, NAFV, AVMA, and the American Association of Veterinary Medical Colleges (AAVMC) to address the issues and concerns raised in the report and at the hearing.

Current Federal VMO Workforce

Recruitment of highly qualified veterinarians for federal service is a critical issue. The federal government lacks a comprehensive understanding of the sufficiency of its veterinarian workforce. There are approximately 3,100 veterinarians working in the federal government. Approximately 1,700 are classified in the veterinary medical 701 series. Since over one third of federal veterinarians work in related medical and biological fields, this in itself creates problems in tracking where veterinarians are within the government and assessing the duties that federal veterinarians perform. It also adds to the lack of understanding of how federal veterinarians contribute to the essential functions of
the federal government. This indicates that routine government-wide veterinarian workforce assessments are needed.

The GAO report depicts a grave scenario for federal agencies that face an increasing shortage of veterinarians to fill critical positions. For example, the report states that the U.S. Department of Agriculture’s Food Safety and Inspection Service (FSIS) has an on-the-job vacancy rate of up to 35 percent, and the agency’s Agriculture Research Service has a 12 percent shortage of mission-critical veterinarians. GAO’s analysis revealed that 27 percent of the veterinarians at APHIS, FSIS, ARS, Army, and FDA will be eligible to retire within 3 years. In addition, until the current federal task groups were formed, there were no government-wide efforts to search for shared solutions, even though 16 of the 24 federal entities that employ veterinarians raised concerns about the sufficiency of this workforce. Efforts to identify the veterinarian workforce needs for a catastrophic event are also insufficient.

In a NAFV survey of federal veterinarians, over 90% identified the rigidity of the starting pay scale as a significant barrier to the recruitment of veterinarians into federal service in some agencies. Increased flexibility in setting starting pay levels would enhance many federal agencies’ ability to recruit veterinarians. Additionally, federal veterinarians overwhelmingly indicated in the survey that significant increased access to incentives like student loan repayment (the average graduating student loan debt for veterinarians in 2009 was $129,976. The federal loan repayment program needs to increase the annual and aggregate limits from $10,000 and $60,000 respectively. Also, the program needs to be made tax exempt), recruitment bonuses, scholarship programs, retention bonuses, internship programs, direct hiring authority, and improved compensation packages would enhance future recruiting efforts. (It should be noted that Congress has provided $4.8 million to date and will soon approve another $4 to $5 million for the National Veterinary Medical Services Act (NVMSA) which was enacted in 2003 to pay for student loans. The National Institute of Food and Agriculture (NIFA) will soon ask states to nominate veterinary shortage situations for designation and before the end of this year veterinarians will apply for the first 40 awards. The amount of this funding available for veterinary students going into federal public practice is unknown at this time)

Additional federal recruiting incentives, identified by NAFV members, include; treating federal veterinary personnel as professionals, providing appropriate and timely training and continuing education opportunities, and official approval to attend professional meetings related to their official duties. These issues impact recruitment and retention of federal veterinarians.

Proposed Solutions

Government-wide solutions to the shortage of federal veterinarians
are needed. Pay, recruitment, and retention authorities among federal agencies are nonexistent or at best, inconsistent. This creates problems in recruitment and retention of veterinarians across all agencies and allows some agencies to obtain veterinarians more easily than others. However, as the shortage of all veterinarians increase, all federal agencies will experience issues in recruitment and retention. Therefore, all agencies employing veterinarians need an array of authorities delegated from OPM in meeting their workforce needs.

USDA and DHHS are in the process of preparing reports to Congress on their workforce needs for veterinarians in the future. OPM has already authorized Direct-Hire authority for all agencies in the spring of 2009. This authority has helped but it is not enough. Agencies will be asking for increased authorities, such as, increases in recruitment incentives of 25% to 50% of base pay for up to four years; increasing the amounts and flexibilities given for student loan repayments; paying for employees relocation expenses; offering referral bonus awards; authority to quickly hire veterinarians as intermittents in case of catastrophic events; expanding the ability to offer internships to veterinary students while still in school; establishing waivers for re-employed annuitants; establishing special salary rates for veterinarians - similar to what other medical personnel receive with the Physicians Comparability Act; providing the funding to pay for these flexibilities; expanding coverage for hazardous duty pay to include working with zoonotic diseases; awarding grant money to veterinary colleges to offer more training in public health veterinary medicine; and ability to increase continuing education and advanced degree opportunities.

Conclusion
The strain on resources and the pressure placed on the federal veterinary workforce to meet the existing demands needs to be addressed, especially when the country is facing a greater shortage of veterinarians in the future. Opportunities and challenges to improve and successfully meet critical agency responsibilities and still be prepared in the event of a national emergency will require new and different interventions. Now is the time to take action.

Ninety-one organizations, including many members of the Animal Agriculture Coalition (AAC) and United States Animal Health Association (USAHA) joined the AVMA/NAFV letter to Congress in February 2009 urging Congress to improve federal recruitment and retention initiatives for veterinarians. We are requesting that OPM grant federal agencies broad recruitment and retention hiring authorities and we are asking for legislation that would allow specialty pay for veterinarians similar to federal physicians pay.
DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

The organizations that joined the February 13, 2009 letter to Congress on Recruitment and Retention of Federal Veterinarians:
Alabama Veterinary Medical Association
Alaska Veterinary Medical Association
American Animal Hospital Association
American Association for Laboratory Animal Science
American Association of Avian Pathologists
American Association of Bovine Practitioners
American Association of Corporate and Public Practice Veterinarians
American Association of Equine Practitioners
American Association of Feline Practitioners
American Association of Food Hygiene Veterinarians
American Association of Retired Veterinarians
American Association of Small Ruminant Practitioners
American Association of Swine Veterinarians
American Association of Veterinary Clinicians
American Association of Veterinary Laboratory Diagnosticians
American Association of Wildlife Veterinarian
American College of Poultry Veterinarians
American College of Veterinary Pathologists
American Farm Bureau Federation
American Feed Industry Association
American Horse Council
American Meat Institute
American Registry of Professional Animal Scientists
American Society of Laboratory Animal Practitioners
American Veterinary Medical Association
Animal Agriculture Alliance
Animal Health Institute
Arizona Veterinary Medical Association
Arkansas Veterinary Medical Association
Association of American Veterinary Medical Colleges
Association of Avian Veterinarians
Bayer Healthcare, Animal Health Division
Boehringer Ingelheim Vetmedica, Inc.
California Veterinary Medical Association
Colorado Veterinary Medical Association
Colegio de Medicos Veterinarios de Puerto Rico (Puerto Rico Veterinary Medical Association)
Connecticut Veterinary Medical Association
Delaware Veterinary Medical Association
District of Columbia Veterinary Medical Association
Florida Veterinary Medical Association
Georgia Veterinary Medical Association
Hawaii Veterinary Medical Association
REPORT OF THE COMMITTEE

Idaho Veterinary Medical Association
Illinois State Veterinary Medical Association
Indiana Veterinary Medical Association
Institute of Food Technologists
Iowa Veterinary Medical Association
Kansas City Animal Health Advisory Board
Kansas Veterinary Medical Association
Kentucky Veterinary Medical Association
Louisiana Veterinary Medical Association
Maine Veterinary Medical Association
Maryland Veterinary Medical Association
Michigan Veterinary Medical Association
Minnesota Veterinary Medical Association
Mississippi Veterinary Medical Association
Missouri Veterinary Medical Association
Montana Veterinary Medical Association
National Association of Federal Veterinarians
National Milk Producers Federation
National Pork Producers Council
National Renderers Association
Nebraska Veterinary Medical Association
Nevada Veterinary Medical Association
New Hampshire Veterinary Medical Association
New Jersey Veterinary Medical Association
New Mexico Veterinary Medical Association
New York State Veterinary Medical Society
North Carolina Veterinary Medical Association
North Dakota Veterinary Medical Association
Novus International Inc.
Ohio Veterinary Medical Association
Oklahoma Veterinary Medical Association
Oregon Veterinary Medical Association
Pennsylvania Veterinary Medical Association
Rhode Island Veterinary Medical Association
Society for Theriogenology
South Carolina Association of Veterinarians
South Dakota Veterinary Medical Association
Student American Veterinary Medical Association
Synbiotics Corporation
Tennessee Veterinary Medical Association
Texas Veterinary Medical Association
United States Animal Health Association
Utah Veterinary Medical Association
Vermont Veterinary Medical Association
Virginia Veterinary Medical Association
The United States Department of Agriculture (USDA) Cooperative State research Education and Extension Service (CSREES) changed on October 1, 2009 to the USDA National Institute of Food and Agriculture (NIFA), as directed by Congress in the 2008 Farm Bill. While the overarching research, education and extension (REE) missions of CSREES will be retained in the new Institute, significant transformations are ongoing in NIFA’s leadership, organizational structure and strategic visioning. One major objective of these changes is to heighten recognition of the critical importance of Agricultural Science to the overall mission of USDA. United States Animal Health Association (USAHA) members may stay abreast of these still-unfolding changes by visiting the USDA and USDA-NIFA internet home pages.

- www.usda.gov
- www.nifa.usda.gov

Presently-authorized, legislatively active, programs administered by USDA NIFA, and of interest to USAHA, include the Veterinary Medicine Loan Repayment Program (VMLRP), Animal Health and Disease Formula Section 1433 (AHD-1433) Program, the Food Animal Residue Avoidance Databank (FARAD), Agriculture and Food Research Initiative (AFRI) and the Minor Use Animal Drugs Program (MUADP; aka NRSP-7).

Other programs of interest to USAHA that have not undergone major changes in 2009 to 2010 include the Extension Disaster Education Network (EDEN), Extension, the Food and Agriculture Defense Initiative (FADI); funding, in part, the National Animal Health Laboratory Network (NAHLN), and NIFA’s flagship research and extension formula programs, Hatch and Smith-Lever, respectively.

The following list highlights the NIFA programs for which there have been legislative changes (mainly impacting funding):

VMLRP: The first implementation of this program is rolling out presently and through 2010. Appropriations for FY-10 increased substantially to $5 M. A total of just under $10 M has accumulated for this program and these funds are now available to support the launch of this program during 2010. (See also http://www.csrees.usda.gov/nea/
AHD-Sec 1433 Formula grant program: Appropriations for this program have fallen from about $5 M per year in 2008 and earlier, to about $3 M per year in 2009 and 2010. Importantly, this program, which had been absent in the President’s budget from 2005-09, was once again proposed for funding in 2010 by the President. However, the President’s proposal was identical to last year’s Congressional appropriation, reflecting the prior year decrease to $3 M. It has been noted by many that the decline in AHD-1433 program appropriations has coincided with the increase in VMLRP appropriations. For 2010, Congress finalized appropriation for AHD at $2.95 M. (See also http://www.csrees.usda.gov/business/awards/formula/animalhealth.html )

FARAD: In 2007 and 2008, no funds were appropriated to FARAD and the program nearly closed down all operations. In 2009 and 2010, funding was restored by Congress and for the current fiscal year FARAD was appropriated $1M. This is the largest appropriation to date but it still falls short of the funding level FARAD PDs indicate is required to fully reap the public food safety benefits of the program. It also falls short of the amount authorized in the 2008 Farm Bill of $2.5 M per year. Thus, FARAD continues to struggle financially. (See also http://www.farad.org/ )

Minor Use Animal Drugs Program (MUADP; aka NRSP-7): This program has struggled with loss of funding in recent years; however funding was recently restored, albeit at a reduced level. FY-2010 appropriations for this program are $429,000. This is an approximate 20% decline in funding relative to 2005 and 2006 levels. However, any appropriation is an improvement compared to 2007 and 2008 when Congressional appropriations were zeroed out for the program. This program continues to struggle financially as it works to facilitate Food and Drug Administration (FDA) approval of orphan veterinary pharmaceuticals and therapeutics for minor species. (See also http://www.nrsp7.org/ )

AFRI: This is the flagship competitive grants program of USDA-NIFA. The scope of this program is broad and covers animal production and health research as just one of many agricultural science sectors, including crops, water and soil quality, social sciences, etc. This program has enjoyed a $60 M boost in funding in FY-2010. Under NIFA’s new Director, Dr. Roger Beachy, AFRI programs are under major review and significant changes are anticipated in the RFA slated for released in December 2009 or January 2010. (See also http://www.csrees.usda.gov/funding/afri/afri.html )
This is a high priority issue for the American Veterinary Medical Association (AVMA) - Active Pursuit of Passage. This bill would amend the United States Public Health Service Act (PHSA) to enhance and increase the number of veterinarians trained in veterinary public health which is broadly defined and includes biodefense and emergency preparedness, emerging and reemerging infectious diseases, environmental health, ecosystem health, pre and post-harvest food protection, regulatory medicine, diagnostic laboratory medicine, veterinary pathology, biomedical research, rural and government practice, and, the sum of all contributions to the physical, mental, and social well-being of humans through an understanding and application of veterinary science.

This bill would:

1) Create a competitive grant program used to pay the costs associated with construction, equipment acquisition, and other capital costs relating to expansion of new or existing facilities; paying salaries for faculty to increase capacity; and, developing a veterinary public health curriculum. This is essentially the Veterinary Public Health Workforce Education Act (VPHWEA) from last Congress.

2) Establishes within the U.S. Department of Health and Human Services (HHS)- Health Resources and Services, the new Division of Veterinary Medicine and Public (DVMPH).

3) Establishes a veterinary faculty loan repayment program to be administered by DVMPH.

4) Establishes a fellowship program for veterinarians in food systems security and veterinary public health to be administered by DVMPH. Fellows could participate in either a year-long or a part-time program.

We are not optimistic that this legislation will pass, as is, in this Congress – however, we could see parts of this legislation attached to other bills. The first section (competitive grants program) was last year’s legislation – unfortunately, it was not changed to address the concerns from last Congress’ bill, and it is authorizing $100M in 2010 and 2011, and $50M in 2012 to 2014 (which will be a huge sell in this economic climate – even though this is the only authorizing legislation). However, if the schools are going to significantly increase capacity to address future shortages, they will need federal money.

HR 3519 The Veterinarian Services Investment Act: This is a bill that AVMA staff drafted and has been introduced in the House; Senator Stabenow of Michigan will soon introduce in the Senate. We have many
cosponsors lined up in both chambers. This is really addressed more towards veterinary services – especially in shortage situations. It creates a grant program to promote efforts to develop, implement, and sustain veterinary services. This bill will be especially helpful to states as they try to deal with providing veterinary services in shortage situations.

Veterinary Medicine Loan Repayment Program (VMLRP): Call to Action. This call to action is for the states (state animal health official) to identify potential veterinary shortage situations for the loan repayment program. The USDA is expected to put an announcement in the Federal Registry in the next couple of weeks referring to the above. It is essential that all states who want to be part of the program submit their shortage situations to the USDA. Once the announcement is made, we will be communicating with the state animal health officials to ensure that states who want to be part of the program get their information to the USDA. We are very supportive of this and encourage USAHA to aggressively promote the future announcement to the states.
International Scientific Forum to Consider Cutting-edge Innovations for FAZD Defense: To find innovative answers to biological threats, an international forum of the world’s leading experts was convened to share ideas and explore concepts for the directions that emerging science might take to reduce the impact of exotic economic and zoonotic disease in the U.S. In November 2008, the FAZD Center convened 42 leading U.S. scientists and specialists for the Forum on Science and Biothreats. Speakers discussed novel discoveries and techniques from a range of scientific and technological disciplines, including epidemiology, pathology, microbiology, wildlife ecology, mathematics and computer modeling. Specialists in zoonotic disease responded with “outside the box” discussions on how these discoveries and techniques may apply to detecting, mitigating and recovering from zoonotic outbreaks, epidemics and pandemics. The results of this meeting identified highly innovative opportunities to exploit the emerging science in development of new methods to reduce the impact of exotic economic and zoonotic animal diseases.

Publication of a Field Guide to Disposal of Large Numbers of Dead Animals Following a Catastrophe: In the aftermath of a disaster that kills thousands of animals, responders face a difficult range of site specific choices for the safe and legal disposal of the carcasses. The FAZD Center sponsored the creation and publication of a field guide, “Managing Contaminated Animal and Plant Materials,” which won the American Society of Agricultural and Biological Engineers (ASABE) Educational Aids Blue Ribbon Award in the comprehensive publication category. The manual is designed to be used as a reference for training and operations in preparing and disposing of contaminated animal and plant materials. It was produced by the Technical Support Working Group, in conjunction with the USDA and the Environmental Protection Agency (EPA), for landowners, private industry, animal producers, and local, state, federal, and military governmental agencies. The manual is available for online download at http://fazd.tamu.edu/fieldguide.

Animal Health Network: A System to Alert Non-Commercial Livestock Owners about Disease Outbreaks: During an animal disease outbreak, the most difficult audiences to reach with critical information are the small, non-commercial owners of livestock. And yet these small backyard operations are often the source for devastating outbreaks, such as the 2002-2003 outbreak of Exotic Newcastle Disease, which began with a
smuggled bird, existed in backyard flocks for six months before detection, and eventually led to the destruction of more than 3.5 million birds and the suspension of exports to 34 nations from California, Nevada and Arizona. A pilot program initiated by the Center in six states found that a message of a disease outbreak can flow from the state veterinarian to the feed retailer and customers within 48 hours or less. As it is being adopted nationally, the Animal Health Network has the potential to reach over 2 million non-commercial livestock and poultry operators through a network of 50 state veterinarians, 2,700 extension educators, and 6,700 feed retailers. The Animal Health Network concept has been well received nationally, with adoption in several states – most recently in the state of Michigan. The program has also been endorsed and used by the USDA Extension Disaster Education Network (EDEN), a coalition of state responders supported by the USDA.

Real-Time Science Based Assessment of the H1N1 Pandemic: Beginning immediately after the recognition of the outbreak of type A H1N1 influenza in Mexico, the FAZD Center launched a special web site which organized and reported the literature that provided in depth assessment of the factors involved in the emergence of the disease including a science based assessment of the origin and distribution of the disease including the understanding of the molecular biological basis for its multi-species origin. The FAZD Center provided a daily assessment of the situation that was widely circulated with the Department of Homeland Security (DHS) including the Office of Health Affairs and the National Biosurveillance Information System. The Center is organizing a national task force of leading scientists to assess and project possible future directions of the pandemic and to define gaps in knowledge and evaluate next steps in dealing with this and other influenza viruses.
The Arthropod-Borne Animal Diseases Research Laboratory: Research Program Update and Current Status

Dr. William Wilson
USDA- Agricultural Research Service (ARS), Arthropod-Borne Animal Disease Research Laboratory (ABADRL)

The Arthropod-Borne Animal Diseases Research Laboratory (ABADRL), currently located in Laramie, Wyoming, has an interdisciplinary staff of microbiologists, virologists, entomologists, and veterinarians with a research mission to address insect-transmitted diseases of livestock. The primary emphasis is on arboviruses, including bluetongue virus (BTV), vesicular stomatitis virus (VSV), and Rift Valley fever virus (RVFV), that were identified by the Agriculture Research Service (ARS) Animal Health stakeholders as high priority livestock pathogens. The ABADRL Biosafety Level - 3 (BSL-3) facilities have not been operational since February 2002. To accomplish their continuing BSL-3 inclusive research mission, the ABADRL has established national and international collaborations with scientists who have access to BSL-3 facilities and/or reside where the BSL-3 agents are endemic. The Agriculture Appropriations Congressional Conference bill contains language for ABADRL to be relocated to Manhattan, Kansas where a BSL-3 facility is available. The Ag bill was passed by the House on October 7th, and subsequently passed by the Senate on October 8th, 2009. The relocation will become official upon signature by the President of the United States. The move timeline is uncertain, but will be completed by the end of FY10. The ABADRL continues to have an important research mission that is further supported by additional funding sources such as Department of Homeland Security (DHS), ARS Office of International Research Projects, and the Department of State Biosecurity Engagement Program. Additionally, the laboratory has the largest number of national and international collaborations in its history, and continues to have a productive research program addressing the needs of our stakeholders. The ABADRL's research mission has been hindered by the ability to recruit veterinary medical officers, especially senior scientists with vector-borne disease expertise. The unit hopes that the relocation will provide opportunities to address this issue and provide opportunities for veterinary students to gain experience in vector-borne diseases.
REPORT OF THE COMMITTEE ON ENVIRONMENT

Chair: Gary Osweiler, IA
Vice Chair: Randall Lovell, MD

Frank D. Galey, WY; L. Wayne Godwin, FL; John P. Honstead, CO; Laurent O’Gene Lollis, FL; David L. Meeker, VA; Gavin Meerdink, IL; Lee M. Myers, GA; Elizabeth J. Parker, DC; Jane F. Robens, MD; Gary M. Weber, MD.

The Committee met jointly with the American Association of Veterinary Laboratory Diagnosticians (AAVLD) Veterinary Analytical Toxicology and Mycotoxin Committee on Saturday, October 10, 2009 at 3:30 p.m., at the Town and Country Hotel, San Diego, Calif. A total of 31 members and guests were present. Dr. Jeff Hall opened the meeting at 3:30 p.m. and handed out the one page agenda with 11 items.

Selenium Poisoning in Florida
Dr. Tom Holt, Florida State Veterinarian, provided an overview on the selenium poisoning of 2 polo ponies in Florida. Many of these polo ponies started showing clinical signs within two hours after being administered an intravenous dose of a vitamin mineral supplement. All 21 horses died within about 24 hours of the dose despite heroic efforts by many veterinarians and veterinary assistants. It appears that an error was made by a compounding company in making this vitamin mineral supplement. Selenium levels in tissues were markedly elevated and this was the only significant toxicology finding.

Selected Environmental and Residue Topics
Dr. Randall Lovell, Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM) then spoke on Selected Environmental and Residue Topics. Dr. Lovell discussed the FDA’s Feed Contaminants Program and provided websites for additional information about this program including specific components (pesticides, industrial chemicals, elements, mycotoxins, dioxins, and microbes). Dr. Lovell will electronically send his presentation to all attendees at the meeting.

Committee Discussion
Attendees discussed significant mycotoxin findings during the past year. In the U.S., there were reports of ergot bodies and elevated levels of ergot alkaloids in barley and rye (especially in screenings) in several states. There were also reports of elevated levels of vomitoxin in wheat in several states due to the cool, wet spring. Also reported were isolated incidences of corn silage with elevated vomitoxin and zearalenone levels, of pasture forage with elevated levels of trichotheocene T2, HT2 and acetyl T2 toxins, and of dry land corn with elevated aflatoxin levels. In Pakistan, there have been reports of elevated levels of ochratoxin-A in grains fed to
poultry due to unusual amounts of rain during the dry season.

Dr. Jeffery Hall, Utah Veterinary Diagnostic Laboratory, led a group discussion on how the two Committees could make better use of all toxicology cases that were handled by the various laboratories during the year. Dr. Hall indicated that a written summary of all toxicology cases could conceivably be submitted to Journal of Veterinary Diagnostic Investigation (JVDI) for publication and could provide benefits for each laboratory and for AAVLD and USAHA. Drs. Brent Hoff and Nick Schrier indicated the University of Guelph already provide a written summary of their toxicology cases each fiscal year and believed this was a useful activity. Dr. Gary Osweiler indicated that a prior FDA sanctioned study of food animal poisoning had been reported at the 2008 AAVLD meeting, and this could be provided as a template for future annual reporting, pending acceptance of the format by the joint committee to be formed. Following discussion, Drs. Osweiler and Hall indicated they were going to form a committee to outline the information needed in these written reports (e.g. number of animals, analytical results [both positive and negative], and disposition of problem, etc). Dr. Hall’s goal is to send out a draft document for comment on toxicology data network (TOXNET) by January, 2010. The attendees asked the committee to try and obtain input from a wide group as there could be benefits from capturing data from states not present at the meeting and from interactions with state veterinarians and directors of diagnostic laboratories.

Dr. Hall led a discussion on the differences between states on the reportability of toxins involving food animals. Dr. Hall has received samples with elevated levels of the same toxin from 2 different states. In one state, toxins involving food animals are reportable to the state veterinarian, while in the other they are not. The AAVLD standard operating procedure (SOP) on confidentiality indicates he would need owner consent to report this toxin in the other state. When the owner indicated she/he did not want the results released to a third party, Dr. Hall was placed in the position of maintaining client confidentiality or possibly getting sued for releasing information that potentially has public health significance. Following this information, the attendees indicated they would like this issue to be brought up for discussion by the USAHA Executive Committee or the appropriate committee recommended by the USAHA and AAVLD Executive Committees.

The next discussion topic was proficiency testing. Dr. Tim Evans, University of Missouri, provided his thoughts on the top 13 toxicants and the preferred sample to test in a toxicology proficiency test. They were as follows:

1) Lead in tissue and/or blood
2) Aflatoxins in feed
3) Arsenic in tissue
4) Ionophores in feed
5) Copper in liver
6) Nitrate in ocular fluid and/or feed
7) Pesticides in rumen contents
8) Selenium in tissues and/or blood
9) Anticoagulants in liver
10) DON (vomitoxin) in feed
11) Cyanide in forage and/or rumen contents
12) Zinc in serum
13) Cholinesterase in brain/serum

Following extensive discussion and the distribution of the AAVLD Assay Validation Requirements, the attendees asked that the laboratories send their current testing capabilities and contact information to Dr. Catherine Barr [acbarr@tvmdl.tamu.edu]. In addition, the laboratories should send Dr. Barr a list of the ten toxicants they test the most each year including the matrices tested and the amount of sample needed. The members also approved a three-person committee; Drs. Nick Shrier, Dr. Jeff Hall, and Dr. Gary Osweiler to determine the most appropriate toxicant(s) and sample(s) to be used in the next round of the proficiency test. This decision should be made after the committee receives a report from Dr. Barr.

Committee Business

Dr. Hall read the mission statement for the USAHA Committee on Environment which includes residues and residue prevention. Dr. Hall indicated that if there is a formal union of the AAVLD Veterinary Analytical Toxicology and Mycotoxin Committee and the USAHA Committee on Environment that a combined name and new mission statement will need to be addressed. Dr. Barr then moved and Dr. Frank Galey seconded a motion to officially merge these two committees. There was a unanimous vote in favor of this union by the 21 USAHA and AAVLD members present.

The attendees indicated that the USAHA and AAVLD executive committees would likely set up a subcommittee to try and resolve the primary issues involved in joining these two committees before rendering a final decision on this proposed union. Dr. Barr then moved and Dr. Michelle Mostrom seconded a motion that the following four people be recommended to the executive committees of the USAHA and AAVLD for this subcommittee – from AAVLD, Dr. Steve Hooser and Dr. Brent Hoff, from USAHA, Dr. Larry Thompson and Dr. Gary Osweiler. There was a unanimous vote in favor of this by the 21 USAHA and AAVLD members present.
The Committee met on October 11, 2009 at the Town and Country Hotel, San Diego, Calif., from 1:00 to 5:30 p.m. There were 15 members and 42 guests present. Chair Dan Lafontaine presided. Dr. Lafontaine welcomed all attendees and introduced this year’s overall theme, Animal Production Food Safety. The program consisted of a series of six presentations by animal production experts from the U.S. Department of Agriculture (USDA), Food Safety Inspection Service (FSIS), industry organizations, private industry and academia. The Committee’s business meeting followed the scientific presentations.

**Beef Quality Assurance…the Revolution Impacts on Quality**

Dr. Dee Griffin, Beef Production Management Specialist, University of Nebraska, Great Plains Veterinary Education Center, opened the program with a presentation entitled Beef Quality Assurance…the Revolution Impacts on Quality. The key mission of Beef Quality Assurance (BQA) is education. BQA grew from its 1980 start as a Beef Safety Assurance Program (residue avoidance) in five states to a national education
REPORT OF THE COMMITTEE

program. The first Quality Audit in 1991 pointed to injection sites and “Defect Avoidance.” Education became a key program. A selling point for the program was that information to producers was applied with common sense, and these early basic BQA points are still sound. Quality Assurance Programs were designed by producers and food industry affiliates to provide production management education. This education targets defect prevention with an emphasis on safety. Specifically targeted is the prevention of chemical, physical and biological safety defects or hazards. Care and husbandry; feeds and additives; health products; and records are still the basis for the National Guideline Best Management Practices (BMPs). They enhance consumer confidence in product quality and safety. An essential point is that BQA Programs are not Government Programs. They are by and for the industry.

In the world of food, consumers want to purchase safe foods. They buy what they trust. So, producers need to know that defects cost money and that their cattle are never too young or too old to create a quality defect. In food animals, quality defects are a life cycle phenomenon and everyone needs to be on board to prevent them. Further, the beef production industry should build on what it knows best. Cattlemen, employees, veterinarians, nutritionists, suppliers and other specialists must take a close look at what could go wrong and where in the continuum of their particular operation. Everyone should develop practices and techniques that allow checking and verifying. It is equally important to design all of the everyday working facilities to minimize hazards.

Hazard analysis critical control points (HACCP) can provide a BQA roadmap by targeting specific chemical, physical and biological hazards. A great success story can be seen in physical hazards. For example, from the period March 1992 through March 2000, top sirloin injection site lesions have decreased from about 22% to 2%. Another example is that broken needles are very rare in industry today due to better needle selection, improved injection methods and better animal restrain techniques. However, simple bruising from improper handling continues to cost the industry tens of millions of dollars per year. The picture with microbiological defects is not as clear cut. In 1982, USDA Food Safety Inspection Service (FSIS) noted that microbiological defects would be the beef industry’s “Achilles’ Heel.” The industry’s position was that this was a pessimistic view until 1993 when E. coli 0157:H7 came along. Since then, the industry has been jerked through knot holes that were not even known to exist prior to 1993. As a result, industry has been scrambling to catch up ever since then. The consensus is that continuous education programs and ongoing research and development of new or improved intervention techniques must be vigorously pursued. Some of the pre-harvest 0157:H7 interventions that are effective are:

- Hide cleanliness and pen surface management
- Direct Fed Microbials - (Prevalence of Escherichia coli O157:H7 and Performance by Beef Feedlot Cattle Given


Post-harvest interventions include:

- Minimize hide contamination on the farm
- Hide cleanliness - washing cattle (pre & post knocking)
- De-hiding sanitation (decrease cross contamination)
- Trim, clean & sanitize hide pattern lines (steam vacuum)
- Carcass washing cabinets (hot water vs organic acids)
- Test & Hold

On the surface, chemical defects, violative residues, are also a success story. In beef cattle they have gone from about 2% in 1982 to thousandths of a percent in 2007. Residues in cull dairy cows and veal calves are only slightly higher – in the hundredths of a percent range. But there is no reason they should not all be zero. Any residue violation indicates improper drug use, usually intentional, on the farm and there is no reason for this. There are too many choices of highly effective drugs today and information on proper use and withdrawal times is better than ever before. Ceftiofur is one drug that is receiving intensive scrutiny now. It was approved in cattle in 1988 and the industry went for almost twenty years without a single residue violation. However, in 2008 the testing methodology was changed and new withdrawal times were published. Resultantly, in the past year there have been 128 residue violations. This is directly related to dairy operators not respecting new withdrawal times.

A current point of interest is that in October 2008, the USDA Food Safety and Inspection Service (FSIS) awarded Charm Sciences a contract to provide Charm KIS™ Tests to USDA inspectors at slaughter facilities to screen for sulfonamides and other antibiotic drugs under the National Residue Program (NRP). FSIS has begun implementing the Charm KIS™ Test in phases starting with cattle (FSIS notice 50-90, issued 7/5/2009) and will eventually implement it for all livestock.

There are multiple antibiotic residue avoidance strategies that are effective. Operators that follow these strategies scrupulously have no residue violations.

- Identify all animals treated;
- Record all treatments;
- Record date for: animal's identification (ID); dose given; route of administration; the person who administered the treatment; withdrawal time (WD);
- Strictly follow label directions for product use;
- Use newer technology antibiotics when possible;
- Select antibiotics with short WD when the choice is equivalent;
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- Never give more than 10 cc per IM injection site;
- Avoid Extra Label Drug Use (ELDU) of antibiotics;
- Avoid using multiple antibiotics at the same time;
- Don't mix antibiotics in the same syringe; and
- Check ALL medication/treatment records before marketing.

Another strategy that can protect beef producers is to use residue screening tests such as the urine adapted PremiTest or PHAST before “high-residue-risk” cattle are sold. These tests will work “pre-harvest”? But it is a microbial inhibition test and must be used with knowledge of the sensitivity and the maximum residue limit in cattle tissue. If urine doesn’t inhibit the test it is not likely that tissue juices from the kidney will inhibit the test. There are two potential exceptions, gentamycin and neomycin, which should never be used in market cattle. Too many good alternatives are available. The most important position the beef industry can have is to not send cattle to market with a chemical residue.

BQA has had successes since 1991. Quality audits up through 2007 have shown decreases in injection site damage, fewer bruises and decreased residue violations. But these same issues also offer continued challenges because they can and should be decreased further. USDA-APHIS data indicates that approximately 90-95% of all U.S. feedlots have a formal training program for Quality Assurance. Their programs include antibiotic selection and use, residue avoidance and physical defect management. USDA-FSIS has stated, “Beef has no residues to be concerned about.” Further, FSIS HACCP data suggests that beef has the lowest bacterial counts of all meats. However, BQA is still missing a large segment if the beef industry. There needs to be more BQA involvement with operations having less than fifty cattle – “the other half of the beef industry.” BQA programs are in almost every state, but the programs need to be adapted to meet the needs of small beef farmers, the dairy industry, veterinarians and government agencies. The industry’s future will be enhanced with increased adoption of BQA.

USDA-FSIS Vision on Animal Production Food Safety

Dr. Dan Engeljohn, Deputy Assistant Administrator, Office of Policy and Program Development, USDA/FSIS, presented the USDA-FSIS Vision on Animal Production Food Safety. FSIS has not traditionally looked at the animal production side of the meat and poultry industry. But the Agency is currently reevaluating its position on this very critical part of the meat and poultry industry. Traditionally, the mission of FSIS has been, “As the public health regulatory agency in USDA, FSIS is responsible for ensuring that the nation’s commercial supply of meat, poultry, and processed egg products is safe, wholesome, correctly labeled and properly packaged. FSIS’s primary statutes are the Federal Meat Inspection Act, the Poultry Products Inspection Act and the Egg Products Inspection Act. As background, this is what we accomplished in federal FY 2008:
FOOD AND FEED SAFETY

Mandatory government inspection of product released into commerce:

- ~44 billion pounds of livestock
- ~57 billion pounds of poultry
- ~3.5 billion pounds of liquid egg product
- ~3.8 billion pounds of product re-inspected at borders
- ~8 million inspection procedures

This was accomplished with approximately 7,800 full-time inspectors, food technologists and veterinary medical officers in over 6,200 facilities. Every establishment received daily inspection. Additionally, at every slaughter establishment and egg product plant, every animal or egg was afforded a critical inspection before and/or after slaughter and/or processing. Our limitation in the pre-harvest arena is that our inspection authority begins at slaughter or at the egg plant. All points thereafter, while product is in commerce, are under FSIS authority to ensure product is not adulterated and is truthfully labeled. One exception is that the 2008 Farm Bill directed that FSIS’s authority for catfish inspection specifically extend to the ponds (on-farm). That issue is currently in rulemaking.

Prior to the 1990s, the Agency was considered as the responsible party for safe products being produced. The 1990s brought about a change in philosophy, and concurrent change in regulations. Now it is clear that industry is responsible for producing a safe and correctly labeled product. This is accomplished through validated process control procedures that are documented for each production lot. The written procedures address food safety hazards (biological, chemical, physical) through Pathogen Reduction and HACCP systems at control points throughout slaughter and processing of livestock, poultry and regulated products at official establishments. With this change, FSIS is now responsible for verifying that established regulatory requirements are met. This is accomplished through setting performance standards and conducting inspection (observation, testing, and review of records). State inspection programs are verified as “equal to,” and foreign establishments are verified as “equivalent.”

President Obama’s new administration brought in a new focus on food safety and resulted in the establishment of the President’s Food Safety Working Group (FSWG). It is chaired by the Secretaries of Health and Human Services and USDA and is founded on three principles.

- Preventing harm to consumers is our first priority.
- Effective food safety inspections and enforcement depend upon good data and analysis.
- Outbreaks of foodborne illness should be identified quickly and stopped.

The FSWG is already delivering results. Projects have been initiated in four areas. First, prevent Salmonella contamination. Second, reduce the threat of E. coli O157:H7. Third, build a national traceback and response system. Fourth, improve the organization of federal food safety
REPORT OF THE COMMITTEE

responsibilities. In concert with this new focus on food safety, the Agency is developing a pre-harvest vision; “Pre-harvest controls are viewed as essential to an effective food safety system.” In supporting this vision, FSIS policies will be designed to encourage slaughter establishments (and egg handling/processing plants) to know, interact with, and limit (as appropriate) qualified suppliers. FSIS will target inspection resources more frequently and intensely in establishments that do not have effective controls to limit incoming food safety hazards. However, the Agency is not looking at trying to expand its inspection authority to farms. Alternatively, FSIS has a specific commitment to issue compliance guidelines to beef and poultry on-farm producers early next year. These will be followed by guidelines to pork producers.

While pre-harvest guidelines are a current initiative, we also continue to improve current inspection programs. One area we are looking at carefully is reducing chemical food safety hazards. Drug residues and environmental contaminants are increasingly becoming issues of public health concern. They will be more effectively verified through HACCP-related inspection activities and supplemented with residue testing through the National Residue Program for domestic and imported product. The Agency maintains a residue violator list which is the basis for a livestock supplier history. Screening tests, such as FAST (Fast Antimicrobial Screen Test), help in determining the disposition of single animals. The KIS™ (Kidney Inhibition Swab) test will soon replace FAST. STOP (Swab Test on Premises) also helps in the detection of antibiotic residues in animal tissues. There are recurring surveys for specific compounds such as dioxin and, when needed one-time investigative surveys are conducted. The melamine investigation is a recent example. Biological food safety hazards (primary pathogens plus emerging special emphasis organisms) remain as issues of significant public health concern and are verified through expanding verification testing programs. The organisms of primary interest are:

- Campylobacter
- Escherichia coli O157:H7
- Non-O157 shiga-toxin forming E. coli (6 serogroups: O26, O103, O111, O121, O45, O145)
- Listeria monocytogenes
- Salmonella, specifically multi-drug resistant types and Salmonella enteritidis

The Healthy People 2010 initiative is used as the Agency’s guideline to direct pathogen reduction efforts. Good progress has been made with all four microorganisms in the raw classes of product that FSIS regulates. However, the agency is targeting Salmonella for more work. There is ongoing effort to develop a mechanism to target the scheduling of a Salmonella full sample set or a mini-set for the specific purpose of gathering information about producers contributing to prior sample results of public health interest. The goal is to prevent recurrence of introducing
certain types of *Salmonella* into commerce. Another project that is underway is end-of-set letters at completion of *Salmonella* full sample sets. *Campylobacter* will be handled with the same approach. The letter identifies percent positive rate and offers comparison to other producers in the same class. There is also information regarding the average number of common human illness serotypes. For the past year, the Agency has been publishing the names of producers that are performing poorly. All current and future initiatives tie back directly to the Agency’s mission of ensuring that the nation’s commercial supply of meat, poultry, and processed egg products is safe, wholesome, correctly labeled and properly packaged.

**Renderers Requirements for the FDA Feed Regulations**

Next, Dr. David L. Meeker, Senior Vice President of the National Renderers Association (NRA) discussed renders’ requirements in relation to new Food and Drug Administration (FDA) feed regulations. Renders process dead cattle, trim, and offal into animal feeds and the industry is closely regulated by FDA. There is a website with detailed information on the process and a directory of renderers: http://www.nationalrenderers.org. The new FDA feed rule places additional requirements on renderers. Cattle materials intended for animal feeds must have prohibited material (Cattle Material Prohibited from Animal Feeds (CMPAF)) removed and separated. The basic raw material requirement is that the brain and spinal cord from cattle 30 months or older must be excluded. Renders must comply with this requirement. Four possible options are:

- Discontinue dead stock service
- Discontinue cattle pick up
- Only pick up cattle younger than 30 months of age
- Continue service, separate prohibited material

Pickup of raw product from slaughter facilities is working itself out since most slaughter facilities have the ability to remove CMPAF. It is a business decision on their part to do so or find alternative means of disposal. However, the challenge that deadstock presents to renders is more difficult. Renderers that process cattle materials for animal feed must document that these materials are free of CMPAF. To facilitate this requirement, producers need to call for pickup service immediately after an animal dies. Since age certification is required, producers can keep costs down by furnishing age certification to the renderer. If producers have valid age documentation, they will be asked to sort and mark carcasses over and under 30 months of age. Renders can provide a form for documenting age. Using this form as a basis, the NRA has developed a recommended age certification program. It is outlined as follows:

**Complete an age certification questionnaire:**

- Do you raise, feed or own cattle that are 30 months of age or older? Yes or No
- Do you have records to determine and verify age of cattle in
Once the certification process is complete, producers that maintain valid records would have to agree to segregate and mark cattle carcasses as under 30 months of age or 30 months of age and older. To mark carcasses, it is recommended that producers use an orange paint stick or another color that is readily visible on the carcasses. Each carcass 30 months of age or older, would be marked with an “X” on the side. Carcasses less than 30 months of age would be marked with a “U” on the side. If the age is uncertain or unknown, the carcass would not be marked. Renderers must assume the age cannot be documented from records and/or such records are not maintained for at least one year for any cattle carcasses left unmarked. These carcasses may be assessed a higher fee to defray additional labor costs associated with dentition and handling. Producers must be truthful in declaring the age of dead cattle and they must be aware of the legal obligations. Their certification constitutes a statement that is subject to inspection and verification by the FDA. The certification contains a disclaimer describing the consequences of making false statements as being subject to civil and criminal penalties under 18 U.S.C. Section 1001(a) (2) & (a) (3).

There are other disposal options available to producers such as burial, landfills, composting, incineration or alkaline hydrolysis. However, rendering is the most suitable technology to protect human and animal health and the environment. The rendering system in the U.S. needs to be strengthened, but it is often the best, most economical choice for emergency depopulations in disease control. The best way to strengthen the rendering system for emergencies is to strengthen it for everyday, normal death loss in livestock production. Several things would help. Local jurisdictions could strengthen disposal regulations. Increased research could expand non-feed uses for animal proteins. Financial incentives could be offered to producers who make the right choice. For example, there could be public payments for carcass pick up. Carbon credits could be offered for producers who avoid choices with higher greenhouse gas production such as composting, burying, burning or abandonment.

Pre-Harvest Food Safety in the Pork Industry

Dr. Steve Larsen, Director of Pork Safety, National Pork Board, presented on pre-harvest food safety in the pork industry. Pork quality assurance is a program that is similar to the BQA program discussed earlier. The pork industry looks at the same three overarching categories of microbiological, chemical and physical defects. As with the beef industry, chemical residues and environmental contaminants are the primary chemical defects. Chemical defects are currently not a major problem in the pork industry and, as a result, there is not a great deal of active research in this area. However, the industry remains vigilant.
in keeping chemical defects under control. Regarding microbiological defects, there are the usual suspects; *Salmonella, Campylobacter, Yersenia, Toxoplasma* and *Tricinella*. *Toxoplasma* and *Tricinella* are actually more international trade issues than true public health issues, but, as such, are still quite important to the pork industry. Current research includes looking for improved enumeration methods for all microorganisms and *Salmonella* serovar indentification techniques. The industry also looks for new or improved microbial intervention methodologies that are consistent, cost effective and applicable to the producer. The ultimate goal is to have interventions that make a difference in microbial load at the consumer level. Other active areas of research involve the effect of lairage (holding pens) and stress on microbial load in processed product. Closely related to microbiological defects is antimicrobial resistance. The industry actively researches the impact of various treatments on developing antimicrobial resistance and the mechanisms involved in antimicrobial resistance. Metagenomics, or how bacteria interact with each other and in reaction to external factors is another subject under review. There is active interest in what actually happens in the swine gut when given antibiotics, during genetic transfer, when under stress and in relation to various levels of immune response. The emphasis placed on microbiological defects has paid off. Using FSIS’s performance standards, over 83% of swine sent to slaughter are at less than half the baseline allowed and over 99% are below the allowable baseline. Physical defects are primarily attributable to abscesses. They are estimated to cost the industry about $50 million annually. After comprehensive research on reasons why abscesses occur, recommendations for farm level interventions are currently being developed.

A methodology the Pork Board uses when it is developing industry recommendations is to fund research. One grant conducted a systematic literature review on microbiological defects of *Salmonella* species in the pork production chain from slaughter to the cooler. This study followed the standard systematic process for a comprehensive literature review. First, the specific issue to be reviewed was developed. The task assigned was to assess the points of introduction and amplification of *Salmonella* species from slaughter to the cooler. Thirteen scientific journals and conference proceedings were selected for review. Next, relevance criteria for citations to be included in the review were developed. The primary relevance criteria were that the study had to examine the same cohort of pigs or pigs on the same day of slaughter and the *Salmonella* species level had to be measured at more than one point in the process. During the data extraction phase of the review, all studies were treated as unique. There was no pooled data. Specific plant processing information and culture methodologies were extracted. Next, all outcomes were described as they occurred after a specific processing point. The points identified were stun, bleed, kill, scald, dehair, singe, polish, bung removal, evisceration, split, stamp, final wash, immediately after chill and 18-24
hours after chilling. Data were summarized to provide point-to-point comparisons. Results were reported from fifteen manuscripts covering forty studies. The results obtained demonstrated that, as a carcass works through the slaughter process, *Salmonella* levels decrease after each step. The results provide empirical evidence that *Salmonella* species prevalence on a pork carcass decreases as the carcass moves toward the cooler. In summary, improving pork quality is a team approach that can be impacted at every step in the production chain.

Dr. Eric Gingerich is an Adjunct Professor at the University of Pennsylvania, School of Veterinary Medicine, and the Staff Veterinarian and Laboratory of Avian Medicine and Pathology for the University. His presentation was entitled “Pre-harvest Food Safety in the U.S. Shell Egg Industry.” Dr. Gingerich provided a narrative to accompany his presentation, included at the end of this report.

Committee Business:

After the formal presentations, Chair Lafontaine opened the Committee’s business meeting. The floor was opened for suggested topics for next year’s Committee on Food and Feed Safety. No resolutions or recommendations were presented by the members for consideration. Possible topics for scientific presentation at the 2010 Committee Meeting were discussed. FDA’s expanding role in regulating the feed industry was suggested as a timely, pertinent topic to consider at the next meeting. There being no further business, Dr. Lafontaine adjourned the 2009 meeting of the Committee on Food and Feed Safety.
Summary

Salmonella enteritidis (SE) in egg layers became a significant issue in 1988 when it was reported by Dr. St. Louis et. al. in the Journal of the American Medical Association that SE was responsible for causing numerous cases of diarrheal disease in humans, and in some cases death, associated with Grade A shell eggs. The SE bacteria had developed the ability to infect laying hens and invade the interior of the egg thus bypassing the normally effective sanitation of egg shells where all other Salmonella organisms had previously been found. In 1992, SE was declared an emergency disease by the Secretary of Agriculture. To illustrate the significance of SE, the number of cases of SE in humans increased from 0.6 per 100,000 persons in 1976 to 3.6 in 1996. In 1992, USDA began the SE Pilot Project in Pennsylvania to study the related factors associated with contamination of eggs with SE. From this study, infected pullets, rodents in houses, and contaminated houses were associated with positive eggs. Even before SE was declared an emergency disease, the National Poultry Improvement Plan (NPIP) developed guidelines to determine if breeder flocks were contaminated with SE in 1989 with the U.S. SE Clean Program. This program found some hatch egg source flocks as positive in the initial years after inception but since has virtually eliminated SE as a source of the bacteria for layer flocks. From the SE Pilot Project and other studies, state and company based egg quality assurance programs (EQAPs) were developed to create an organized, voluntary means of using best management practices to reduce the risk of SE infection in layers and eggs. These programs have greatly helped keep the rate of SE infections in humans to a relatively low level. At present, the rate of infection is estimated to be about 2.2 per 100,000. In September 2004, the Food and Drug Administration (FDA) produced their “Proposed Rule for Prevention of Salmonella Enteritidis in Shell Eggs During Production” due to the lack of a decline in the incidence of SE in humans. Some of the reason for a lack of reduction is that not all major egg producing states or companies adopted an EQAP. In addition, SE has begun to be found in broiler meat as a source of human infection. This proposed rule received over 2000 comments during the comment period. On July 7, 2009, FDA announced the Final Rule for its Egg Safety Plan to become implemented in 2010.

History of Human SE Infections Due to Table Eggs

Prior to Dr. St. Louis’ first report in the literature about egg associated SE, outbreaks were seen to significantly rise in the New England region.
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from about 1 per 100,000 persons in 1976 to 9 per 100,000 by 1982 (CDC outbreak surveillance information). This likely indicates that SE was established in the table egg flocks during this time. The North Atlantic region was the second region to show an increase in SE as the incidence rose from 1 per 100,000 in 1980 to over 10 per 100,000 in 1989. The Pacific region had a slow rise in SE rates from 1 per 100,000 in 1983 to 2 per 100,000 in 1992. It then took a significant rise to 6.5 per 100,000 in 1994. The Mountain region saw its SE case rates increase significantly starting in 1992 from 1 per 100,000 to 4 per 100,000 in 1996. The Midwest and Southeast regions have not seen significant increases in SE over the period of 1970 to 2006. All regions rates of SE have declined significantly since 1995, likely the result of control measures put in place. The overall US rate of infection has increased from 1 per 100,000 in 1980 to 3 per 100,000 in 1990, remained at 3 per 100,000 during the 1990’s, declined to 2 per 100,000 in 2006, but has increased to 2.9 per 100,000 in 2008. There is evidence of SE outbreaks from sources other than table eggs, namely broiler meat, the likely reason for the lack of continued reductions since 2002.

Control Measures – Reducing Exposure

Both breeders and commercial layers have the same set of risk factors for contamination of SE as follows:

- Infected chicks or point-of-lay pullets
- Rodents
- Contamination from outside sources (Biosecurity) – Contaminated housing, moving equipment, people, egg handling materials, etc.

Both breeder prevention program and EQAPs incorporate best management practices to effectively prevent contamination from these 3 sources. Chicks are obtained from breeder flocks that are participants in the US SE Clean Program of NPIP. This program assures that the chicks are negative due to an intensive testing program whereas the breeder flocks are tested every month for evidence of SE infection (manure drag swab tests). In EQAPs, chick box papers are tested for SE contamination. Pullet growing flocks are grown in houses that are cleaned and disinfected prior to placement and use best management practices to prevent rodent infestations. Pullets are tested during growing prior to movement to the layer house in some EQAPs to assure the layer producer that the pullets are negative. Rodent control programs not only contain baiting as part of the program but also reducing harborage (rodent hiding and nesting sites) and reducing places where rodents can enter houses (doorways, holes in walls, etc.). A rodent indexing system is used in the Pennsylvania Egg Quality Assurance Program (PEQAP) using 12 live traps set throughout the house and counting the number of mice caught one week a month as a means of estimating the effectiveness of the rodent control program. As SE can contaminate a flock carried on footwear, hands, clothing, and
equipment, biosecurity is a big part of prevention. Maintaining disinfectant footwear bathes and hand sanitation at the entries to the chicken area can eliminate SE on hands and footwear picked up outside or in the egg processing area. Requiring all visitors to don clean coveralls, boots, and hats is important. Employees need to wear dedicated clothing and footwear. Crew members moving birds, pullets or spent fowl, must wear clean clothing and footwear between jobs. Any equipment brought into the chicken production area must be thoroughly cleaned and disinfected. The procedure used to clean and disinfect houses between flocks depends on the testing status of the flock. Houses where SE negative flocks have been housed need only standard, minimal cleaning and disinfection. If a flock with SE was present, additional steps need to be taken to assure that the next flock will not become contaminated. A thorough wet washing with hot water, detergent, and high pressure followed by a surface-wetting application of an effective disinfectant on all surfaces is done. In addition, many producers follow this with fumigation of the house with formaldehyde gas or fogging.

Control Measures – Egg Refrigeration
Refrigeration is an important deterrent to growth of SE inside the egg. Hatch eggs are stored at 62F while table eggs prior to processing are stored at 55F and after processing at 45F.

Control Measures – Egg Washing and Sanitation
Hatch eggs are generally not washed but can be sprayed with sanitizer to reduce the risk of SE contamination. Handling hatch eggs with washed hands is very important to prevent contamination. Table eggs are washed in 105 to 110F, high pH (10+) wash water containing chlorinated detergent in washers using brushes to clean off any fecal material. The eggs are then rinsed in highly chlorinated water.

Control Measures – Vaccination
Using the birds immune system to aid in preventing infection should the bird be exposed is a very powerful tool. This has aided many producers both in reducing the risk of contaminated eggs reaching the consumer and reducing house contamination levels over time as SE vaccine reduce shed of SE into the feces. The inactivated vaccines, bacterins, appear to be the superior in effectiveness compared to live vaccines. Bacterin is applied by injection usually at 13 to 15 weeks of age to provide a lifetime of immunity. Live vaccines are applied by spray at 2, 6, and 15 weeks for example. Both must be considered as only a part of the SE risk reduction program and cannot be relied on as the total program.

Control Aspects – Verifying Flock Status
Verification of the status of flocks is essential to the control of SE as knowledge of the flock status allows accurate program planning and
adjustment plus action to remove flocks from the egg (hatch egg or table egg) supply. The NPIP U.S. SE Clean Program calls for testing manure drag swab samples of each flock starting during the first month of life and continuing each month thereafter. In addition, each breeder flock is tested serologically at 16 weeks of age using the Pullorum test, a group D Salmonella test that will detect flocks positive for SE as well. Many EQAPs also require chick box paper testing which, in essence, is another test of the status of breeder flocks. If a breeder flock is found positive when tested by any of the above tests, further tests of bird’s tissues are performed to determine if the flock is truly positive. If the flock is determined to be SE positive, it is no longer used for hatch egg production. Table egg flocks are tested to a varying degree depending on the EQAP the company uses. The greatest amount of testing is performed in PEQAP where the pullets are tested by manure drag swab at 10 to 12 weeks then layers are tested at 30 and 45 weeks of age, and if molted, after molt at 50% production. If a layer flock is found manure drag swab positive, eggs are tested to determine if the flock is at a high risk for the consumer. One thousand eggs are tested in pools of 20 at two week intervals for four tests. Thereafter, 1000 eggs are tested every 3 months. If any tests show a single egg pool to be positive, eggs from that flock must be diverted from the shell egg market to hard-cooking or pasteurization. A flock’s eggs can return to the shell egg market if it passes one, 1000 egg test but must test 1000 eggs for three more tests at two week intervals. In PEQAP, approximately 1/3 of the manure positive flocks have eggs that test positive.

Control Measures – Pasteurization

Pasteurization of shell eggs has been developed in the U.S. and South Africa. The U.S. method uses progressively increasing temperature water baths to raise the internal temperature of the eggs sufficiently to be capable of the required five log reduction of SE. The South Africa method is less costly and uses microwave ovens initially followed by convection ovens to provide the required heat to bring about the five log reduction of SE bacteria. These methods are slow to be adopted due to the cost of capitalization and operation that adds to the cost of the final product and the perceived lack of risk of using non-pasteurized shell eggs.

Control Measures – Other

Commercial preparations of beneficial bacteria (probiotics) seeds the intestine with bacteria which produces substances that kill or inhibit SE can be useful when administered to flocks during periods of stress when the intestinal microflora may be upset; moving, hot weather, high production, vaccinations, etc. They also may be very useful when applied to day-old chicks to establish a normal microflora prior to exposure to SE in the pullet house. Prebiotics can also be useful in reducing colonization of SE in the intestinal tract. The commercial preparations are made up
of sugars that aid probiotics to establish themselves and also reduce the ability of SE to attach to sites on the intestinal cells. Continuous antibiotic use is not advised due to rapid buildup of resistance by the SE bacteria. Treatment with an effective antibiotic can be useful in flocks where SE is causing mortality due to septicemia and peritonitis. Botanical preparations are becoming more available as a natural alternative to antibiotics for long term use. Whether or not SE bacteria will be able to develop resistance to these preparations is not yet known. Feed has not been implicated as a risk factor in contamination of flocks therefore interventions to avoid contamination have not been done. Breeder flocks that choose to use meat byproducts in the feed must obtain these from companies participating in the Animal Protein Producers Industry (APPI), Salmonella Education Reduction Program and the product must be either treated with a Salmonella-killing additive or palletized.

FDA Egg Safety Rule

The FDA Egg Safety Rule of 2009 uses many of the components of the Pennsylvania Egg Quality Assurance Program (PEQAP) – Chicks from NPIP SE Clean breeders, rodent monitoring and control, cleaning and disinfection of houses between flocks, verification of flock status by manure and egg testing, diversion of eggs from SE egg positive flocks, and refrigeration of eggs at 55F if farm-packed or 45F after washing, grading, and packing. Differences between PEQAP and the FDA Rule are a required fly monitoring and control program, refrigeration of all eggs at 45F within 36 hours after collection, and no early lay (30 week) manure test. Concerns about the FDA Egg Safety Rule are 1) laboratory availability in all states to perform the required tests, 2) increased expenditures by the laboratories to perform FDA laboratory test procedures, 3) the increased costs to producers for testing flocks using FDA laboratory protocols compared to present used methods, 4) possible increased sensitivity of FDA testing protocols yielding high numbers of manure or egg positive flocks, 5) destiny of flocks that test egg positive but the producer has no market in his area that can pasteurize or hard-cook eggs, 6) the thermal crack effect of requiring 45F refrigeration of farm-packed eggs that will be washed in 110F or higher water, 7) training requirements of on-farm persons responsible for the SE program, and 8) egg recall possibilities if eggs test positive for SE.

Conclusions

SE continues to be a serious concern of the egg industry. Each company needs to address issues of potential exposure to SE and implement control measures to reduce the risk of flocks or eggs becoming contaminated.

Dr. Bob O’Connor concluded the afternoon’s formal presentations with his discussion on Effective Salmonella Control – Commercial Poultry Operations. Dr. O’Connor is Vice President of Technical Services – Food
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Safety, Quality and Veterinary Services for Foster Farms. Pre-harvest interventions are effective in reducing microbial loads in poultry flocks. The key is to develop a systematic approach to applying interventions that will yield a result that is both effective and economical. Review of an actual case study from a large poultry operation emphasizes this point. In this case study, the problem was significantly increased Salmonella positive samples at one operating unit of a large broiler operation. The approach to solving the problem (“kitchen sink”) was to immediately implement every pre-harvest intervention strategy possible as quickly as possible. This included the following:

- Cleaning live-haul modules
- Acidifying water in grow out barns
- Probiotic use in water of grow out barns
- Probiotic gel in chick boxes at hatchery
- Probiotic in feed
- Acidifying litter of grow out barns
- Complete cleanout of litter in grow out barns
- Growth promotant in feed
- Propionic acid in feed
- Antibiotics in the feed
- Vaccinate – hatchery and field
- Breeder vaccination and abtobiotic treatment

A positive result was unquestionably achieved since Salmonella levels were significantly reduced. However, the process was expensive and it was unknown which strategies were effective and by how much. It was also unknown if there were some interventions that were ineffective since multiple interventions were implemented almost simultaneously. Consequently, an independent audit firm was contracted to review and stratify the results to the extent possible. One of the first steps by the audit team was that various members of management were interviewed to capture their perceptions of the sources of Salmonella and which interventions had been successful. There was no consistency in the perceptions:

- “everything got better when we put in a new chiller”
- “it is all the things that we did at the grow-out farm that solved the problem”
- “my instinct tells me that it all comes in from the breeders”
- “I don’t know what made it better. I hope it stays that way”
- “It must be the vaccine”

This confirmed that, in the absence of empirical data, perceptions are frequently of little value in solving a problem. The audit team then proceeded to conduct a systematic review of available data. The goals were twofold. First, determine the effectiveness of interventions at the grow-out farm level as related to performance measured by Salmonella results on carcass wash rinsate. Second, assist in the management of withdrawal of ineffective interventions from this point in the value chain.
Post-chiller *Salmonella* test results were then reviewed.

The control chart of *Salmonella* positives week-by-week showed a clear downward trend in the proportion of samples tested positives for *Salmonella* between April 2, 2005 and August 20, 2005. On March 6, 2005, carbon dioxide (CO2) was added to the chiller and chlorine (CaClO2) was added to the recycled chiller water. From the dramatic drop in *Salmonella* positives on carcasses at this point, it appears that these changes to the interventions were effective. The results were substantiated by the results of a validation study performed at the same facility, with bio-mapping of the process showing the various incidence levels of Salmonella. The March 6, 2005 changes to the interventions were noted to be effective albeit not sustainable until the impact of intervention changes made in early April.

There were two dates of statistically sustainable significance, April 12, 2005 and July 8, 2005. In early April, three interventions appeared to have a positive impact on *Salmonella* levels. These interventions were: introduction of vaccinations at the hatchery, field vaccinations at grow-out farms and increased overflow water in the scalders. The drop associated with April 12, 2005 captures the combination of these three interventions. The significance of increasing the scalders overflow is related to maintaining a lower microbial load in the scalders. *Salmonella* vaccine was introduced to the grow-out farms on February 9, 2005 as a follow up to the hatchery vaccinations which were started January 26. The impact of this program coincides with the decline in *Salmonella* positive results as seen in the Process Control Chart of *Salmonella* positive drag swabs at the farms. The timing of this intervention corresponds to the improvements seen at the processing plant in April. Later on, a sudden reduction in *Salmonella* positives to 0% (that was persistent for 5 weeks) was noticed at the time of an on-site visit conducted on or about July 18, 2005. This date corresponds directly to the expected 60-day lag time between treatment of breeder birds with antibiotic, and the earliest processing of their progeny. The concept of treating the breeder flocks with an antibiotic was gleaned from control strategies used with table-egg flocks to successfully eradicate S. *enteritidis*. Unfortunately, the antibiotic used, previously licensed for use in poultry, is no longer able to be used in this species as per a subsequent ruling by FDA.

In addition to the statistically significant interventions, there were also interventions with no correlation to reduction of *Salmonella*. A strong correlation related to probiotic use was not found and it is difficult to determine definitively if and when this intervention would produce noticeable results down the value chain. Also, there is not a statistically significant reduction in *Salmonella* counts on carcasses attributed to the implementation of live haul module washing on October 1, 2004. From this, there were several key learning points from the first part on the independent audit:

- Chiller management (CO2/Cl2) can directly impact final
Salmonella levels.

- There is a need to consider effectiveness of interventions in combination and alone. Changes should be introduced in a controlled and systematic way.
- Instinct needs to be supported with information.
- Impact of interventions at the breeder level extends throughout the value chain.

Questions remained unanswered after the first phase of the study. A follow up to the data analysis led to a separate, second study to test the impact of eliminating interventions alone or in combination on grow-out farms. Four factors were identified; vaccination (broiler), litter acid treatment (+/-), organic acid (+/-) and probiotic (water: +/-). Carcass rinse samples per house (test/control) were collected pre-chiller and post-chiller and analyzed for presence of Salmonella. The data was evaluated at the pre-chiller and post-chiller level.

Pre-Chiller:

- There is a statistically significant reduction in Salmonella with the use of litter treatment.
- There is a statistically significant reduction in Salmonella if the birds are the progeny of those previously treated with antibiotics.
- The reduction in Salmonella positives with the use of either organic acid or probiotics is not statistically significant.
- The effect of vaccination is statistically significant – but in the opposite direction as expected (i.e. the probability of having Salmonella decreases when vaccination is not used).

Post-chiller:

- At the post chiller location, the probability of having positive Salmonella is 0.14 times that of the probability at the pre-chiller location. That is, after processing through the chiller, the probability of having positive Salmonella on carcasses drops by 86%.

At the end of the audit, some conclusions were made. First, pre-harvest interventions will work, some better than others. For example, vaccinations do help, but feeding probiotics do not. But the most effective intervention is at the chiller. This is another way of saying that the old, reliable intervention of proper disinfection still works. In a chiller, attention must be given to both pH and free chlorine levels, although there are alternatives to chlorine such as peracitic acid and cetylpiridinium chloride. In closing, food safety is a common goal of all reputable producers whether their product is beef, pork, poultry or others. They learn from one another and practice what they learn.
REPORT OF THE COMMITTEE ON
FOREIGN AND EMERGING DISEASES

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The Committee met on October 13, 2009 at the Town and Country Hotel, San Diego, Calif., from 8:00 a.m. to 5:30 p.m. There were approximately 129 members and guests present. The beginning of the session included a thank you to former Committee Chair, Alfonso Torres and introduction of the new Vice-Chair, Tammy Beckham. In addition, there was a reading of the committee charge and a review of the 2008 Resolutions and the United States Department of Agriculture (USDA) response to those Resolutions.

Dr. Jim Clark from the Canadian Food Inspection Agency (CFIA), presented a time-specific paper entitled, "Novel H1N1 Influenza A Virus in Canadian Swine Herds." The paper in its entirety is included at the end of this report.

**UK Perspective on Vector Borne Diseases in Europe : Bluetongue and AHS**

Richard Drummond

Department for Environment, Food and Rural Affairs (DEFRA), U.K.

Vector borne diseases of livestock and equidae have occurred for many years as occasional incursions into Europe from warmer climates, but since 2006, there has been renewed interest as a consequence of the unexpected (and unexplained) incursion of Bluetongue Virus (BTV) type 8 with subsequent wide spread over 2007 and 2008.

The paper set out the pattern of recent spread of BTV serotypes since 2000, and gave an outline of the current control strategy which revolves around early detection, official reporting and investigation, controls over movements, sharing of information and use of inactivated vaccines (where these are available).

These recent events have prompted an urgent review of control policies for dealing with African horse sickness (AHS), with strong engagement with legislators in the European Community and with the equine industry in the U.K. Looking to the future, Dr. Drummond
concluded that evidence for permanent climate change is firm and that accompanying changes in natural habitats could bring new threats to Europe from introduction and establishment of vector borne diseases. The impacts of this threat can be mitigated by a clearer understanding of trends in prevalence, epidemiology, well planned and executed surveillance, modelling and development of new tests and vaccines.

Equine Encephalosis: 2008 Occurrence in Israel
Peter Timoney
Department of Veterinary Science; Gluck Equine Research Center, University of Kentucky

Evidence of the northward migration of equine encephalosis virus from sub-Saharan Africa was provided by an extensive occurrence of the disease in Israel, October/November 2008. Initially believed to be equine viral arteritis based on limited serological findings, it was not until late March 2009 that a diagnosis of equine encephalosis was confirmed by polymerase chain reaction (PCR) testing of viral isolates from several affected horses. Isolation and characterization of the virus strains was performed by the Kinron Veterinary Institute, Israel and VLA, Weybridge, U.K.

The disease was first reported around October 1, after which it spread over the ensuing weeks, involving an estimated 80% of the country's equine population. The total number of recorded outbreaks was 42, most of which were localized along the Mediterranean coast. Typical clinical manifestations in affected horses involved fever up to 40 - 41°C, depression, anorexia, muscle soreness and generalized weakness.

As part of the control measures that were enforced, all public horse events were cancelled in mid-October, with affected premises placed under quarantine. A four-day countywide ban on all horse movements was imposed November 7, 2008. Vaccination was not carried out and treatment of affected horses was not considered necessary in the majority of cases. The official date the occurrence of equine encephalosis was resolved was December 1, 2008.

Equine Encephalosis Virus and other Equine Orbiviruses: Current Status and Diagnostic RT-PCR Assay Development.

Since 1998 at least 15 different incursions of bluetongue have occurred in Europe, involving 12 different strains of nine different bluetongue virus (BTV) serotypes. These outbreaks (particularly those caused by BTV-8) have killed large numbers of animals mainly sheep and cattle, and have been linked to climate change in the region. Molecular epidemiology studies confirm that these viruses arrived in Europe (likely in the form of wind-borne infected midges) via several different routes (via...
Turkey into Greece and Bulgaria; from North Africa into Italy, the western Mediterranean Islands or Iberia; and via an unknown route directly into northern Europe).

Recent events (in 2007-2009) involving the equine orbiviruses, have included outbreaks of African horse sickness (AHSV types 2 and 7 in Senegal and Mauritania; AHSV-4 in Kenya) and Equine encephalosis (EEV – untyped, in Israel). In view of the recent European outbreaks of BTV these viruses (which are also transmitted by Culicoides biting midges) must also be considered as a significant risk to animal health in the region.

Isolation and characterisation of the mosquito transmitted Peruvian horse sickness virus (PHSV) in South America and Australia (Attoui et al J. Virol in press) suggest that it could emerge to threaten new territories, possibly also linked to climate change.

As part of strategies to help deal with these threats, the full genomes of available virus strains (including all of the reference strains) of the equine orbiviruses were sequenced. These data have supported the development of novel serogroup/virus-species specific diagnostic real-time RT-PCR assays for African horse sickness virus (AHSV), equine encephalosis virus (EEV) and Peruvian horse sickness virus (PHSV), targeting the conserved polymerase and helicase genes (Segment-1 and 9).

RT-PCR assays have also been developed for the different AHSV serotypes (which were used to identify recent outbreaks in Kenya and Senegal/Mauritania) targeting genome segment two (encoding the outermost capsid protein VP2). Type specific assays have also been developed for the seven EEV serotypes and for the single known type of PHSV.

Although these assays all work well with the virus strains currently available at IAH Pirbright (most of which were supplied by OVI in South – Africa) it will be important to maintain their validity, by testing them against further sequences and isolates of these viruses as they become available.

Emerging Diseases: Partnership between the Pharmaceutical Industry and Regulatory Authorities
Danny Goovaerts
Intervet/Schering-Plough Animal Health

This presentation provided the industry perspective of responding to emerging diseases through vaccine production. The presentation addressed the current issues facing the industry including regulatory hurdles, capacity, marketing and working as partners with the regulatory agencies. When responding to an emerging disease, three main issues exist. There is a need for vaccines, enzyme-linked immunosorbent assays (ELISAs) to differentiate vaccinated versus infected and also production facilities to handle the extra capacity needed.

In order to obtain a conditional license for a vaccine during emergency situations, the vaccine companies must submit a dossier with defined
information about the product. During non emergency times, it can take six years to obtain licensure (two years from time of submission of dossier to license). There are certain situations in which the conditional licenses are provided. The chief veterinary officer has the authority to declare an animal health emergency. When bluetongue broke in Europe, Intervet and other companies started developing vaccines one month after outbreak. The first license was given in 2007 and in 2008 a large vaccination campaign began. The conditional license was provided and this took a total of 14 months.

Issues that the vaccine company faces are that it is difficult to prepare a business case for the company for development of a vaccine for an emerging disease. The investment in research and development is often hard to justify. Volume cannot be predicted and the industry doesn’t have idle factories waiting until an event happens. Conditional licenses are good for getting to market in short time, but still require complete licensure. Dr. Goovaerts posed a series of questions including:

• What vaccines are attractive for a company to develop?
• Is there market potential?
• What type of vaccine should be produced?

For some diseases, it may be better to produce antigens for a vaccine bank and keep them stored. Dr. Goovaerts concluded by stressing the need for full partnership between industry, and regulatory authorities. A proactive instead of a reactive relationship would promote the development of vaccines for the control of epidemic diseases.

A Case of Novel H1N1 Influenza Virus in a Swine Herd in Alberta, Canada
Jim Clark
Disease Control Terrestrial Animal Health Division, Canadian Food Inspection Agency.

Dr. Clark reported that influenza A virus infections commonly occur in swine herds world-wide, including the North American swine population. Although human influenza viruses have been isolated from pigs, historically there has been varied evidence of human H1N1 influenza viruses maintaining themselves in swine population. Swine influenza virus (SIV) infections, both H3N2 and H1N1, have been reported in humans in Canada, the United States, Europe and Asia. Occupational exposure to pigs increases the risk of sero-conversion and influenza-like illness (ILI) attributable to SIV. The reported number of SIV infections in humans, however, is negligible compared to the number of people exposed to pigs through occupation or association. The true incidence and significance of zoonotic swine influenza infection in the animal or human populations is unknown.

On April 23, 2009, the Canadian Food Inspection Agency (CFIA) convened a High Visibility Issue meeting to consider the importance and relevance of information being reported from Mexico and the USA.
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concerning a novel influenza A virus. According to a ProMED posting of April 21, 2009, “On 17 Apr. 2009, CDC determined that two cases of febrile respiratory illness occurring in children who resided in adjacent counties in southern California were caused by infection with a swine influenza A (H1N1) virus. The viruses from the two cases are closely related genetically, resistant to amantadine and rimantadine, and contain a unique combination of gene segments that previously has not been reported among swine or human influenza viruses in the United States or elsewhere. Neither child had contact with pigs; the source of the infection is unknown”. Additional information in the report indicated, “the viruses are similar to those of swine influenza viruses that have circulated among U.S. pigs since approximately 1999; however, two genes coding for the neuraminidase (NA) and matrix (M) proteins are similar to corresponding genes of swine influenza viruses of the Eurasian lineage.” Based on a lack of exposure to pigs in the histories of the infected individuals, there was concern that this virus could be transmitted human to human. Due to the unknown risks the virus might pose to swine or other animals, the CFIA mobilized its National Emergency Response Team to consider the potential risks and develop a policy to address the possibility the virus would be found in the Canadian domestic swine herd. Communication products were developed to provide information to the swine industry, veterinary community and agricultural officials in the provinces and territories asking they be vigilant for any influenza like illness in the swine population especially where there was a history of a person in contact with the swine that had influenza like illness (ILI) and a history of recent travel to Mexico or southern California. Initial policy development adopted a precautionary approach requiring federal quarantine to control movement and testing the herd until virus circulation was no longer detected at which time the quarantine would be released. There was also discussion of the need for research trials to better define any disease caused by this novel virus in swine and poultry and determine the efficacy of the currently available commercial swine influenza vaccines.

Influenza (pH1N1) in Pigs in Australia.
P.D. Kirkland
Virology Laboratory, Elizabeth Macarthur Agriculture Institute (EMAI), New South Wales, Australia

The swine population in Australia was presumed free of influenza viruses up to this year. In mid July of 2009, influenza like clinical signs were reported in a breeding herd in Australia. This coincided with epidemic of influenza in the human population. H1N1 virus was isolated on a 250 sow breeding farm. There were no other commercial pig farms within 50 km of this farm. Clinical signs included sudden onset of mild flu like illness. These clinical signs were noted 5 days after flu-like illness in worker had occurred. Clinical signs included coughing and pigs of most ages affected. Nasal swabs and sera were collected. All 13/13
pigs were found positive using a modified fluA matrix PCR test. All 21/21 pigs were positive by serology. The owner of farm also became ill. The confirmatory laboratory in Gelong was sent samples for virus isolation but were unable to propagate virus. The farm was quarantined. When no clinical signs and if clear from infection for 7 days, pigs were then allowed to go to slaughter. There was good support from abattoir workers. In humans in Australia, the virus is causing mild clinical symptoms. Virus is easily spreading from humans to pigs, but it does appear that virus goes back the other way as well.

U.S. Swine Industry Response to Novel H1N1 Influenza A Virus
Patrick Webb
National Pork Board

The U.S. pork industry continues to take a proactive approach towards managing the novel H1N1 event, which has caused significant economic repercussions to an industry already experiencing 21 months of financial losses. When news of the novel H1N1 outbreak in humans hit in late April, crisis management plans were ready to be put into action. These actions included rapid communications out to producers explaining the issues and actions they needed to take on the farm to better protect the U.S. swine herd.

To address the H1N1 outbreak in a comprehensive way, the National Pork Board joined with the National Pork Producers Council, the U.S. Meat Export Federation and the American Association of Swine Veterinarians to focus on four main objectives:

• To reassure U.S. consumers and America’s international trading partners that U.S. pork is safe.
• To protect the U.S. swine herd from becoming infected with H1N1.
• To monitor the coverage of H1N1 by the media, social media, government and industry, and supply these organizations with science-based, accurate information.
• To be prepared to protect and defend the U.S. pork industry against unwarranted attacks and allegations.

As this event continued to unfold, the pork industry worked closely with USDA-Animal and Plant Inspection Service, USDA-Agricultural Research Service, Centers for Disease Control and Prevention, State Veterinarians and State Public Health Officials to address research, surveillance and response issues.

The industry will continue to proactively address novel H1N1 issues. The U.S. pork producers are prepared to act in the best interest of the public, the animals in their care, their employees and their communities.
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USDA Response to Novel H1N1 Influenza A Virus.

Amy L. Vincent, DVM, PhD, Alessio Lorusso, DVM, PhD, Janice Ciacci-Zanella, DVM, PhD, Eraldo Zanella, DVM, PhD, Kelly A. Lager, DVM, PhD, Kay S. Faaberg, PhD, Marcus E. Kehrli, Jr., DVM, PhD* Swine and Prion Diseases Research Unit, National Animal Disease Center, USDA-ARS

Influenza A viruses are endemic in swine in most parts of the world. Swine influenza viruses in the U.S. have been very dynamic over the past 10 years - ever since the introduction of the triple reassortant internal gene cassette into swine influenza viruses. The predominant subtypes circulating in U.S. herds are H1N1, H1N2 and H3N2. The most prevalent isolates submitted to U.S. diagnostic laboratories over the past three years have been of the H1 subtype; within the H1 subtypes, the gamma, beta and delta hemagglutinin genetic cluster viruses are most commonly seen. Soon after the emergence of the H1N1 virus in April 2009, the team recognized the genetic origin of the pandemic virus H1 placed it in the gamma cluster of swine influenza viruses. ARS scientists at the National Animal Disease Center developed a research plan to investigate the pathogenesis and transmissibility of the pandemic virus in pigs. Before work began the team conducted a risk assessment and review of all protocols and permits required to work with this pandemic virus. After establishing the necessary laboratory safeguards (biosecurity level 2 (BSL-2)-enhanced) were in place, collaborators at the Centers for Disease Control and Prevention (CDC) shared pandemic viruses with the team. Immediate attention went to propagating the virus while developing 2 differential diagnostic tests (one reverse transcriptase polymerase chain reaction [RT-PCR] and one gel-based restriction fragment length polymorphism [RFLP]) based on the novel matrix gene present in the pandemic virus, this work was completed the same day (May 1, 2009) that the team began inoculating pigs in a pilot pathogenesis study. The team also planned a larger pathogenesis/transmissibility study that began shortly thereafter. This first pig study was designed to evaluate whether the novel 2009 (A/H1N1) pandemic virus would infect, cause disease in and transmit between pigs. Unfortunately, this first study had to be abandoned as a result of discovering that the pigs had been infected with endemic SIV strains shortly before they arrived at our research facilities. These pigs were allowed to recover and were used in a later experiment. A second even larger pathogenesis/transmissibility study was then planned and executed, in this study the team doubled the number of pigs and used two separate pandemic virus isolates provided by the CDC. These studies quickly confirmed the pandemic viruses were pathogenic in pigs and readily transmissible between pigs. As part of these pathogenesis studies, it was confirmed that the novel 2009 (A/H1N1) pandemic influenza virus was only isolated from tissues associated with the respiratory tract in acutely infected pigs and that pigs quickly recover from the infection. The team then turned our attention to whether pigs previously infected
with an endemic H1N1 swine influenza virus circulating in the U.S. pigs could protect against the 2009 (A/H1N1) pandemic influenza virus. It was found that pigs from our abandoned study that had recovered from a circulating endemic swine influenza virus appear to have complete cross-protection against subsequent challenge with the pandemic virus. Finally, three commercial vaccines were selected for efficacy testing against the pandemic virus based on serological cross-reactivity of vaccine antisera in a hemagglutination inhibition assay using 2009 A/H1N1 influenza viruses isolated from persons in California, New York, and Mexico. Results showed that in spite of limited cross-reactivity against the new 2009 A/H1N1 influenza viruses the three vaccines tested, each provided significant protection against pneumonia lesions in pigs challenged with a 2009 (A/H1N1) pandemic influenza virus. The most optimal protection was seen with an inactivated vaccine made from the homologous pandemic virus. Importantly, none of the vaccines tested caused disease enhancement in the lungs as is sometimes observed when the challenge virus is a mismatch with the vaccine virus strain. The team has also tested an experimental MLV vaccine and will continue research to develop new vaccines that afford the best degree of heterologous protection possible against endemic swine influenza viruses.

An African Perspective on Novel H1N1 Influenza A Virus and HPAI H5N1
Linda Logan presented by John Shaw
International Services (IS), USDA-Animal and Plant Health Inspection Service (APHIS)

APHIS-IS is covering 25 countries in west and central Africa. This presentation related to the work on the prevention and control of animal influenza. APHIS-IS performs and sponsors diagnostic training. They are very involved in trying to consolidate poultry and producer groups with a focus on controlling disease in the live bird markets (LBMs) which are very important in this region. APHIS-IS holds workshops in the host countries and also training in the U.S.

What are the H5N1 HPAI threats to Africa? Egypt has a persistent problem with H5N whereas in sub-Saharan Africa there have been no new outbreaks since 2008. Studies indicate three separate introductions of H5N1 viruses to Africa. There is a lack of adequate surveillance and capacity in the region and there is a large gap between animal health and public health. There are logistical issues—especially shipping of samples to reference laboratory.

Avian Influenza and H1N1 Research Update
David E. Swayne, Erica Spackman, Mary Pantin-Jackwood, Darrell Kapczynski and David L. Suarez Southeast Poultry Research Laboratory, USDA-Agriculture Research Service

Beginning in April 2009, cases of acute respiratory disease were
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reported in humans caused by a novel H1N1 influenza A virus in Mexico. The causative agent was complex reassortant influenza A virus with gene segments from North American classic H1N1 swine viruses, North American avian viruses, human influenza A virus and Eurasian H1N1 swine viruses. The presence of avian and swine influenza virus genes in the 2009 novel H1N1 virus raises the potential for infection in poultry following exposure to infected humans or swine. To study infectivity and transmissibility of the 2009 novel H1N1 strain in poultry, turkeys, chickens, domestic ducks and Japanese quail were intranasally challenged with the virus and naïve birds put in contact. No clinical disease was produced. Detection of virus replication was infrequent, and only in the oropharyngeal swabs of intranasally inoculated Japanese quail. There was no contact transmission of the viruses for any of the species. These data suggest turkeys, chickens, and domestic duck have low risk for field infection, but Japanese quail might become infected, but because replication and shedding was limited to the respiratory tract and the virus did not transmit to quail by contact, suggested low potential for initiation and sustaining an outbreak unless the virus mutates or reasserts with an avian influenza virus.

Sporadic cases of H5N1 have occurred in pigs and various carnivorous mammals. To understand the route of transmission that oral ingestion might play and the pathogenesis, several H5N1 high pathogenicity avian influenza (HPAI) viruses were studied in pig and ferret models. Intranasal inoculation produced infection, initiated in the respiratory tract in both pigs and ferrets. Feeding of infected chicken meat to pigs produced asymptomatic infection with virus present in tonsil and respiratory tract but not in the digestive tract. By comparison, two H5N1 viruses in infected chicken meat fed to ferrets produced only respiratory infection while the A/Vietnam/20/04 virus produced a combined respiratory and digestive tract infection, initiated simultaneously in both sites.

The chicken’s major histocompatibility complex (MHC) and non-MHC genes have a profound influence on the resistance or susceptibility to certain pathogens. Recently, 100% survival in the field by Thai indigenous chickens to H5N1 HPAI outbreaks was attributed to B21 MHC haplotype while the B13 MHC haplotype was associated with 100% mortality in the field. To determine the influence of the MHC haplotype on HPAI resistance, a series of MHC congenic white leghorn chicken lines (B2, B12, B13, B19 and B21) and lines with different background genes but with the same B2 MHC haplotype (Line 63 and 71) were intranasally challenged with low dose (10 mean chicken lethal doses) of H5N1 HPAI virus rgA/chicken/Indonesia/7/2003. None of the lines were completely resistant to lethal effects of the challenge as evident by mortality rates ranging from 40 to 100%. The B21 line had mortality of 40% and 70% and the B13 line had mortality of 60 and 100% in 2 separate trials indicating the Thai field results could not be the result of MDC differences.
Ebola Virus (Reston) in Swine in the Philippines
Samia Metwally
Foreign Animal Disease Diagnostic Laboratory (FADDL), USDA-APHIS

Dr. Metwally described how Ebola Reston was diagnosed in swine in the Philippines. In 2008, swine began dying with high fever syndrome from which porcine respiratory and reproductive syndrome (PRRS) virus had been isolated. FADDL was contacted early in 2008 and by the end of July they got samples to Plum Island. Samples were accepted with minimal history. Based on the history and clinical signs, FADDL designed a diagnostic scheme to look for African swine fever (ASF), classical swine fever (CSF), PRRS, circovirus, porcine enterovirus, and other rule outs. Samples were set up on six different cell lines. If samples were positive for virus isolation they were moved on for further identification. Electron Microscopy (EM) was utilized and if there was no virus found by EM, then the samples were moved on to microarray and sequence analysis and animal inoculation. These samples tested negative for ASF and CSF. PRRS was isolated and it was similar to that isolated in China with deletion that is characteristic of the virus that is spreading in Asia. The samples were also examined using a panviral microarray. This is a new technology that was developed in FADDL laboratory which indicated that the samples contained an Ebola virus. Subsequently conventional PCR was performed and bands were specific for Ebola Reston. The CDC was contacted and FADDL provided information to them. CDC confirmed the diagnosis of Ebola Reston infection of the pigs. The significance of the infection is being investigated further. There is no evidence that pigs in the Philippines are currently infected.

Classical Swine Fever (CSF) and other diseases of pigs in the Caribbean Region
John Shaw
International Services, USDA-APHIS

Dr. Shaw described a working group that is emerging in the Caribbean. He described the situation with CSF in Cuba which currently has a swine population of 2.5 million pigs. They had 193 outbreaks of CSF last year. The disease is reportable and controlled by vaccination. CSF is also present to a lesser extent in Haiti. The Haitian authorities also reported an outbreak of Teschen virus infection, the origin of which is unknown.

Rift Valley Fever: International Coordinated Efforts from Early Warning to Rapid Responses.
William Wilson, Kristine Bennett, James Mecham, Myrna Miller, and Barbara Drolet
Arthropod-Borne Animal Diseases Research Laboratory, USDA-ARS

Scientists at the USDA-ARS Arthropod-Borne Animal Diseases Research Laboratory (ABADRL) initiated research to develop operator-
safe, rapid diagnostic tests and develop large animal models for both virulent and vaccine strains of Rift Valley fever (RVF). The ABADRL currently does not have biological containment facilities that could be certified for virulent RVF research. Therefore, to accomplish this research mission, the ABADRL has relied on molecular applications and has established national and international cooperative agreements. The ABADRL and the Canadian Food Inspection Agency (CFIA) have been working together to develop clinical diagnostic test samples and a large animal infection model for vaccine evaluation. To date, six experimental virulent RVF infection studies with calves (four) and sheep (two) have been conducted at the CFIA laboratory. In addition, in the ABADRL biosafety level 2 (BSL-2) facilities, three RVF MP-12 vaccine studies have been conducted in sheep. These studies have provided samples and reagents for ARS scientists and collaborators to develop of operator-safe BSL-2 diagnostics tools. One of these tools is a multiplex real-time RT-PCR that detects all three segments of RVF viral RNA and can distinguish between wild-type and several candidate attenuated vaccine strains. This assay was field tested at the Kenya Agriculture Research Institute and Kenya Department of Veterinary Services. The results indicated that some modifications were required, but overall the assay performed well, did not cross-react with Nairobi sheep disease virus and was more sensitive than existing nucleic acid detection assays. Immunological assays based on expressed glycoprotein (Gn), nucleocapsid (N) and Nonstructural protein (NSs) have also been developed and laboratory evaluated. International cooperative agreements are in place to allow for field evaluation of these diagnostic tests and of candidate RVF vaccines. The Food and Agriculture Organization (FAO) and International Atomic Energy Agency (IAEA) Animal Health and Production Division have a coordinated research project of RVF veterinary surveillance in which ABADRL scientists participate as consultants. These interactions, along with the assistance of USDA-APHIS, will allow the development of internationally harmonized diagnostic tools for RVF in North America.

The ABADRL is also developing a RVF vaccine discovery project. In order to better evaluate RVF vaccine candidates, the ABADRL has been evaluating various tools to assess the humoral and cell-mediated immunity responses of sheep. The ABADRL, in collaboration with the U.S. Army Medical Research Institute for Infectious Diseases and CFIA, are evaluating the vector competence of North American mosquito species for infection and transmission of RVF virus. The West Nile virus vector, Culex tarsalis has been shown to be a competent vector for RVF. In addition, the origin of populations of Aedes vexans has been shown to affect this species vector competence. Thus, to effectively control the spread of RVF, knowledge of competence of geographic populations of vector species is needed. The ABADRL is working with ARS scientists at the Center for Medical, Agricultural, and Veterinary Entomology (CMAVE) have developed a Risk Assessment Model for RVF outbreaks in East
Africa. ABADRL and CMAVE are coordinating insect vector research to further improve this model and develop vector control strategies. ABADRL, CMAVE, Department of Homeland Security (DHS), APHIS, CDC and various universities are coordinating research activities in a “One Heath” approach through a voluntary Interagency RVF working group, which was established to facilitate and coordinate U.S. research efforts. In summary, RVF is of significant concern in Africa and poses a significant threat to the U.S. due to importations and globalization. The goal of these internal and international collaborations is to develop systems for early warning, early detection and more rapid and effective responses to this devastating disease. International cooperation is both mutually beneficial, and essential, in order to adequately evaluate the veterinary RVF countermeasure tools. ARS believes one of the most effective U.S. countermeasures for the potential introduction of RVF is to provide tools to control the disease at its source.

Rift Valley Fever: A Multi-agency Test of Florida’s Response to a Hypothetical Introduction to the State
Paul Gibbs
College of Veterinary Medicine, University of Florida

Dr. Gibbs reported that Rift Valley fever (RVF) is a zoonotic viral disease affecting ruminants and people. It was first recognized, as the name suggests, in the Rift Valley of East Africa, but it now recognized to be an endemic disease affecting most of Sub-Saharan Africa and Madagascar. Since 1970, on occasion, it has shown an ability to spread northwards to cause epidemics in Egypt, Yemen, and Saudi Arabia. It is considered an emerging pathogen. The disease in most humans is characterized by fever and malaise, but a small percentage of patients develop either fatal encephalitis and/or generalized hemorrhage. In ruminants, the disease is particularly severe in lambs and calves, which die of generalized hemorrhage; pregnant animals commonly abort. RVF virus is transmitted by several species of mosquito, but human infection is often associated with the slaughter of infected animals for food. Experimental studies have established that U.S. species of mosquito can transmit the virus, and the RVF virus is classified as a select agent. It is feared that RVF virus, if introduced accidentally or through bioterrorism, could have an even greater impact than West Nile virus on the animal and human populations of North America.

In partnership with the State’s Emergency Operations Center, a multi-agency exercise (State and Federal) was organized to test the Florida’s response to a simulated outbreak of RVF in both ruminants and humans. The exercise involved approximately 100 professionals November 18-20, 2008. The outbreak was characterized by increased calf mortality and mild human cases on a large ranch in Southern Florida. A case of hemorrhagic fever in West Palm Beach was connected to the slaughter of goats, and a case of retinitis in Gainesville, Florida was connected to
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the initial introduction of the virus. The introduction of virus to Florida was linked to a bioterrorism event. Dr. Gibbs described the scenario and discussed the difficulties met by the different agencies in combating the spread of the virus and determining its origin.

ARS Research Update 2009
Luis L. Rodriguez
Foreign Animal Disease Research Unit (FADRU), Plum Island Animal Disease Center, USDA-ARS

Dr. Rodriguez reported that during 2009 ARS-FADRU has continued working on basic and applied research focused on foot-and-mouth disease, classical swine fever and vesicular stomatitis. There are 4 research projects:

• Foot-and-Mouth Disease Virus Countermeasures Discovery, Lead Scientist: Marvin Grubman;
• Foot-and-Mouth Disease Virus Host-Pathogen Interactions, Lead Scientist: Luis Rodriguez;
• Prevention Control and Diagnosis of Classical Swine Fever, Lead Scientist: Manuel Borca; and
• Vesicular Stomatitis Virus Host-Pathogen Interactions, Lead Scientist: Luis Rodriguez.

1- FMD vaccine discovery: We report the preliminary results of experiments using alternate delivery systems to improve FMD vaccine performance. Specifically we report the use of a needle-free device to deliver inactivated antigen FMD vaccine in an aqueous formulation to cattle. The results suggest that transdermal delivery results in protection of cattle against challenge with FMDV. Furthermore, similar protection levels were observed with 1/4th and even 1/16th volume of the standard vaccine dose. Utilization of transdermal delivery devices for FMDV allows for rapid vaccine delivery during emergency control, is safer and prevents the spread of infections without the need to change needles between animals.

2- CSFV novel live attenuated marker vaccine: we update the Committee on the advance of the Classical swine fever live attenuated marker vaccine. Specifically we update on the development of proof-of-concept differentiated infected from vaccinated animals (DIVA) diagnostic tests for serological differentiation of infected and vaccinated animals and the positive identification of vaccine strains by real-time RT-PCR

3- Vesicular stomatitis (VS): report on the re-emergence of VS New Jersey serotype in the southwestern U.S. (Texas and New Mexico). This small outbreak was diagnosed by APHIS NVSL by serology only (no virus isolation). The limited distribution of this outbreak could be a failed incursion of VSV into the southwestern U.S. Increased VS activity in northern Mexico
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could be related to this incursion.

4- Brief report on the status of the Global Foot-and-Mouth Disease Research Alliance (GFRA), current membership and new collaborative projects of PIADC with international GFRA partners.

National Veterinary Services Laboratories (NVSL) Update
Dr. Beverly Schmitt
NVSL, USDA-APHIS-Veterinary Services

Dr. Schmitt, on behalf of Dr. Beth Lautner, reported that they had recently moved into new facilities and she showed various photographs of the impressive buildings. The move took place over eight weeks this summer with 654 employees moving from three locations in Ames, Iowa. Dr. Schmitt reported that the move had gone smoothly with no disruption of diagnostic services.

Transition of the laboratory information management system (LIMS) is complete now. Customers can elect to receive reports by email or fax. The year was busy, with investigations into contagious equine metritis (CEM), H1N1, and equine piroplasmosis necessitating extensive laboratory support. The laboratories also identified bluetongue virus types 9 and 12 for the first time in the U.S. Among other things, Dr. Schmitt also mentioned the development of an OIE twinning project in Brazil for avian influenza and Newcastle disease virus (NDV). She also described renovations to the new facility to put in wet laboratory for aquaculture activities and to provide support for viral hemorrhagic disease of fish. The activities at NVSL, Plum Island included the discovery of ebola virus in pigs in the Philippines (see above).

National Center for Foreign Animal and Zoonotic Disease Defense Update
Neville P. Clarke
Texas A & M University

Dr. Clarke reported under three headings:

- **Enhanced Immunity to Exotic Animal Diseases Affecting U.S. Public and Animal Health and the National Economy** – Prevention of the introduction or rapid spread of exotic diseases through enhanced resistance is recognized as a high priority objective for reducing the impact of animal diseases that may trigger human pandemics, endanger livestock, and cause economic damage. An animal vaccine against Rift Valley fever virus, one of the priority select agents, has been developed from the MP12 antigen developed for human use and is currently moving to commercial production trials. This product is being enhanced in further research with a genetic marker that allows the immunity resulting from vaccination to be
distinguished from that associated with active disease, thereby allowing immunized animals to safely move through interstate commerce. The second generation vaccine will be tested in sheep in the early part of 2010.

- **Rapid Detection of Infected Animals During Disease Outbreaks**: Rapid, accurate, and inexpensive tests for exotic disease that can be applied under field conditions provide the ability to distinguish animals infected with exotic disease from uninfected animals, thereby avoiding unnecessary culling of normal animals during the eradication process and maintaining continuity of operations and reducing economic losses. Early detection of infected animals drastically reduces the spread of disease and resulting economic impact. The National Center for Foreign Animal and Zoonotic Disease Defense (FAZD) Center has developed an effective, accurate, and economical strip test (similar to a home pregnancy test) that provides the ability to detect foot-and-mouth disease (FMD) and Rift Valley fever viruses in the field. This system is now being tested at the Plum Island Animal Disease Center against live FMD virus. Also in the pipeline at an earlier stage of development is the universal biodetection array system that is being tested for proof of concept. This system simultaneously detects both the organism and the host response for 100-plus pathogens including select agents and commonly encountered infections.

- **Innovative Anti-Viral Products that Provide Greater Protection for Livestock** – The devastating effect of an outbreak of foot-and-mouth disease (FMD) is illustrated by the 2001 outbreak in the United Kingdom that led to $11.5 billion in losses. Vaccination remains among the most effective strategies for protecting livestock during an outbreak. Unfortunately, the vaccine for FMD requires up to 10 days after administration to become effective. This lag time severely limits the efficacy of the vaccine because FMD is among the most contagious and destructive of animal diseases and the disease spreads widely before vaccinated animals are immune. The FAZD Center has developed an antiviral product (an immunomodulator) that is incorporated into the FMD vaccine being developed by the Plum Island Animal Disease Center that reduces the time to develop an effective immune response to vaccination from 10 days to three days, thus providing almost immediate protection until the induction of long-term immunity by the vaccine. Developed at Univ. of Texas Medical Branch, the anti-viral is undergoing tests at Plum Island Animal Disease Center.
Bioportal System for Global Surveillance of Animal Diseases; Focus on Vesicular Stomatitis
Andres Perez
University of California, Davis

Dr. Perez reported that the BioPortal is a web-based system was developed by UC Davis (http://www.fmd.ucdavis.edu/) in response to recommendations of the Infectious Disease Informatics Working Committee; an interagency senior group organized in 2002 to develop IT needs for national and global infectious disease surveillance. The BioPortal (http://fmdbioportal.ucdavis.edu/), provides real-time or near real-time access to disease information, and offers tools for data searches, public or secure data sharing, visualization, and data analyses. The system is applicable for use at the state, and national, and international levels. Operation, maintenance, and development of BioPortal are supported through contributions of the users, which currently include the National Center for Medical Intelligence (NCMI), the University of California, USDA-ARS, and the United Nations Food and Agriculture Organization (FAO). Capabilities of the BioPortal include:

- Integration and utilization of data from multiple sources with disparate and non-standardized data formats. No standardized nomenclature required.
- Secure routing and analysis of one’s own data.
- Data display using common tabular and graphic formats, maps, and Google Earth.
- Data display in spatial-temporal formats.
- Data downloaded in a comma-separated values (CSV) format.
- Creation of detailed, personalized custom queries of the data.
- Alert user when new data have become available.
- Display using phylogenetic analytical tools to display phylogenetic trees of isolates.
- Spatio-temporal phylogenetic analysis, displays, and visualization of molecular changes.
- Anomaly detection with user-defined rules to identify and display anomalies in disease cases.
- Analysis to assess presence of disease clusters.

Specific applications of the BioPortal to meet state, federal, or international needs can be developed through cooperative contract agreements with UC Davis. Potential collaborators interested in using the BioPortal, or willing to contribute to development or support, are encouraged to contact Drs. Andres Perez (amperez@ucdavis.edu), Preben Willeberg (pwilleberg@ucdavis.edu), or Mark Thurmond (mcthurmond@ucdavis.edu).
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Mo Salman
Colorado State University

Dr. Salman provided a written report. The Institute of Medicine and National Research Council conducted a study to address the global surveillance and response of emerging zoonotic diseases. The study was sponsored by U.S. Agency for International Development (USAID). A report of the findings from this study was recently released by the Institute of Medicine/National Research Council entitled, “Sustaining Global Surveillance and Response of Emerging Zoonotic Diseases”. The report indicates the significant weaknesses undermine the global community’s abilities to prevent, detect, and respond to potentially deadly species-crossing microbes, such as the pandemic H1N1 influenza virus. The report provides a detailed plan for establishing and funding a comprehensive, globally coordinated system to identify novel zoonotic disease threats as early as possible so that appropriate measures can be taken to prevent large numbers of illnesses, deaths, and livestock losses.

The report emphasized the role of U.S. federal agencies – particularly USAID – in spearhead efforts to develop a comprehensive surveillance system and work with international partners to provide funding and technical assistance to build the expertise, equipment, and other components of the system. The report notes that species-jumping pathogens have caused more than 65 percent of infectious disease outbreaks in the past six decades, and have racked up more than $200 billion in economic losses worldwide over the past 10 years. The U.S. beef industry alone lost $11 billion over three years after the detection of one cow with mad cow disease in 2003.

Greater integration of the human health and veterinary medicine sectors should be a key feature of this new system because the lack of coordination and communication between these groups results in missed opportunities to detect potential species-crossing pathogens and leads to less effective measures to contain diseases. The report also recommends a fundamental shift in surveillance away from urgent, time-constrained reactions to individual diseases when they arise to a sustained focus on preventing the conditions for zoonotic agents to emerge and looking for signs of possible threats on an ongoing basis.

USAID should also lead an effort to identify sustainable funding sources to develop and maintain this new system. Funding for surveillance traditionally has focused on individual diseases with disproportionate resources aimed at infections in humans compared with those in animals. Moreover, development aid budgets tend to fluctuate with changes in leadership or priorities. The effort to find sustainable funding should specifically consider a tax on internationally traded meat and meat products as one possible mechanism; although the pros and
cons of all options must be weighed to determine which funding sources will work best, the report notes.

The U.S. government and other donor organizations should provide economic incentives and technical and medical assistance to encourage the reporting of outbreaks and to lessen the social and economic consequences. Repercussions such as drops in trade and tourism and necessary culling of livestock can lead individuals and nations to conceal outbreaks.

In addition, the report calls for the director general of the World Organization for Animal Health (OIE) to have the power to declare animal health emergencies and make public credible information it receives about animal disease outbreaks if national governments fail to provide information in a timely manner. Greater transparency could improve control of animal diseases before they decimate livestock or wildlife or make large numbers of people sick.

The committee that conducted this study was composed of co-chairs Gerald T. Keusch, associate provost for global health and associate dean for global health, School of Public Health, Boston University, Boston and Marguerite Pappaioanou, executive director, Association of American Veterinary Medical Colleges, Washington, D.C. Committee members include several USAHA active members. The report can be reviewed through the following website: http://nationalacademies.org/morenews/20090922.html.

Global Approaches to Foot and Mouth Disease (FMD)
Dorothy Geale
Canadian Food Inspection Agency

Dr. Gaele gave an overview of the challenges of surveillance for FMD and the role of vaccination in different continents related to the FAO/OIE progressive control pathways. She reported that control of FMD on some continents will be difficult within the proposed time frame, but in others, such as Asia and South America, this may be feasible.

Distribution of Foreign Animal Disease Training Report 2008-2009
Paula Cowen
Professional Development Staff, USDA

Dr. Cowen provided an illustrated overview of the current and extensive foreign animal and emerging disease training courses provided by USDA-APHIS Professional Development Staff.

Committee Business
The Committee reviewed and approved a resolution namely to enhance development of risk assessment models by determination of United States wildlife susceptibility to Rift Valley fever virus.

The Committee recommended that USAHA join the Global Foot-and-Mouth Disease Research Alliance as described by Dr. Rodriguez above.
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The Committee noted that the last clinical case of rinderpest had occurred in Somalia in 2001. The Global Rinderpest Eradication Programme (GREP) was thus on target to recognize eradication in 2010 as originally intended. After discussion, the Committee charged the Chair to propose to the Executive Committee of USAHA, that the achievement be celebrated at the 2010 meeting in Minnesota.
A CASE OF NOVEL H1N1 INFLUENZA VIRUS IN A SWINE HERD IN ALBERTA, CANADA

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Background:
Influenza A virus infections commonly occur in swine herds worldwide, including the North American swine population (1). Although human influenza viruses have been isolated from pigs, historically there has been varied evidence of human H1N1 influenza viruses maintaining themselves in swine populations (2). Swine influenza virus (SIV) infections, both H3N2 and H1N1, have been reported in humans in Canada, the United States, Europe and Asia (3). Occupational exposure to pigs increases the risk of sero-conversion and influenza-like illness (ILI) attributable to SIV (4). The reported number of SIV infections in humans, however, is negligible compared to the number of people exposed to pigs through occupation or association (5). The true incidence and significance of zoonotic swine influenza infection in the animal or human populations is unknown.

On April 2, 2009, the Canadian Food Inspection Agency (CFIA) convened a High Visibility Issue meeting to consider the importance and relevance of information being reported from Mexico and the USA concerning a novel influenza A virus. According to a ProMED posting of April 21, 2009, “On 17 Apr 2009, CDC determined that two cases of febrile respiratory illness occurring in children who resided in adjacent counties in southern California were caused by infection with a swine influenza A (H1N1) virus. The viruses from the two cases are closely related genetically, resistant to amantadine and rimantadine, and contain a unique combination of gene segments that previously has not been reported among swine or human influenza viruses in the United States or elsewhere. Neither child had contact with pigs; the source of the infection is unknown” (6). Additional information in the report indicated, “the viruses are similar to those of swine influenza viruses that have circulated among U.S. pigs since approximately 1999; however, two genes coding for the neuraminidase (NA) and matrix (M) proteins are similar to corresponding genes of swine influenza viruses of the Eurasian lineage.” Based on a lack of exposure to pigs in the histories of the infected individuals, there was concern that this virus could be transmitted human to human. Due to the unknown risks the virus might pose to swine or other animals, the CFIA mobilized its National Emergency Response Team to consider the potential risks and develop a policy to address the possibility the virus would be found in the Canadian domestic swine herd. Communication products were developed to provide information to the swine industry, veterinary community and agricultural officials in the provinces and...
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territories asking they be vigilant for any influenza like illness in the swine population especially where there was a history of a person in contact with the swine that had influenza like illness (ILI) and a history of recent travel to Mexico or southern California. Initial policy development adopted a precautionary approach requiring federal quarantine to control movement and testing the herd until virus circulation was no longer detected at which time the quarantine would be released. There was also discussion of the need for research trials to better define any disease caused by this novel virus in swine and poultry and determine the efficacy of the currently available commercial swine influenza vaccines.

The Alberta Herd:

On April 28, 2009 the owner of a conventional 220-sow single site commercial farrow-to-finish swine operation in Alberta notified his herd veterinarian of an acute onset cough in his pre-grower and grower animals. A contract worker hired to rebuild the ventilation inlets and upgrade the exhaust fans in the barns, had recently returned from Mexico and exhibited symptoms of ILI while working in the barn. Due to media reports about the outbreaks of severe respiratory disease in Mexico and southern California, the producer was concerned and reported these findings to his herd veterinarian. The veterinarian notified Alberta Agriculture and Rural Development (ARD) of this situation and ARD reported the situation to the CFIA. CFIA inspectors were dispatched to the farm to investigate and take samples.

Swine influenza is not a reportable disease under the federal Health of Animals Act and there is no national control program in place for this disease. However, the CFIA has the authority to respond to any disease of animals including emerging diseases that may affect animals or that are zoonotic in nature. Some provinces, including Alberta, have provincial animal health regulations that make swine influenza reportable. Based on the existence of ILI in both the humans and swine associated with this operation, the history of recent travel to Mexico of the worker, increasing public health concern about severe respiratory disease in some people and the lack of scientific information that characterized the risk of this emerging disease for the animal and human populations, CFIA issued a federal quarantine, as a precautionary measure, under the Health of Animals Act and conduct a full epidemiological investigation.

The complete analysis of the previous history in the herd, lead to the conclusion that it was unlikely the animals present on the farm were previously exposed to, or vaccinated for, swine influenza.

Initial results from the National Centre for Foreign Animal Diseases (NCFAD) showed real time RT-polymerase chain reaction (PCR) for the Matrix gene were negative for 23/24 swabs. The same samples were run overnight in conventional RT-PCR for the Matrix and the H1 gene. Embryonated eggs were also inoculated.

The preliminary serological results were inconclusive for SIV infection.
Four to six of 31 samples had a weak to borderline reaction in the cELISA and bELISA and 27 of the 31 sera were positive by HI assay to H1 and H3 subtypes, but were negative to H2. This serological reaction could have been caused by vaccination or by prior circulation of traditional North American H1 and H3 viruses and is not conclusive. On May 2, 2009, the sequencing results of PCR products (6 samples for the Matrix and 5 for the H1 gene) showed a segment of approximately 244 nucleotides of the Matrix gene from 6 samples that was 100% (for the 244 nucleotides sequenced) identical to sequences derived from the novel H1N1 virus from the U.S. and Mexico and similar results (99-100% identity) were found for around 500 nucleotides of the H1 gene from five samples. The sequences derived from the pig samples were identical to each other and for the M gene most similar to the Eurasian lineage while the H1 gene is more reminiscent of the North American lineage as would be expected for this novel virus.

Conclusion:
The data is a strong indication that this may likely be the novel H1N1 virus. Additional sequencing confirmed the presence of pandemic H1N1 2009 influenza A virus within the herd. The virus was cultured from the Alberta swine herd and the entire genome characterized. There was extensive homology between the swine isolate and the human isolates from Mexico and the USA.

Animal and public health authorities supported the continuation of the quarantine and movement restrictions on the herd while there was evidence of live virus circulating. None of the authorities supported a policy of stamping out or eradication of the entire pig herd as an approach that would alleviate animal or human health concerns. The rationale for implementing regulatory movement restrictions was to prevent spread of disease to human or animal populations from the herd while the risks associated with the virus could be better defined for swine. Continued sampling and regular health assessments of the herd provided information on the clinical course of disease and allowed better definition of the risk.

While the herd was under quarantine, finished hogs could not be shipped to slaughter and due to limitations of available space, crowding became an unavoidable animal welfare issue. To relieve stress associated with crowding, and at the request of the producer, ARD undertook a limited cull of 475 grower/finisher animals on May 8th. This alleviated animal welfare concerns and allowed a period of time to conduct additional testing. Hogs were humanely destroyed on site using captive bolt stunners (“Cash Special” captive .22 and .25 caliber bolt stunner and “Cash Special” HD captive .25 calibre bolt stunner) by trained staff from ARD and the Alberta Society for the Prevention of Cruelty to Animals. Training on the use of the captive bolt stunners was provided and veterinarians were present on site at all times during the depopulation activities to monitor the activities.
Carcasses were transported to a rendering establishment for disposal using biocontainment procedures. Influenza A viruses are heat labile and the time-temperature combination of the rendering process inactivates any virus that might be present. Despite scientific evidence supporting the negligible risk associated with use of rendered product, the rendered material was buried in a landfill because of concerns, by the rendering company, about the marketability of the meat and bone meal produced and potential negative public perception if the products were incorporated in animal feeds. Burial of the intact carcasses was not an option because the large number of carcasses could not be accommodated on the small land base of the farm property, the soil type was inappropriate to support burial and concerns about public perception.

To avoid a future welfare cull and allow a resumption of the usual marketing pattern from the herd, a controlled marketing approach, that allowed movement of test negative animals to slaughter, was proposed. Testing was undertaken by CFIA at two-week intervals. Despite the uneventful clinical recovery of animals, there was reluctance by slaughter facilities in Alberta to accept animals from this farm if the quarantine was removed. Concerns related to food safety and marketability from meat buyers were cited as the reason for pork processors refusing to accept pigs from this farm. Due to a second impending overcrowding situation and inability to resume normal marketing practices, the herd owner made an economic decision to depopulate the herd and exit the situation. This allowed him to resume operation with a clean replacement herd that would remove the concerns about infected pigs. Neither CFIA nor ARD ordered the destruction of the herd to address concerns related to animal or human health. At the owner’s request, and with the assistance of ARD, approximately 2300 pigs were humanely destroyed between June 4 and 6 and either composted-off site or disposed of via rendering. The quarantine was removed on July 29, 2009 when cleaning and disinfection measures, developed by the private veterinarian and approved by CFIA, were complete.

Tracing:

Movement tracing of all pigs, pig products, objects exposed to pig or pig products and humans associated with this premises during the 21-day period prior to the onset of clinical signs of respiratory disease observed were undertaken. The purpose of this epidemiological tracing was to identify other swine farms or humans at risk of having been exposed to pandemic H1N1 2009 virus by either direct or indirect contact, and to attempt to determine the source of virus introduction. The initial hypothesis that the contracted worker who returned from Mexico was the most likely source of virus onto this farm was tested to rule out the possibility of another human or swine source as well as confirm that no other farms were at risk of being exposed.

Results of the trace-out investigations did not identify any farms at risk
of exposure via the direct or indirect movement of humans or animals. One shipment of 52 finished hogs went to slaughter on April 23 from production areas that were clinically unaffected on the date. A review of ante and post-mortem examinations completed on these animals at the slaughter plant indicated there were no unusual findings. The most recent purchase of animals was breeding gilts in February of 2009 from a private purebred breeder. Prior to the delivery of the gilts, and in the months following, there was no evidence of ILI within the source herd. Results from the trace-in investigation did not identify possible source farms for the virus ruling out the possibility that an unidentified swine operation was the source of virus for this herd.

The individual who worked on the ventilation system experienced ILI while in the barn on April 4. The individual returned from Mexico on April 2 prior to international attention to the emerging disease. Retrospective investigation confirmed that this virus had been circulating in Mexico for a minimum of several weeks prior to his return. Alberta Health Services (AHS) investigated the human illnesses associated with this farm. The investigation of the hired individual, the farm family and other community members indicated several cases of pandemic H1N1 2009 were present in the community in April and May. A number of community members had recently returned from travel to Mexico. Although the hired individual’s initial laboratory results were negative, confirmatory testing by PCR at the National Microbiology Laboratory in Winnipeg identified that he had been infected with pandemic H1N1 2009 virus.

Laboratory testing of individuals who had direct or indirect contact with the pigs and exhibited ILI prior to the first observed clinical signs in the pigs was inconclusive making it impossible to confirm or rule out their potential as the possible source of virus. Several H1N1 positive individuals with an epidemiological link to the farm had ILI symptoms after the swine were ill creating the possibility of swine to human transmission. However, given the existence of the virus in the community, it is also possible that their infections occurred as a result of person-to-person transmission either via contact with the positive hired worker or other infected individuals in the community. The public health investigation concluded that the hired individual and possibly other individuals in direct contact with this herd introduced the virus to the swine.

**Occupational Health and Safety:**

The zoonotic potential of swine influenza viruses is well recognized (1). During the course of the field epidemiological investigations, diagnostic sampling and humane destruction activities it was necessary for both CFIA and ARD staff to enter the barn on multiple occasions. The associated staff was at increased risk for exposure to pandemic H1N1 2009 virus as a result of these activities. Based on the specific situation, current scientific knowledge of the novel virus and following consultation with the Public Health Agency of Canada (PHAC), Health Canada’s
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Workplace Health and Public Safety Program (WHPSP) provided advice for all federal government employees associated with the response. In consultation with WHPSP and CFIA, Alberta Health and Wellness (AHW) and AHS provided advice to provincial government staff.

Considering the lack of information about the risks this novel virus posed for human and animal species, full personal protective equipment (PPE) was recommended by WHPSP on May 5th; this included N95 respirators, gloves, eye protection with seals around the eyes, boots, hair covers and coveralls or other body suit be used by all workers entering the barn. Due to the large amount of potentially contaminated fluids in the air, the possibility that the PPE may be dislodged, the perception of severe human illness associated with the virus at the time and the previous use of anti-virals during avian influenza response activities, antiviral medication was recommended for prophylaxis during exposure and for an additional 10 days. Prior vaccination with seasonal influenza vaccine was an additional prerequisite for staff working with infected swine. Antiviral medication was dispensed and vaccines administered by the Occupational Health Nurse from WHPSP as indicated. Ongoing follow-up was carried out to monitor for adverse reactions to antiviral medication. AHS provided similar occupational health and safety support to ARD staff. Workers who experienced ILI after exposure to the quarantined premises were encouraged to contact the AHS Medical Officer of Health to arrange testing and to isolate themselves until 24 hours after symptoms had resolved as a precautionary measure.

A telephone questionnaire was administered by the public health division of AHS to assess the potential human exposure to influenza virus for ARD and CFIA staff who responded to the outbreak and determine whether the protection provided by the recommended PPE and antiviral recommendations was adequate to protect exposed staff and to inform decision making in the event of future cases.

Two probable cases of infection with pandemic H1N1 2009 occurred in workers who entered the barn on April 28th. These workers became symptomatic within the expected incubation period following exposure to the infected swine and an investigation into their illness supported a common source of exposure. These individuals did not report contact with a symptomatic human prior to developing ILI. The investigation revealed there was an opportunity for transmission of virus from the infected swine to the workers. Although PCR testing was positive, a virus was not isolated and sequencing results are unavailable.

Current Approach to Cases of Human Pandemic H1N1 2009 Virus Infection in Swine Herds in Canada

The initial risk management decision made by CFIA and ARD to place this herd under federal movement restrictions was precautionary during a period of significant public and global concern and scientific
uncertainty. At the time virus was confirmed on this operation there was a lack of information available on the virulence of this virus in both human and pig populations. It was deemed prudent to conduct a full epidemiological investigation and restrict movement until such time as additional information was available and the risk to both the swine and human populations of North America could be better assessed. Currently, other than Canada, Argentina, Australia and Ireland have identified and reported infection of swine with this virus. In addition, turkey flocks in Chile have been reported as infected.

Internationally, veterinary authorities are discussing the most appropriate approach to manage the occurrence of influenza infections in swine herds. Animal and public health authorities agree that influenza virus is not a food-borne zoonosis and influenza viruses do not affect the safety of properly cooked pork. Scientific evidence supports that live, infective virus is not present beyond the respiratory tract, and it is most likely to be found in nasal and pharyngeal secretions during the febrile period of illness, of one to three days post exposure (3); therefore, there is no risk of acquiring the virus from meat of recovered animals. As with any raw meat, pork should always be properly handled and cooked to eliminate a range of food safety concerns. Acutely ill pigs that are shedding virus could present a potential occupational risk to individuals handling live animals, but the obvious clinical manifestations of illness in affected animals (e.g. respiratory signs, inactivity, decreased feed intake) should preclude their shipment to slaughter until they have recovered.

The OIE has stated that this virus is currently behaving in the same fashion as other swine influenza A viruses and does not require restrictive trade or disease control measures. The Food and Agriculture Organization (FAO) of the United Nations approaches the management of this disease from a similar perspective. Public health authorities in Canada, in line with World Health Organization (WHO) recommendations, have indicated that no extraordinary response measures are needed or warranted in the human population to contain or control the spread of the virus, at this time. Public health authorities are providing advice about how to minimize transmission, personal respiratory hygiene and the role of prescription anti-virals, where appropriate.

The number of people that have contact with an infected swine herd is extremely limited when considering the opportunity for human-to-human transmission within an infected community. Consequently, the imposition of strict control measures on swine herds while employing a more measured approach in people may create the impression that infected swine are more of a risk than infected people. This is clearly inconsistent with the observations available to date. Based on the currently available information, and the approach undertaken by public health authorities, CFIA has modified its initial approach of imposing federal quarantine restrictions on swine herds or poultry flocks infected with, or exposed to, the pandemic H1N1 2009 virus. Should there be evidence of a change in
the virulence of the virus in people or pigs, the need for federal restrictions will be re-evaluated.

CFIA will assist with the diagnostic characterization of any H1 influenza A virus isolated by a non-CFIA laboratory and offer advice and assistance to the provincial animal health authority and industry stakeholders if an infected herd is identified.

CFIA is leading consultations on the most appropriate manner to manage identified infected herds in collaboration with animal and public health authorities from the provincial and territorial governments, veterinary community and industry stakeholders. Under the authorities contained in the Health of Animals Act and Regulations, CFIA has the legislative mandate and capacity to implement stringent control measures should the risk to animal or public health increase and such measures are deemed to be warranted. The CFIA is also working in collaboration with the competent veterinary authorities of the United States and Mexico on a memorandum of understanding under which sets out the notification framework and measures to be applied to prevent unnecessary trade restrictions. This overall approach is meant to minimize the economic impact of imposing regulatory movement restrictions on swine producers while ensuring appropriate control mechanisms are in place where required.

Summary

This disease occurrence has highlighted the importance of ongoing collaboration between animal and public health authorities at all levels to ensure a timely and coordinated response to emerging zoonotic diseases. Given the continued spread of this virus in the human population it is not unreasonable to predict that additional cases of pandemic H1N1 2009 in swine herds in Canada will be identified. Further dissemination of this virus in pig populations may pose an additional risk for transmission to humans in direct contact with clinically ill pigs and create an opportunity for recombinant activity to occur.

Evidence from this outbreak and findings from experimental studies suggest that this virus is unlikely to cause more significant clinical disease in pigs than commonly observed with classical SIV’s in Canada which is essentially a self-limiting infection confined to the respiratory tract with limited morbidity and eventual recovery. Enhanced containment measures employed by industry to restrict further transmission and control infection should be effective in minimizing spread in the swine population.

Acknowledgments

The author thanks Dr. Krista Howden for her extensive evaluation of the information related to this swine herd and her report, “An Investigation into Human Pandemic Influenza Virus (H1N1) 2009 on an Alberta Swine Farm” which will appear in the Canadian Veterinary Journal. The extensive information she collected was used as the source for much of
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the information contained in this report.

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REPORT OF THE COMMITTEE ON GOVERNMENT RELATIONS

Chair: Dr. Steven L. Halstead, MI

Richard E. Breitmeyer, CA; Stephen K. Crawford, NH; Dave E. Fly, NM; Tony M. Forshey, OH; William L. Hartmann, MN; Guy Hohenhaus, MD; Donald E. Hoenig, ME; James W. Leafstedt, SD; David T. Marshall, NC; David L. Meeker, VA; Bill Sauble, NM; John R. Scamahorn, IN; Brian T. Smith, DC; Robert C. Stout, KY.

AAVLD participants included: Bruce Akey, NY; Gary Anderson, KS; Craig Carter, KY; Sharon Hietala, CA; Steve Hooser, IN; Barbara Powers, CO; David Steffen, NE.

Committee representatives included: Joseph Corn, GA; Christine Hoang, IL; Francois Elvinger, VA; Greg Rosales, AL.

The Committee on Government Relations met on March 10-11 in Washington D.C. Meetings began in the Whitten Building, with Acting Animal and Plant Health Inspection Service (APHIS) Administrator Kevin Shea and Veterinary Services (VS) Deputy Administrator, Dr. John Clifford.

Shea addressed the trajectory on USDA appointments for the Committee. Secretary Vilsack has appointed his chief of staff and deputy chief of staff. Nomination for Deputy Secretary has been made. He anticipates that the Under Secretary positions should be determined in the next two to three months. The APHIS Administrator has historically been a career position, and at this point Cindy Smith will likely continue in that position.

Shea outlined the Secretary’s priorities for the administration, which include:
1. Safe, nutritious food supply
2. Sustainable agriculture policy
3. Climate change adaptation leader
4. Technology for USDA
5. Support 21st Century rural community
6. Quick implementation of the Farm Bill

He indicated that currently there is does not exist great detail on direction of national policy, awaiting appointment of the respective under secretaries.

Shea discussed the National Animal Identification System (NAIS), indicating that the Secretary is revisiting the program, though no decisions have been made as to its direction. He noted that Rep. Collin Peterson is pressing for a mandatory program, and a House Agriculture Subcommittee will hold a meeting on March 11, where Dr. Clifford will testify on the program’s effectiveness. Regarding mandatory premises identification, the proposed rule has not driven in overall policy, though

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the rule expected to prevail. He also noted that on the relation between food safety and NAIS, there is no formal intent, but evidence can indicate that NAIS has potential to support food safety.

Effectively, there is an anticipated flat budget for APHIS and most likely other agencies for the coming fiscal year. Shea responded to a question of the status of availability of Commodity Credit Corporation (CCC) funds by saying there is no decision. Though there has been some tightening in recent years, the true test will be the next emergency. In past benefit to industry was the primary consideration. It is likely that job protection may be a significant consideration in use of CCC funds.

The Committee asked Shea as to the involvement of the Secretary regarding animal care. Though there is not much direction to date, the Secretary is sensitive to welfare. Dr. Clifford added that VS is considering adding a welfare specialist, and VS would likely take lead for USDA on farm animal care. Many questions still revolve around this issue.

The issue of a single food safety agency was discussed. The Secretary is interested in the issue, but its final status is unclear.

Shea was asked about the opportunity to move the National Animal Health Laboratory Network (NAHLN) forward, regarding a letter sent on behalf of AAVLD. He encouraged continued communication with the Secretary’s office, and the goal of increasing jobs in the U.S. as a point to consider. AAVLD representatives also expressed interest in the 2015 initiative. Committees are being formed, with the intention to have broad inclusions.

The Committee continued discussions with Dr. John Clifford, beginning with discussion on the 2009 budget. The current omnibus bill provides $21 million for animal identification; a slight decrease for Avian Influenza; slight increase for Brucellosis, Chronic Wasting Disease and emergency management; and a significant increase for Cattle Fever Ticks. As the bill stands there would be a $23 million shortfall for Veterinary Services. This will probably mean a decrease in state cooperative agreements. Also the 2009 NAHMS goat study has been cancelled. Finally, Veterinary Services staff will probably be reduced to adjust to the reduced budget.

He discussed the current status of the Bovine Tuberculosis program. Since the listening sessions, VS staff has been having internal discussions concerning long range planning for the program. He expressed that they want to get it right and that will probably takes some time and require the usual rule making process that could take two to three years. A USAHA symposium on Bovine Tuberculosis was discussed as a method of expediting changes to the program. The need for a better test for tuberculosis remains a high priority. Because of this, VS will fund the creation of a serum bank over the next year for use in the development of tests for tuberculosis.

Clifford suggested that a much faster track is being considered for the bovine brucellosis Eradication program. Consideration is being
made to regionalize the Greater Yellowstone Area and declare the rest of the United States Brucellosis free. A priority for the program remains the development of an effective vaccine for use in elk.

VS has heard feedback on its 205 initiative, and there is not a change in the vision, but feedback has impacted the thought process. VS at this time does not see long term eradication programs for VS or states as has existed historically. Rather, shorter term programs three to five years may be the direction, with industry taking a larger role in the time before that. It also provides a new opportunity to evaluate Cooperative Agreements. States will continue to need support – a single line item directive to states could provide more stability from year to year for animal health, with a shift to more of a species-specific line items. APHIS has to lead this issue, and support would still be needed from senior officials and Congress. Clifford indicated that Johne’s disease would be a good example of this model, and an example of scrapie eradication would be completed before the transition.

Clifford indicated he would testify before a House Agriculture Subcommittee on the effectiveness of NAIS. Discussion followed on data transfer from states to national, and concerns on accuracy and duplication of data entry. The emphasis so far has been to build system, not maintenance; there is a need to continue work on that part of it.

The meeting continued with Mr. John Picanso, VS chief information officer, Drs. Aaron Scott, and Sarah Tomlinson National Surveillance Unit in addition to Dr. Clifford.

Picanso indicated that in March 2008, the VS information technology (IT) Board met and found that VS needed a framework for IT. IT has prepared a Status of Framework document that includes five execution initiatives:
1. Data acquisition and exchange
2. Security: will increase.
3. Software services and delivery
4. Governance
5. Modernizing legacy

Many of the initiatives tie into the VS 2015 vision. The Committee stressed the importance of input from the States and laboratories in the developmental process. Currently VS is drafting a national implementation plan for review.

Scott, by teleconference, discussed surveillance fundamentals: smarter, cost efficiency, for specific information. He highlighted the following key points:
- More tools are now available
- Efficient funding allocation-most measure effectiveness
- Premises animal ID-will help in planning and efficiency
- More collaboration with public health
- Changes in long-standing surveillance (brucellosis and
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tuberculosis

- More comprehensive, integrative, dynamic surveillance across species
- Targeted towards streams of information

The Committee also discussed disease reporting confidentiality as an important factor being dealt with in regards to surveillance. Integration of state data into VS system will play a key role.

Clifford discussed the contagious equine metritis (CEM) situation, noting that VS does not currently have any direct equine disease program funding. VS will work with stakeholders on levels of resources needed at the local level, and work to determine a threshold for related support.

VS will also be seeking input from stakeholders on bluetongue virus (BTV) and other vector borne diseases as it becomes a more prominent issue in the U.S. Surveillance resources currently are not available for BTV.

Dr. Cyril Gay, Agriculture Research Service (ARS), provided an update of programs to the Committee, sending apologies from Drs. Caird Rexroad and Steve Kappes for being unable to attend. Dr. Gay addressed the budget outlook for 2009. He cited not much of an increase with FY09 Omnibus bill. He expressed his appreciation of USAHA Resolutions in support of ARS programs. Animal Health funding will be approximately $60 million, however no funding was included in the stimulus bill.

Dr. Gay admits ARS is not on the cutting edge of technology in areas of diagnostics/research and collaboration, when looking at models of other countries. ARS is working to capitalize on genomics activity, and working to create vaccines for production purposes that are specifically designed for disease eradication. ARS is also conducting Good Agricultural Practices (GAP) analysis on what is needed in terms of agriculture research and what their priorities will be. There is a need to strengthen partnerships with academia, industry, and other government entities. The Washington State University, College of Veterinary Medicine is an example of an excellent partnership between ARS and universities.

Regarding the National Bio- and Agro-defense Facility (NBAF), Department of Homeland Security (DHS) is working on design. ARS is planning to focus on seven disease categories and their vectors. NBAF should provide more capacity to train scientists for when new disease emerge. ARS will look to partner with industry (pharmaceuticals and biologics) to develop countermeasures once new discoveries come online. ARS wants feedback on what priorities the agency should focus on.

The Committee met with representatives of the Cooperative State Research, Education and Extension Services (CSREES), including Dr. Muquarrab Qureshi, Dr. Mark Robinson and Dr. Gary Sherman.
They discussed the transition to the National Institute of Food and Agriculture (NIFA) by October, 2009. There will be structural changes, but mostly administrative changes and the Farm Bill funding will remain intact. NIFA is authorized for up to $700 million for programs. The Agriculture and Food Research Initiative (AFRI) administrator and Chief Scientist will be appointed directly by the President. USAHA can provide input on these appointments to the White House. Agriculture research funding went to zero in the stimulus bill, though funding was considered. Dr. Sherman indicated that National Veterinary Medical Services Act (NVMSA) will become National Veterinary Medical Loan Repayment Program (VMLRP). CSREES had 270 days from when the Farm Bill was signed to promulgate regulations for implementation, which should be expected within a week. There will be an interim final rule with a 60 day comment period and 30 days after that for final implementation. VMLRP received $2.95 million in the omnibus spending bill and have $1.8 million currently for a total of nearly $5 million for the program. It will include veterinary laboratory diagnosticians, pathologists, etc, but will focus on food animal veterinarians. Additionally, Food Animal Residue Avoidance Databank (FARAD) received $806,000 in the omnibus bill.

Dr. Beth Lautner, National Veterinary Services Laboratories (NVSL) and Barbara Martin, National Animal Health Laboratory Network (NAHLN), joined the discussion with CSREES to review the direction of the NAHLN. Significant cooperation between NVSL and CSREES has taken place since the 2008 Annual Meeting in Greensboro, as the two agencies have been working jointly on the vision and mission.

The Committee continued discussion with Lautner and Martin. Regarding the NAHLN Survey from 2007-2008, results indicated it was necessary to clarify roles of APHIS and CSREES, and there is a need for a more active role of the deputy administrator. The NAHLN Coordinating Council will include 13 state partners, made up of nine laboratory directors and four state animal health officials, as well as nine USDA participants. The goal of the council is to have good balance and geographic, species, etc., representation. A framework has been drafted for the Coordinating Council, which includes APHIS, CSREES, and laboratories. Key components include:

- Responsibilities, Roles and Veterinary Services Strategy
  - review and write goals
  - determine what makes a NAHLN laboratory
  - call for nominees – balance geography and activity
  - establish co-chairs
  - determine industry partners/committees, such as Animal Ag Coalition

Dr. Powers indicated that the mission and vision edits have been completed.

Proficiency Tests and other day-to-day activities will be led by NVSL,
while CSREES will provide support such as strategic and coordination planning. True teamwork is the goal of the framework.

A technical working group is active and working on method validation, continual assessment, etc. The perception is that the modeling which is used to determine what laboratories to select for testing regional diseases is very good, for example, what was done for pseudorabies, brucellosis, and classical swine fever.

Dr. Hoenig commented that it may make good sense to think of surveillance more broadly than a test-specific focus – possibly broad based evaluations such as necropsy.

A viable opportunity likely exists for NAHLN laboratories to partner with Food Emergency Response Network (FERN), where they can leverage resources where DHS may be able to fund equipment needs.

Dr. Martin highlighted key successes of NAHLN:
- 580.4 – good example was the Malignant Catarrhal Fever (MCF) situation in Washington
- NAHLN Checklist – outlining laboratory responsibilities: Quality Assurance (QA) implementation, 4 laboratories did not respond, all laboratories will eventually be accredited
- Scenario testing – Avian Influenza (AI) was a good example with >700 people attending across the network – found marked differences among States – this exercise looked at what goes on in the laboratory - North Carolina and Indiana provided good examples
- Surveillance Pilots: Swine Influenza Virus (SIV), Pseudorabies (PRV), and Food and Mouth Disease (FMD)

The GRC met next with with Mr. Bryce Quick, Deputy Administrator with Food Safety and Inspection Service (FSIS). Mr. Quick represented Administrator Alfred Almanza, who was unable to attend due to a late scheduling conflict. Mr. Quick addressed five items on the GRC agenda:
- FSIS awaits publishing (probably within the next week or so) a Final Rule addressing non-ambulatory cattle at inspected plants, which will expand current regulations and prohibit the inspection and passing for human consumption cattle that become non-ambulatory after the antemortem inspection process. FSIS feels that this rule will enhance consumer confidence, has the support of the agency, and does not expect any delay or objection from the current administration.
- Interstate shipping of state inspected meat products. Provisions to allow interstate shipping of meat products are included in the current Farm Bill, which charge the agency with publishing a Final Rule within 18 months. The provisions would allow movement of state product if the plants met provisions that were “identical to” federal requirements, rather than the current “equal to” language. I would also require inspection supervision by
federal FSIS personnel. The rule is quite restrictive and does not meet all of the needs of the state inspection lobbying efforts, but has the approval of NASDA and is a compromise on the issue.

- Single food inspection agency - Secretary Vilsack supports the concept, but early discussions do not appear to include FSIS. The previous administration attempted to administer “risk based inspection” but the plants and the consuming public were not ready for that concept. FSIS has positioned themselves for future regulatory structure changes through their development of a performance based inspection protocol, and their activities involve actual inspection authority, rather than the oversight authority of FDA which actually involves auditing of the process rather than direct on sight routine inspection.

- FSIS is a supporter of any veterinary workforce development legislation as they have struggled for years to attract veterinarians for employment with their agency.

- FSIS has met the majority of their pathogen reduction goals, despite a few blips in e. coli numbers that they are still assessing.

The Committee adjourned its meetings for the day. The meetings resumed on Wednesday, March 11 at the American Veterinary Medical Association (AVMA) Government Relations Division Office.

Meetings began with AVMA, represented by Drs. Ron DeHaven, Mark Lustchaunig, Angela Demaree and Christine Hoang, and the Association of American Veterinary Medical Colleges (AAVMC) represented by Dr. Michael Chaddock and Mr. Brian Smith. Dr. DeHaven began discussion by informing the group of the omnibus spending package for fiscal year 2009, that included $806,000 for the Food Animal Residue Avoidance Databank (FARAD), and $2.95 million for the National Veterinary Medical Services Act (NVMSA).

DeHaven stated that AVMA will support a mandatory animal ID system, and he would be testifying to Congress later in the day. He highlighted five of AVMA's priorities for the 111th Congress, which include: animal care; veterinary workforce development; veterinary education including the North American Veterinary Medical Education Consortium (NAVMEC); economic viability; and other veterinarian advocacy. He highlighted the importance of the antibiotic resistance issue, noting that veterinary oversight of all feed with antibiotics would add to the demands of current veterinarians, though AVMA will explore areas to provide oversight in a manageable way.

Dr. Lutschaunig discussed the AVMA legislative agenda, which is still in development, but includes areas of healthcare reform as it affects practicing veterinarians, animal welfare legislation, food safety, environmental regulations, and veterinary accreditation. He
addressed the process for requesting funding, noting that inclusion in the President’s Budget is preferable, but they do also work closely with the appropriations process in Congress.

AVMA and AAVMC will be working closely on workforce issues, including the federal salary level increase. He indicated that this could translate to the state level if progress is made.

AVMA also has an interest in finding an appropriate bill to authorize funding for the NAHLN.

Dr. Chaddock welcomed the opportunity to visit with the group. Brian Smith reviewed the AAVMC legislative agenda, noting their focus is exclusively on veterinary schools' interests. Smith noted that education, research and outreach is their primary focus, including: Veterinary Public Health Workforce Expansion Act (VPHWEA) and funding authorization. A key part of this issue is to look at unique ways to increase enrollment, not exclusively focused on new facilities. AAVMC is also aware of the issues related with advanced training, specifically for laboratories. They feel that members of Congress are making progress in their understanding of the veterinary workforce needs.

Dr. Chaddock explained the AAVMC’s leadership on the NAVMEC. They have produced a foresight report, and will be evaluating input over the next few months. The vision of the consortium is to: address the societal needs of veterinarians of the next 25 years; evaluate skill sets needed; and develop models to deliver these. Two key issues are accreditation and licensure for the future. Chaddock emphasized the need for broad-based input, and extended invitations to any organizations interested in participating and supporting the consortium.

Dr. Chaddock welcomed the opportunity to visit with the group. He stated that AAVMC can only have limited lobbying efforts because of its tax status, thus many efforts focus on research and education.

Mr. Smith reviewed the AAVMC legislative agenda. Veterinary Workforce Expansion Act (VWEA) passed last year as part of a larger bill giving responsibility to the Department of Health and Human Services (DHHS), and it only included minor renovations instead of outright new construction allowed. There is no real progress on implementation of the law yet, though the House Energy and Commerce Committee is interested in pursuing this. AAVMC wants a comprehensive approach to address not just construction but also expanding enrollment in schools, assistance to recruiting faculty, and fellowships. A recent GAO report on federal veterinary workforce has stimulated interest throughout Congress. There is a need grassroots advocacy, and AAVMC is encouraging members to talk to the local Congress person(s), including topics such as training for diagnosticians. AAVLD can provide workforce survey results for laboratories for use in discussions. Congressman Curt Schrader (D-Oregon) is currently the only veterinarian in Congress and will likely be a leader on veterinary issues.

Dr. Chaddock explained the AAVMC’s leadership on the NAVMEC,
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which is a follow up to the Foresight Report (AAVMC publication). They envision a 12-18 month process of identifying societal needs for the veterinary profession, determine entry-level skills/knowledge for new vets, and evaluate what are the different models for delivering the needed education (land grant institutions, distributed model, etc.). The Consortium will also address how accreditation and licensure fits into veterinary education in the future. AAVMC will be the leader, convener and facilitator for this effort but will not dictate outcome. There is also international interest. A written, non-prescriptive plan will be the final product, meant to serve as a planning guide for veterinary schools in the future. AAVMC is currently in a fund raising mode right now but hope to kick off this process in the next two weeks. This process is meant to be all inclusive.

The Committee held its next session with a joint meeting of the Animal Agriculture Coalition (AAC). Ms. Kerry Thompson, Chair of AAC and representing the American Horse Council, was accompanied by representatives of the American Sheep Industry Association, National Pork Producers Council, National Milk Producers Federation, Biotechnology Industry Organization, National Association of Federal Veterinarians, and National Aquaculture Association. National Renderers Association and AVMA were represented on the Government Relations Committee.

Ms. Thompson presented AAC priorities for FY2010, broken down by agencies within USDA and FDA.

• AAC is particularly concerned about the significant reductions in animal research funding resulting in the loss of critical research infrastructure and long-term research programs at USDA's Agriculture Research Services (ARS) which puts the economic competitiveness and viability of the animal agriculture sector at risk. AAC recommends and strongly supports funding increases for ARS to fulfill its mission, with planned emphasis on animal genomics, food safety and animal protection, as well as increased emphasis on improving animal productivity and efficiency, including utilization of alternative by-products and waste management and treatment.

Mr. John Adams pointed out that there was new emphasis on competitive funding and AAC encourages greater integration of ARS efforts with the Cooperative State Research, Education, and Extension Service (CSREES).

• AAC strongly supports the concept and creation of the National Institute of Food and Agriculture (NIFA) with the transfer of all authorities of the CSREES into the new agency by October 1, 2009. AAC requests that full funding to the authorized level of $700 million for the Agriculture and Food Research Initiative (AFRI) be achieved within 5 years. Areas of research that AAC supports include - reproduction, genomics, animal health, nutrition,
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quantitative genetics, physiology; - animal productivity and efficiency; - animal wellbeing and assessment of wellbeing; - nutrient excretion and waste management and treatment [AAC opposes removal/reductions of funding for Integrated Water Quality programs ($14.5 million) and Sustainable Agriculture Extension ($1 million)]. AAC furthermore requests the development of tools for application of research outcomes and urges support for the development of disease outbreak and spread models by DHS. AAC also requests support of Graduate Fellowship Grants ($4.5 million) and Institution Challenge Grants ($6.5 million), and a $5 million appropriation for the National Veterinary Medical Services Act (NVMSA).

AAC representatives and the Committee expressed a sense of urgency in restoring and allocating funds for agricultural research and science based agriculture. The return on investment of animal agricultural research is very high and developing a plan for pushing and increasing animal agricultural research is imperative. Rich Breitmeyer suggested that AAC produce one-pagers to keep USAHA and State Veterinarians informed on action items that the AAC is working on and provide regular updates to help generate broader support.

• Regarding the USDA Animal and Plant Health Inspection Service (APHIS) budget, AAC’s top priority is the request for an $18.4 million increase over the $13.6 million FY 08 funding for APHIS/Veterinary Services (VS) initiatives for the National Animal Health Emergency Management System (NAHEMS). AAC supports a strong VS and Wildlife Services (WS) infrastructure to support disease control and eradication programs, disease surveillance and monitoring, including detection of emerging diseases, emergency control and response, and animal protection operations at the wildlife/domestic animal interface. Some of those programs are severely underfunded and leave animal populations at risk. AAC further requests funding ($10 million) to support field validation of new detection technologies and enhance the Veterinary Stockpile, funding ($ 10 million) to support the creation of a National Animal Health Emergency Management (NAHEM) and Infrastructure Development Center and supports the creation of a system that allows identification of premises and animals for adequate trace back capability in the time of disease or other emergency.

The AAC requests a $19 million increase to $155 million funding for the Animal Health Monitoring and Surveillance (AHMS) program, assuring regional surge capacity for laboratory diagnostics in major animal health emergency events, enhanced surveillance and further National Animal Health Laboratory Network (NAHLN) infrastructure development in coordination with CSREES. The 12 core laboratories receive less than 6%, and the remaining 46 NAHLN laboratories 1% or less to operate their operations (average per State is $5.2 million), and
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Federal funding of the NAHLN is grossly insufficient and inappropriate for adequate preparedness in case of an animal health emergency. AAC further requests enhancement of the National Surveillance Unit to ensure its capability in collecting, analyzing and disseminating domestic and foreign animal disease surveillance output in both the public and private sectors. AAC finally requests adequate funding for the Center of Veterinary Biologics which currently is at about 50-60% of its authorized staffing levels.

Mr. Adams asked State Veterinarians specifically about the value of pushing for funding of eradication programs versus control and prevention programs. Don Hoenig replied that some new initiatives and potential moves based on VS 2015 would redirect activities towards prevention instead of eradication with a move away from federal staff towards control and activities by stakeholders in industry and States. The need for smarter spending of federal dollars is advocated, although USDA lacks flexibility because of funding mechanisms. TB control and eradication could be viewed as a model in the context of VS 2015 – in California $16 million were spent to date on remaining infected herds which is not sustainable, while National Milk approached ARS for TB research support ~ 5 years ago with no increased funding for research into sustainable control measures. State Veterinarians, as a group, are ‘cautiously optimistic’ to see necessary changes occur and look forward to details in VS 2015 and elsewhere as to progress and changes away from the status quo.

AAC also indicated reinstating support for the Livestock Market Information Center. They will continue to support long-term FARAD funding in the amount of $2.5 million per year.

Continuity of business planning (COBP) is also a priority for the AAC, through the USDA Office of Homeland Security. Key issues addressed with this include: emergency management; a need for system-wide inclusion; bringing together public and private sectors on regional basis; and working with DHS on diseases crossing state lines and thus a regional emphasis. A number of tools are currently in place, including the Emergency Management Councils. The threat of FMD demonstrates the need for planning now. The group discussed various aspects of DHS funding, including challenges for the agriculture sector and the need for the ability to use funding for positions. States could benefit from involvement of USDA, and the possibility of an Memorandum of Understanding (MOU) was discussed. It was also suggested that the National Animal Emergency Task Force be re-implemented to get more recognition for agriculture funding and help to expedite planning processes for COBP. It was noted that the regional exercises for emergencies have been productive.

AAC also shared its support for FDA-Center for Veterinary Medicine (CVM), specifically the Animal Drug User Fee Act (ADUFA) to be funded at a level of $15.262 million.
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The Coalition noted that the details of the President's budget for FY 2010 have not yet been released, and from that a more detailed list of funding requests can be shared. For FY 2011, budget increases are not anticipated.

The Committee discussed the trend of animal care and welfare legislation. The group discussed the various state legislative initiatives, many driven by anti-animal agriculture organizations. The role of OIE in animal welfare is becoming increasing, and though the U.S. agriculture industry is providing input, it is only one of the 167 member countries, and impact may be minimal. USDA's role in welfare regulations is an important point, though much of the state legislation needs to be addressed by the industry. The group discussed various programs in place throughout the industry, but emphasized the need for continued coordination among the commodity and agriculture organizations to develop a strong, unified voice.

Ms. Jessica Fantinato, USDA Office of Homeland Security, provided an update on the Government Coordinating Council. The Obama Administration considers the Homeland Security measures for the Food and Agriculture Sector a priority. All of the previous "Presidential Directives" have been renamed by the title; i.e., the National Infrastructure Protection Plan (NIPP) and are still a priority to further develop the critical infrastructure protection plan. The current administration is emphasizing the need for the federal government to partner with states, localities and the private sector to leverage its expertise and its assets, and listen to their concerns. The newly revised NIPP has been released and identifies the Nation’s critical infrastructure and key resources. Each section has to develop a Sector Specific Plan and an annual report describing progress in implementation of the plan. The Agriculture and Food Sector Specific Plan was originally written in 2006 and in 2008, an update document was released. Currently, a revision is underway to make the plan more relevant to sector partners. Changes will include combining two separate plans of USDA and FDA into one plan, increased information on the sector and its complexities and providing resources for infrastructure protection.

The Food and Agriculture Sector has a Government Coordinating Council (GCC) and a Sector Coordinator Council (SCC). The GCC has over 19 agencies or organizations represented, including NASAHO and AAVLD. The SCC represents producers. The GCC has monthly conference calls, quarterly face-to-face meetings, and annual tabletop exercises. The most recent tabletop exercise revealed strengths in interagency coordination, incident command structure, and public information. Areas identified for improvement included planning, disposal and economic considerations. The next tabletop exercise will be in Federal Emergency Management Agency (FEMA) region 7.

Further work is progressing to identify Critical Infrastructure and Key
REPORT OF THE COMMITTEE

Resources (CIKP). The Food and Agriculture Criticality Assessment Tool (FASCAT) has been developed to assist in identifying these resources and is available at http://www.ncfpd.uma.edu. This is aimed to assist states in identifying the key food and agriculture resources and provide more uniformity across the sectors. The FASCAT can be used to develop the sector and state lists (but FASCAT use is not required). The FASCAT has been released to the State Homeland Security Advisors, as well as State Veterinarians and GCC members. Webinars have been provided and some states are designated as Pilot states and have had workshops. The data call is due April 1. The process will be refined even more next year, and hopefully, more resources will be available for assistance.

2008 Sector goals included: FASCAT implementation, one tabletop exercise, improving sector communications and revision of the Sector Specific Plan. Action items also included increasing participation of sector members at the state and local level, and review of guidance language for allocation of DHS grant funds.

2009 Sector goals also include a continuance of 2008 goals, increasing more active sector membership participation, and creating more effective and efficient information sharing process. In addition, a 3-year tabletop exercise schedule will be developed for the yearly exercises.

Dr. William Flynn, Senior Policy Analyst for the Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM), Senior Advisor for Science Policy, Center for Veterinary Medicine, FDA next addressed the Committee. Several members of the Committee expressed interest in exploring opportunities for NAHLN laboratories to work more closely with FDA, especially in the areas of toxicology and food microbiology. Continuing efforts will be made in the areas of the Food Emergency Response Network (FERN) and FDA's new program, Pet Net, which needs laboratory support for problems with pet food and animal feed.

The FDA enhanced feed rule was also discussed. Dr. Flynn anticipated that the Administration may delay the April 27, 2009 implementation date. Many members expressed concerns regarding carcass disposal; many rendering companies will discontinue services or increase charges significantly. Veterinary diagnostic laboratories will also face much increased costs for disposal, requiring additional charges to clients, which could lead to decreased submissions. Dr. Flynn recognized that the rule was written before the BSE surveillance was completed that demonstrated the extremely low risk of BSE in the U.S.

Antibiotic resistance issues were also discussed. It is important to protect the ability for veterinarians to use antimicrobial drugs to treat, control and prevent disease. Dr. Flynn noted that CVM must be more proactive and work closely with stakeholders, as Congress is very
interested in reviewing this issue.

The Committee concluded its meeting with a session with USDA-APHIS-VS, Emergency Management and Diagnostic Programs, represented by Drs. Jose Diez and Mark Teachman, and Department of Homeland Security, Office of Health Affairs represented by Drs. Tom McGinn and Doug Meckes.

Dr. Diez reported that, following the collaboration leading up to the Joint Scientific Session in Greensboro, DHS and USDA have continued to meet jointly every two weeks. They distributed hundreds of the FAD Preparation CD following the Greensboro meeting. Dr. Diez also stated that he now supervises NVSL, CVB, the move to the new Ames facility and the NAF transition.

A national level exercise is planned for 2010 but funding will be a challenge. Dr. Teachman said that VS is pursuing efforts to plug into the FEMA five year exercise planning process.

Dr. McGinn was asked a question about USAHA Resolutions 2 and 35 and reports that while formal responses are being reviewed at the Department level, DHS has put together a grants mentoring tool for states to pair up with others states who have been successful in receiving DHS funds in the past. The need still exists to fund one person per state for emergency management and homeland security. Dr. McGinn also suggested procuring a speaker for the fall meeting in San Diego who could address the progress made by Customs and Border Protection on intercepting agricultural contraband. Dr. McGinn also mentioned that the fire fighting community has refined their approach to obtaining funding over the years by linking the lack of capacity and resources directly to consequences. DHS is looking at ways to model this approach. FASCAT is the avenue for agriculture in this process which will enable us to compete more effectively for the 80:20 funds.
REPORT OF THE COMMITTEE ON IMPORT-EXPORT

Chair: Charles E. Brown, II, WI
Vice Chair: George O. Winegar, MI

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The Committee met on October 12, 2009 at the Town and Country Hotel, San Diego, Calif., from 1:00 to 4:00 p.m. There were 11 members and 14 guests present. The Chair opened the meeting by welcoming members and guests, requesting all to sign in, reviewing the agenda and asking for any requests to modify the agenda. A review of where to find 2008 Resolutions on the website was given.

Mr. Effingham Embree, Livestock Exporters Association (LEA) presented Livestock Exports from the Exporters Perspective. The complete text of this presentation is included at the end of this report.

Dr. Peter Merrill, National Center for Import and Export (NCIE), United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (USDA-APHIS-VS) presented Organizational Structure and Activities of the National Center for Import and Export (NCIE) Live Animals and Germplasm and Animal Products. The complete text of this presentation is included at the end to this report.

Dr. Floyd Horn and Dr. Matthew Lorence presented Progress toward State of the Art Multiplex Pathogen Detection System for Animal Health. The complete text of this presentation is included at the end of this report.
Committee Business

The Committee reviewed the two Resolutions passed in 2007 Resolutions 28 and 66. USDA-APHIS-VS staff updated the Committee on the progress of USDA actions in addressing these Resolutions.

The Committee reviewed and discussed a resolution presented to the Committee for consideration. After review and discussion by members and comment by USDA-APHIS-VS staff, the Resolution was passed as presented and forwarded to the Committee on Nominations and Resolutions.
There are U.S. Cattle moving to Mexico, Turkey, Russia, Central America and other destinations. There was recently a shipment of dairy cattle to Iran under special license. There are a few pigs still being shipped to Latin America and other places. There seems to be more interest in imports of sheep and goats. There was a project for about 2,000 sheep and goats to the Philippines that was recently cancelled when the U.S. and the Philippines could not agree on a health protocol.

Many markets are again open to U.S. Breeding Cattle, but some, notably in Latin America remain closed due to the BSE issue. The European Union (E.U.) still does not allow entry or transit of most U.S. Livestock. This is a critical issue because air shipments of U.S. Livestock going to Eastern Europe and Africa would in most cases need to transit in Europe.

A very short time ago everyone in the world wanted our Dairy Cattle, and there were not enough cattle to go around. The year, 2009, should have been a good year for U.S. Livestock Exports, however several things happened that changed everything. World-wide demand for dairy heifers declined as milk prices dropped, and the unfortunate naming of H1N1 flu as swine flu was a death sentence to the already struggling swine Industry.

China was by far the largest importer of U.S. breeding swine before the announcement of H1N1 flu. After the news of H1N1 in Mexico, China shut down imports of all of U.S. pork and breeding swine. China has not imported U.S. Cattle since the discovery of the Canadian Cow with bovine spongiform encephalopathy (BSE) in Washington State in 2003. Prior to 2003, China was rapidly becoming the most promising market for U.S. dairy cattle.

When a market closes and then reopens, the health protocols have to be re-confirmed or re-negotiated, and that is where the real problem begins. The World Organization for Animal Health (OIE) has become the reference for importing countries to determine what should be required. In many cases, a new breed of bureaucrat takes the opportunity to excerpt their authority and require certifications and tests for every reported disease in the history of the country. More often than not, the negotiations about health issues are used by our trading partners to gain leverage to get concessions for items that they want to sell to us. Whatever happened to the idea that Health Issues were supposed to be based strictly on Science?

If we are going to use the OIE as the reference for reported disease, then we should follow the OIE guidelines in determining what is both practical and appropriate to require. If a country refuses to follow the
guidelines perhaps they should be penalized or at least there should be some recourse. A bloated health protocol that requires many unnecessary tests and requirements is truly an artificial trade barrier. The most important issue to Livestock Exporters today is the escalating requirements which are in most cases making exports difficult, if not impossible, increasing cost, and making us less competitive.
USDA-APHIS-VS National Center for Import and Export (NCIE) is responsible for facilitating international trade in animals and animal products. NCIE evaluates the animal disease status and veterinary infrastructure of foreign countries, represents APHIS in international forums, and protects and supports American agriculture through regulating imported animal commodities. Customer service is also provided to the general public typically in the form of assisting with the movement of companion animals to foreign countries or importing items such as animal hides and trophies.

I. ANIMAL EXPORT

A. Trade negotiations

NCIE develops export protocols, participates in negotiations, and provides technical expertise in developing, retaining, and expanding export markets for U.S.-origin animals and germplasm.

In fiscal year 2009, NCIE opened or retained about 100 markets for animals in over 45 countries and advanced protocols for over 100 other different country/commodity combinations. NCIE animal export staff are also responsible for requesting and negotiating exceptions to normal trade circumstances for shipments that need special consideration, or for shipments that have been detained at a foreign port, and for reviewing and harmonizing testing that is required for exported animals.
## IMPORT-EXPORT

### NEW, RE-OPENED OR RETAINED MARKETS (FY 2009)

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>COMMODITY</th>
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<tbody>
<tr>
<td>Argentina</td>
<td>horses</td>
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<tr>
<td>Aruba</td>
<td>cattle, alpaca and llama, horses</td>
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<tr>
<td>Australia</td>
<td>horses (temporary and permanent)</td>
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<tr>
<td>Barbados</td>
<td>breeding cattle</td>
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<tr>
<td>Belize</td>
<td>cats and dogs</td>
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<tr>
<td>Bermuda</td>
<td>horses</td>
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<tr>
<td>Brazil</td>
<td>horses, equine semen, equine embryos, pet birds, day-old chicks, hatching eggs</td>
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<tr>
<td>Canada</td>
<td>equine semen, equine embryos, horses, cattle</td>
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<tr>
<td>Chile</td>
<td>day-old chicks and hatching eggs, horses</td>
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<tr>
<td>China</td>
<td>aquaculture</td>
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<tr>
<td>Colombia</td>
<td>horses, aquatic animals</td>
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<tr>
<td>Costa Rica</td>
<td>horses</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>cats and dogs, horse</td>
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<tr>
<td>E.U.</td>
<td>day-old chicks and hatching eggs</td>
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<tr>
<td>Guatemala</td>
<td>horses, swine</td>
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<tr>
<td>Honduras</td>
<td>horses</td>
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<tr>
<td>India</td>
<td>bovine semen</td>
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<tr>
<td>Indonesia</td>
<td>llamas/camelidae</td>
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<tr>
<td>Iran</td>
<td>cattle</td>
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<tr>
<td>Israel</td>
<td>laboratory rodents, pet birds, equine semen</td>
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<tr>
<td>Japan</td>
<td>commercial pet rodents, camelids, horses, bovine semen, wart hogs, bears</td>
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<tr>
<td>Korea, Republic of</td>
<td>aquaculture</td>
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<tr>
<td>Kuwait</td>
<td>horses</td>
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<tr>
<td>Madagascar</td>
<td>swine, swine semen</td>
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<td>Malaysia</td>
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<td>Mexico</td>
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<td>Moldova</td>
<td>bovine semen</td>
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<td>Nicaragua</td>
<td>cattle</td>
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<tr>
<td>Panama</td>
<td>horses, sheep, goats, cattle</td>
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<tr>
<td>Peru</td>
<td>horses, giraffes, bovine semen, specified pathogen-free eggs</td>
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<td>Philippines</td>
<td>horses</td>
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<td>Qatar</td>
<td>horses (permanent)</td>
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<td>Saint Kitts and Nevis</td>
<td>cats and dogs</td>
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<tr>
<td>Saudi Arabia</td>
<td>equine semen</td>
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<tr>
<td>Serbia</td>
<td>breeding swine, bovine embryos</td>
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<tr>
<td>Singapore</td>
<td>pets</td>
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<td>South Africa</td>
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<td>Sri Lanka</td>
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<td>Suriname</td>
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<td>Taiwan</td>
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<td>Uruguay</td>
<td>horses, equine semen</td>
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<tr>
<td>United Arab Emirates</td>
<td>horses (temporary, permanent and sport)</td>
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<td>Country</td>
<td>Products</td>
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<tr>
<td>Argentina</td>
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<td>Australia</td>
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<td>Barbados</td>
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<td>Belize</td>
<td>breeding cattle</td>
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<td>Bolivia</td>
<td>bovine semen</td>
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<tr>
<td>Brazil</td>
<td>sheep, goats, sheep semen, goat semen, goat embryos</td>
</tr>
<tr>
<td>Cambodia</td>
<td>bovine semen, bovine embryos</td>
</tr>
<tr>
<td>Chile</td>
<td>pullets, bovine semen, bovine embryos, swine, swine semen</td>
</tr>
<tr>
<td>China</td>
<td>pets, mink/ferrets, swine, swine semen, IVF bovine embryos, horses, chicken and other poultry, bovine semen, bovine embryos, commercial canines</td>
</tr>
<tr>
<td>Colombia</td>
<td>trout eggs</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>pet birds</td>
</tr>
<tr>
<td>Croatia</td>
<td>bovine semen</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>breeding cattle</td>
</tr>
<tr>
<td>Ecuador</td>
<td>poultry genetics</td>
</tr>
<tr>
<td>E.U.</td>
<td>swine, day-old chicks, hatching eggs, finfish, horses, equine semen, equine embryos</td>
</tr>
<tr>
<td>Guatemala</td>
<td>breeding cattle</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>horses, turtles</td>
</tr>
<tr>
<td>India</td>
<td>poultry, horses, bovine embryos</td>
</tr>
<tr>
<td>Indonesia</td>
<td>cattle, poultry, horses</td>
</tr>
<tr>
<td>Israel</td>
<td>bovine embryos, cattle, horses, day-old chicks, hatching eggs, cats and dogs</td>
</tr>
<tr>
<td>Jamaica</td>
<td>swine, horses</td>
</tr>
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<td>Japan</td>
<td>swine, equine, giraffes</td>
</tr>
<tr>
<td>Korea, Republic of</td>
<td>cattle, bovine embryos, swine</td>
</tr>
<tr>
<td>Kazakhstan</td>
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</tr>
<tr>
<td>Macedonia</td>
<td>bovine semen</td>
</tr>
<tr>
<td>Malaysia</td>
<td>cattle, bovine semen, sheep/goats</td>
</tr>
<tr>
<td>Mexico</td>
<td>swine semen, horses, cattle</td>
</tr>
<tr>
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</tr>
<tr>
<td>Morocco</td>
<td>horses, bovine semen</td>
</tr>
<tr>
<td>New Zealand</td>
<td>bovine semen, lamoids, hatching eggs</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>small ruminants, horses</td>
</tr>
<tr>
<td>Pakistan</td>
<td>cattle</td>
</tr>
<tr>
<td>Panama</td>
<td>horses</td>
</tr>
<tr>
<td>Peru</td>
<td>breeding cattle, bovine semen</td>
</tr>
<tr>
<td>Philippines</td>
<td>sheep/goats, bovine embryos</td>
</tr>
<tr>
<td>Qatar</td>
<td>horses (temporary)</td>
</tr>
<tr>
<td>Russia</td>
<td>day-old chicks, hatching eggs</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>horses</td>
</tr>
<tr>
<td>Serbia</td>
<td>bovine semen</td>
</tr>
<tr>
<td>Taiwan</td>
<td>swine, swine semen, cattle, bovine embryos, horses/donkey</td>
</tr>
<tr>
<td>Thailand</td>
<td>swine, swine semen, hatching eggs/day-old chicks, sheep/goats, sheep/goat semen, bovine semen, bovine embryos, cattle, horses</td>
</tr>
<tr>
<td>Turkey</td>
<td>sheep/goats</td>
</tr>
<tr>
<td>Ukraine</td>
<td>horses, swine, cattle</td>
</tr>
<tr>
<td>Uruguay</td>
<td>equine semen, equine embryos</td>
</tr>
<tr>
<td>Vietnam</td>
<td>cattle, swine, swine semen</td>
</tr>
</tbody>
</table>
B. Additional Examples of NCIE Animal Export Activities in FY 2009

1. General responsibilities

In addition to negotiating export protocols, NCIE facilitated international trade by serving as a technical liaison, providing technical support for visits (for audits or training) from foreign veterinarians, participating on international committees, attending meetings/conference calls, preparing letters/reports/briefings for senior level leaders, responding to notices (issued by foreign countries) to the World Trade Organization and responding to the impact of U.S. animal disease outbreaks on exports. NCIE negotiates the release of detained shipments and receives derogations from foreign requirements for trade in animals. NCIE staff officers provided support to the VS field staff by providing direction and responding to questions from VS Regional and Area Offices, the U.S. animal export industry, and the public. NCIE staff also interpret foreign animal import requirements and develop associated policies and programs to facilitate trade. NCIE staff handles dozens of queries each month about companion animals (including securing the release of pets detained by foreign countries) as well as negotiating protocols for moving pets around the world. NCIE staff develop and participate in training and mentoring programs which, in FY 2009, included an Import Export training course for VS staff and initiating the development of an export animal course for AgLearn (for internal training).

U.S. animal disease outbreaks have substantial repercussions on the activities of NCIE staff. In FY 2009 the U.S. reported outbreaks involving contagious equine metritis, vesicular stomatitis and piroplasmosis. Animal export staff needed to provide technical support (typically in the form of detailed and specialized scientific reports and updates) for the international diplomatic community as various countries imposed trade bans often without scientific substantiation. Animal export staff also needed to request derogations from foreign countries for shipments in progress as new outbreaks were reported. U.S. animal disease outbreaks also require NCIE animal export staff to provide additional epidemiological updates to individual countries as well as renegotiate foreign import protocols that reflect the current (and sometimes emerging) disease status of the U.S. Many countries imposed bans on U.S. animals following reports of the U.S. human outbreak of H1N1: Korea, China and Thailand, for example, still have bans on trade in swine and negotiations are continuing. Substantial effort was needed to lift the bans imposed by Eastern European countries and a limited ban imposed by Russia still remains (but is expected to be removed shortly). Reports of all types of avian influenza continue to influence international market access and require additional research and correspondence to trading partners to limit or lift trade restrictions.

In FY 2009, NCIE met with industry groups such as the Livestock Exporters Association, the Holstein Association USA, Inc. and the
REPORT OF THE COMMITTEE

National Association of American Breeders and provided speakers to the annual meetings of the American Embryo Transfer Association and the U.S. Livestock and Genetics Association.

NCIE animal export staff participated in a variety of bilateral technical meetings including: the Australia Standing Technical Working Group and the E.U. Animal Health Technical Working Group, and the U.S.-E.U. Joint Management Committee meeting, technical animal health bilateral with Japan and The Republic of Korea. Staff provided translation services as well as technical input on conference calls with Colombia and Mexico (regarding poultry and slaughter horse protocols, respectively) and Central America and the Caribbean. Similar activities were involved with the Animal Health Trilateral Meeting between Canada, the U.S. and Mexico.

NCIE organized and led several foreign delegations on audits of the U.S. veterinary infrastructure and animal production. In FY 2009, a Standard Operating Procedure was developed to coordinate the logistics of the tours and audits of foreign officials. Animal export staff planned and facilitated several audit visits of equine pre-export quarantine facilities by high level Australian officials.

Other foreign visitors were part of technical exchange programs and NCIE staff provided presentations on the roles and responsibilities of APHIS, explained our veterinary infrastructure and described U.S. systems of animal disease control. These training activities build more personal international relations and help build foreign veterinary capacity both of which indirectly facilitate the flow of international trade in animals and animal products. In FY 2009, presentations were given to delegations from Croatia, Egypt, Kazakhstan, Macedonia, Moldova, Saudi Arabia, Turkmenistan, Uzbekistan, Taiwan, Thailand, China, and India.

2. Specific events or commodity-based activities

Some trade negotiations for animal export cut across all commodity lines and have significant impact for U.S. exporters. In FY 2009, NCIE animal export staff established the use of electronic signatures for equine infectious anemia test results for export to Australia, Canada, China, E.U., Mexico, New Zealand and Taiwan. Staff was successful in negotiating with Brazil to remove a burdensome administrative requirement. A Brazilian consulate authentication is no longer needed on the veterinary health certificate used to export animals. This has provided significant relief for U.S. exporters as they trade live animals and germ plasm.

NCIE staff have participated in special USDA tours of duty or working groups. One staff member recently worked to help improve animal inspection facilities at the U.S.-Mexican border. Another is participating in developing VS’s role in “One Health” initiatives designed to increase interdisciplinary activities among those protecting animal and human health and ecological well-being. Another member is involved with the working group charged with the revision of the national animal identification system (NAIS).
NCIE continues to develop U.S. trade in aquaculture. NCIE is developing laboratory and surveillance systems for mollusk diseases and is developing ornamental and catfish training workshops for VS aquaculture liaisons across the U.S. Negotiations are continuing with several Central and South American countries for many types of aquatic animals. Responses to WTO notification on aquaculture have been submitted for The Republic of Korea, Malaysia, and Taiwan. In addition, protocols for aquaculture export to The Republic of Korea and China have been finalized. NCIE and NOAA-Fisheries are also co-developing protocols designed to facilitate the complex types of health and food safety certifications that may be necessary for live animals and their products exported to a large number of countries worldwide.

Negotiations for trade in cattle were completed with Turkey and Iran. FY 2009 saw the continued export of cattle to Mexico, Russia, Egypt, Morocco and Kazakhstan – markets that were opened the previous year. VS provides technical assistance to U.S. exporters to assure that trade moves smoothly. As international cattle markets are only now re-opening after many years of inactivity, the U.S. industry is developing the infrastructure (e.g., pre-export isolation facilities) to assemble and move herds of cattle across the U.S. and into ships and planes: Animal export staff assists with these endeavors. Improvements in existing markets and additional new markets are being pursued in Asia, Australia, the Middle East, Eastern Europe, the Caribbean, Central America and the Pacific. Israel has agreed to trade requirements but final authorization is pending. Negotiations continue to seek Mexico’s agreement to accept cattle of all ages. More inquiries are originating from politically sensitive or economically challenged countries as U.S. State Department programs encourage and enable foreign agricultural development to support social, and therefore political, stability. For example, a trial export of cattle to Iran is underway and contact with NCIE has been made to send cattle to Afghanistan. In spite of the U.S. receiving a BSE controlled risk status from OIE, many countries, including some in Asia, are still creating technical trade barriers for U.S. cattle and beef: USDA continues to address the entire range of this situation from technical reports through top level trade international delegations. During bi-lateral negotiations and in international forums, USDA continues to emphasize the importance of following the requirements of the World Organization for Animal Health (OIE).

Opportunities for trade in germplasm are also being developed around the world. While trade in bovine semen and bovine embryos dominate, trade is also active for equine semen, swine semen, small ruminants and occasionally equine embryos or canine semen. In FY 2009, a new program was developed for APHIS oversight of export of equine embryos. Foreign countries raise an array of objections to accepting trade protocols for germplasm based on: the disease status of the U.S. (e.g., BSE, bluetongue); inspection requirements; testing requirements
REPORT OF THE COMMITTEE

(e.g., epizootic hemorrhagic disease); a perceived lack of knowledge about the U.S. veterinary infrastructure (e.g., the Ukraine); their own national requirements (i.e., a regulation to test all species for classical swine fever); or for political reasons unrelated to veterinary health (e.g., Croatia’s intention to join to E.U.). Some countries are unresponsive to diplomatic inquiries others are simply obstreperous. NCIE continues to provide technical evidence and arguments for assuring animal health and for using science-based decisions (e.g., OIE does not consider BSE restrictions pertinent to bovine germplasm). Difficulties in finalizing export protocols for swine semen often involve the type of tests needed to assure the health of the donors: The Ukraine, for example, is seeking test results on donor boars for diseases that aren’t present in the U.S. VS continues to work with APHIS International Services and USDA Foreign Agricultural Services to address diplomatic and political issues blocking trade in germplasm. Trade in germplasm that is already established must be maintained by routine APHIS VS inspection of semen collection centers and embryo transfer teams and maintaining the records and developing checklists used by inspector also requires attention from NCIE staff. Staff are preparing a VS memorandum on inspection and approval processes necessary to trade bovine germplasm with the E.U.

The international market dynamics for primary poultry breeding products (e.g., day-old chicks and hatching eggs) continue to shift as concerns about avian influenza (AI) persist. Some countries, such as Russia, Albania, Kazakhstan, Japan and China require or impose limits on exports of poultry or primary poultry breeding products from states where AI of any level of pathogenicity has been reported. This year Taiwan ceased the State based bans of live poultry and birds related to low pathogenic AI; however, discussion continue to remove the bans for all commodities. NCIE provides the technical information to foreign countries to report the status and resolution of the outbreak, to reassure the country that a particular shipment is free of disease or to request the end to the imposed trade limits. Negotiations with Russia to establish a bi-laterally agreed upon trade protocol continue slowly: The U.S. is proposing to use the National Poultry Improvement Plan as the means of U.S. inspection and approval of poultry breeders. Detailed technical responses to questions on U.S. control and surveillance programs for poultry diseases are provided routinely to foreign countries (e.g., Israel and the E.U.). Efforts are being made in the U.S.- E.U. Animal Health Technical Working Group meetings to change the certification requirements for day-old chicks and hatching eggs.

Progress has been made in negotiating with the E.U. for market access for live swine. NCIE has provided extensive information to the E.U. and hosted (in FY 2008) an audit on U.S. swine and swine semen health and production. As part of the follow-up to this audit, NCIE staff provides significant amounts of technical material for the E.U.’s continuing evaluation. Opening the E.U. for trade in swine would also facilitate trade
in Eastern Europe and other countries by allowing swine to transit the E.U. However, political constraints confound.

Horses are shipped around the world to new owners or moved in association with sporting events. The U.S. advises foreign countries of our equine disease status and reports of outbreaks in FY 2009 have resulted in restrictions on equine movements and NCIE efforts to provide status reports and, eventually, lift the restrictions. Modifying foreign import requirements for contagious equine metritis continued as the outbreak was controlled, testing completed and quarantines lifted. Export requirements to send horses to the Middle East (i.e., Kuwait, Qatar, United Arab Emirates) have been clarified. Changes in requirements for the export of equine meat to the E.U. have created the need for NCIE staff to re-examine the requirements for the export of slaughter horses to Canada and Mexico.

NCIE has also been asked to address trade issues for small ruminants (e.g., sheep or goats), cervids and camelids. Technical difficulties tend to center around testing requirements especially the validity of testing requirements for those particular species. The market for exporting sheep and goats to Panama was closed in 200 due to concerns about scrapie but was re-opened as technical negotiations resolved issues.

B. ANIMAL IMPORT
1. Live Animals

Among other activities in FY 2009, NCIE’s Live Animals import staff participated in international meetings, developed import protocols, responded to requests for special projects, and developed additional policy for the movement of ruminants and other livestock into the United States. These activities are summarized in the bullet points below:

- Processed and issued over 3,000 import permits for live animals, embryos and semen (AES) consignments. An additional 1500 permits were issued directly by the three APHIS Animal Import Centers for animals going to quarantine at those facilities.
- Assisted an additional approx. 14,000 stakeholders with live animals, embryos and semen import information requests.
- Continuously monitored world animal disease status reports for all countries as issued by OIE, APHIS-CEAH/Center for Emerging Issues (CEI), Food and Agriculture Organization (FAO) and others, and coordinated review/response involving appropriate import requirements and/or restrictions.
- Issued Import Alerts for changes in H5N1, screwworm and tuberculosis status resulting from foreign outbreaks.
- Revised or developed 65 import protocols for live animals, embryos and semen.
- Revised or created 8 VS Memoranda.
- Facilitated 15 Freedom of Information Act (FOIA) requests for historical animal import or export data and documents.
REPORT OF THE COMMITTEE

• Made numerous changes to APHIS Import-Export websites for clarity and understanding.
• Assisted with the continuing development and implementation of new database systems including ePermits for Live Animals, the Live Animal Import Module for Veterinary Services Process Streamlining (VSPS), and the Animal Import Center Reservation Module for VSPS.
• Attended two Bi-national Committee meetings with Mexico.
• Attended U.S.-Canadian cross-border animal imports working group meeting.
• Attended U.S.-Mexican-Canadian trilateral meeting.
• Participated in aquatic animal technical working group with Canada.
• Participated in March 2009 technical working group sessions with the European Commission for swine, equine and poultry import-export issues.
• Participated in numerous commodity-specific trade meetings and conferences to interact with key stakeholders for import-related issues.
• Collaborated with Biotechnology Regulatory Services and FDA-CVM to better understand and assess the roles VS might undertake for the regulation of transgenic animals (including insects and synthetic genomics).
• Provided technical expertise and trade updates as member of contagious equine metritis (CEM) Coordination Group, responding to 2008 CEM outbreak in the U.S.; drafted initial CEM testing protocol.
• Planned and presented training on CEM testing and regulations for State and APHIS personnel in Pennsylvania and Oregon.
• Currently drafting a memorandum of understanding (MOU) concerning the dual U.S.-Canadian use of certain land border port facilities.
• Gave video conference presentation on live animal import requirements for Iraqi delegation, facilitated by U.S. Army.
• Continued evaluation of risk assessment for import of cloned equine tissue. Implemented decision memo for import of cloned equine tissue, to facilitate import of tissue samples for cloning from the E.U.
• Worked with domestic programs on development of draft recommendations for handling domestic equine piroplasmosis cases and reactors. Helped finalize document for distribution during 2009 Missouri piroplasmosis situation.
• Finalized workplan for interim rule updating CEM testing procedures, and drafted the rule.
• Published a final rule on standards for privately owned quarantine facilities for horses; drafted VS Memo for
implementing the rule.

- Drafted rule for Equine Viral Arteritis, coordinated with domestic programs.
- Finalized workplan for scrapie and BSE requirements for imported sheep, goats and non-domesticated ruminants.
- Collaborated with Products staff to finalize draft/proposed BSE Comprehensive rule; expected publication date December 2009.
- Coordinated numerous complex import, export and transit requests for live animals with importers and VS field staff.
- Co-organized and participated in Animal Import Center directors’ meeting in Los Angeles.
- Co-developed and finalized Northern Border Port manual for Canadian land border port animal import operations; published on intranet.
- Reviewed and commented on approximately 20 World Trade Organization (WTO) Technical Barriers to Trade (TBT)/Sanitary and Phytosanitary (SPS) notifications for aquatic and other animals.
- Worked with Canadian Food Inspection Agency (CFIA) and NCIE regionalization/Programs staff to review and adequately assess CWD status for cervid populations in and around EINP in Alberta, Canada.
- Developed and disseminated State Veterinarian Contact lists to VS field staff as part of development of VS Memo.
- Participated in continued APHIS-wide IT development (‘Deep Dive’) for the integration of ePermits, Veterinary Services Process Streamlining (VSPS) and the ACE/ITDS systems.
- Developed and implemented public access email box for Import-Export questions.
- Developed and implemented database for Canadian import non-compliance issues for follow-up with CFIA.
- Developed and implemented database for all live animal shipments that were refused entry to the U.S.
- Archived current and previously-issued NCIE Import and Export Alerts on intranet.
- Gave presentations at 2008 USAHA committee meetings (Import/Export, Parasitic Diseases, Bluetongue, Infectious Diseases of Horses).

2. Products:
NCIE’s Products staff likewise engaged in numerous and ongoing activities during FY 2009, as summarized in bullet format below:
- Issued approximately 15,000+ permits for animal products and by-products.
REPORT OF THE COMMITTEE

- Assisted stakeholders with expediting permits.
- Collaborated with FSIS on the issuance of permits for animal origin foodstuffs containing small amounts of animal origin material.
- Continue to cancel permits issued for China due to conflicts with FSIS regulations.
- Authorized/inspected USDA-approved establishments.
- Provided guidance to VS Field on reviewing approved establishments.
- Provided amendments and changes in VS import Policies to APHIS' Veterinary Regulatory Services.
- Drafted various Decision Memos and Communication Memos.
- Drafted Swine Trophies from CSF Rule; Drafted Table Egg rule.
- FSIS Joint Jurisdiction Implemented to facilitate the import of meat, poultry and egg products.
- Approved Establishment module in VSPS went into production.
- Completed Swine Hide rule.
- Project manager for BSE Comprehensive Rule.
- VS on court-order Over Thirty-Month (OTM) Rule notice and comment for extension.
- Working with Live Animals group to develop proposed rule for import regulation on BSE and scrapie in small ruminants and wild ruminants.
- Drafted Workplan for the importation of fetal bovine serum from foot-and-mouth disease-affected countries considered as free with vaccination.
- Conducted ongoing U.S./Canada pet food negotiations due to new CFIA regulations.
- Communicated with VS field via e-mails and phone calls regarding deficiencies in inspection reports.
- Convened bi-weekly conference calls with field and industry to explain inspection requirements.
- Held meetings with U.S. Trade Representatives (USTR), Foreign Agriculture Service (FAS), Trade Supply Team (TST), other government agencies and industry to set priorities for negotiations, determine negotiation strategies.
- Approx 750 export inspection packages reviewed yearly for products being exported to the E.U., Japan, Canada, China, Indonesia, Australia, Mexico, and Korea.
- Made quarterly or monthly notifications to trading partners as required with updated lists of approved exporting facilities.
- Maintained and updated all export product IREGS; implemented a new web format.
- Provided numerous responses to e-mails in the export products mailbox.
- Continued to revise/update E.U. inspection packages based on
new E.U. regulations published this year.

- Reviewed documents/notices for removing or adding regions for H5N1 recognition status prior to sending to the field and other stakeholders, i.e. Customs and Border Patrol (CBP), Plant Protection and Quarantine – Veterinary Regulatory Support (PPQ-VRS), and FSIS.
- Provided monthly Avian Influenza reports to departmental administration.
- Established an Import Animal Products mailbox to help VS field staff have better access to central headquarters staff for products-oriented import problems.

II. Import-Export Statistical Data Graphs

Aquaculture Imports
FY 2007–2009

<table>
<thead>
<tr>
<th></th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>4,554</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Eggs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td>13,241,962</td>
<td>14,145,557</td>
<td>10,498,564</td>
</tr>
<tr>
<td>Live</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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## Aquaculture Exports

**FY 2007–2009**

<table>
<thead>
<tr>
<th></th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish Eggs</td>
<td>279,415,760</td>
<td>77,370,813</td>
<td>70,754,911</td>
</tr>
<tr>
<td>Fish Live</td>
<td>7,583,230</td>
<td>29,839,663</td>
<td>41,425,945</td>
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</tbody>
</table>

*USDA Safeguarding Animal Health*

## Bison Imports From Canada

**FY 2007–2009**

<table>
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<tr>
<th></th>
<th>FY07</th>
<th>FY08</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Feeder</td>
<td>4,010</td>
<td>8,778</td>
<td>8,252</td>
</tr>
<tr>
<td>Immediate Slaughter</td>
<td>15,339</td>
<td>18,515</td>
<td>16,871</td>
</tr>
<tr>
<td>Total</td>
<td>19,349</td>
<td>27,293</td>
<td>25,123</td>
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</table>

*USDA Safeguarding Animal Health*
**Bison Exports**
**FY 2007–2009**

<table>
<thead>
<tr>
<th></th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>2</td>
<td>845</td>
<td>0</td>
</tr>
<tr>
<td>Mexico</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>845</td>
<td>0</td>
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</table>

**Canada Feeder Cattle**
**Imported by Port  FY 2009**

<table>
<thead>
<tr>
<th>Port</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchorage, AK</td>
<td>13</td>
</tr>
<tr>
<td>Dunnell, ND</td>
<td>105,804</td>
</tr>
<tr>
<td>Eastport, ID</td>
<td>40,369</td>
</tr>
<tr>
<td>Niagara Falls, NY</td>
<td>3,532</td>
</tr>
<tr>
<td>Oroville, WA</td>
<td>22,885</td>
</tr>
<tr>
<td>Pembina, ND</td>
<td>50,985</td>
</tr>
<tr>
<td>Portal, ND</td>
<td>71,995</td>
</tr>
<tr>
<td>Raymond, MT</td>
<td>38,270</td>
</tr>
<tr>
<td>Sumas, WA</td>
<td>69</td>
</tr>
<tr>
<td>Sweetgrass, MT</td>
<td>10,386</td>
</tr>
<tr>
<td>Port Huron, MI</td>
<td>1,124</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>351,498</strong></td>
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## Canada Slaughter Cattle

**Imported by Port FY 2009**

<table>
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<tr>
<th>Port</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Alexandria Bay, NV</td>
<td>84,715</td>
</tr>
<tr>
<td>Champlain, NY</td>
<td>1,092</td>
</tr>
<tr>
<td>Derby Line, VT</td>
<td>850</td>
</tr>
<tr>
<td>Detroit, MI</td>
<td>37,328</td>
</tr>
<tr>
<td>Dunseith, ND</td>
<td>46,872</td>
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<tr>
<td>Eastport, ID</td>
<td>258,977</td>
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<tr>
<td>Highgate Springs, VT</td>
<td>2,874</td>
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<tr>
<td>Houlton, ME</td>
<td>275</td>
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<tr>
<td>Niagara Falls, NY</td>
<td>50,735</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>758,663</strong></td>
</tr>
</tbody>
</table>

## Mexican Feeder Cattle

**Imported by Port FY 2009**

<table>
<thead>
<tr>
<th>Port</th>
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</thead>
<tbody>
<tr>
<td>Columbus, NM</td>
<td>33,205</td>
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<tr>
<td>Del Rio, TX</td>
<td>64,512</td>
</tr>
<tr>
<td>Douglas, AZ</td>
<td>86,723</td>
</tr>
<tr>
<td>Eagle Pass, TX</td>
<td>70,182</td>
</tr>
<tr>
<td>Hidalgo, TX</td>
<td>31,820</td>
</tr>
<tr>
<td>Laredo, TX</td>
<td>35,865</td>
</tr>
<tr>
<td>Nogales, AZ</td>
<td>128,077</td>
</tr>
<tr>
<td>Presidio, TX</td>
<td>200,604</td>
</tr>
<tr>
<td>San Luis, AZ</td>
<td>18,857</td>
</tr>
<tr>
<td>San Jeronimo, NM</td>
<td>238,560</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>910,468</strong></td>
</tr>
</tbody>
</table>
### Bovine Exports
#### Top Five Countries FY 2009

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>12,647</td>
</tr>
<tr>
<td>Russia</td>
<td>9,451</td>
</tr>
<tr>
<td>Canada</td>
<td>3,481</td>
</tr>
<tr>
<td>Morocco</td>
<td>2,350</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>2,285</td>
</tr>
<tr>
<td><strong>(Total all countries)</strong></td>
<td><strong>(60,299)</strong></td>
</tr>
</tbody>
</table>

Safeguarding Animal Health

### Caprine Exports
#### Top Five Countries FY 2009

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>2,489</td>
</tr>
<tr>
<td>Canada</td>
<td>854</td>
</tr>
<tr>
<td>Cayman Islands</td>
<td>56</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>52</td>
</tr>
<tr>
<td>Guatemala</td>
<td>22</td>
</tr>
<tr>
<td><strong>(Total all countries)</strong></td>
<td><strong>(3537)</strong></td>
</tr>
</tbody>
</table>

Safeguarding Animal Health
### Cervid Imports from Canada
#### FY 2007–2009

<table>
<thead>
<tr>
<th></th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deer</td>
<td>292</td>
<td>24</td>
<td>191</td>
</tr>
<tr>
<td>Elk</td>
<td>957</td>
<td>505</td>
<td>1,249</td>
</tr>
</tbody>
</table>

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### Cervid Exports
#### FY 2007–2009

<table>
<thead>
<tr>
<th></th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elk and Deer</td>
<td>176</td>
<td>555</td>
<td>453</td>
</tr>
</tbody>
</table>
**Equine Live Animal Imports**  
**FY 2007, 2008, 2009**

<table>
<thead>
<tr>
<th></th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equine</td>
<td>30,414</td>
<td>26,523</td>
<td>35,966</td>
</tr>
</tbody>
</table>

Safeguarding Animal Health

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**Equine Live Animal Imports**  
**Top 5 Countries**  
**FY 2007, 2008, 2009**

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 07</th>
<th>FY 08</th>
<th>FY 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>19,324</td>
<td>17,564</td>
<td>13,520</td>
</tr>
<tr>
<td>Mexico</td>
<td>3,203</td>
<td>2,592</td>
<td>2,307</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2,147</td>
<td>1,663</td>
<td>966</td>
</tr>
<tr>
<td>Germany</td>
<td>1,501</td>
<td>1,173</td>
<td>759</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>805</td>
<td>693</td>
<td>510</td>
</tr>
<tr>
<td><strong>Top 5 totals</strong></td>
<td><strong>26,980</strong></td>
<td><strong>23,685</strong></td>
<td><strong>18,062</strong></td>
</tr>
</tbody>
</table>

Safeguarding Animal Health
### Equine Live Animal Imports
**Top 5 Countries**
**FY 2007, 2008, 2009**

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 07</th>
<th>FY 08</th>
<th>FY 09</th>
</tr>
</thead>
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<tr>
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</tr>
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</tr>
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<td>1,501</td>
<td>1,173</td>
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<td>693</td>
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</tr>
<tr>
<td><strong>Top 5 totals</strong></td>
<td><strong>26,980</strong></td>
<td><strong>23,685</strong></td>
<td><strong>18,062</strong></td>
</tr>
</tbody>
</table>

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### Ovine Imports
**FY 2009**

<table>
<thead>
<tr>
<th>Country</th>
<th>FY 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1,767</td>
</tr>
<tr>
<td>Iceland</td>
<td>400</td>
</tr>
<tr>
<td>Canada</td>
<td>52</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,219</strong></td>
</tr>
</tbody>
</table>
### Semen and Embryo Exports
#### Major Species
#### FY 2009

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>EMBRYO</th>
<th>SEMEN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>5,846</td>
<td>6,064,609</td>
<td>6,070,455</td>
</tr>
<tr>
<td>Caprine</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cervid</td>
<td>0</td>
<td>195</td>
<td>195</td>
</tr>
<tr>
<td>Equine</td>
<td>65</td>
<td>40,2233</td>
<td>40,298</td>
</tr>
<tr>
<td>Ovine</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Porcine</td>
<td>0</td>
<td>14,938</td>
<td>14,938</td>
</tr>
<tr>
<td>Totals</td>
<td>5,911</td>
<td>6,119,975</td>
<td>6,125,886</td>
</tr>
</tbody>
</table>

Safeguarding Animal Health

USDA

Veterinary Services
Protecting the nation from infectious disease pathogens carried by imported animals is a critical need. Current protocols require regulatory agencies to balance the health of an imported animal that may be pathogen-free versus the costs of failing to identify infected animals during lengthy and expensive quarantine periods. A superior protocol may be achieved through genomics-based diagnostic assays that greatly reduce or eliminate quarantine periods through rapid detection and definitive identification of infectious disease pathogens. Resequencing microarray technology developed by TessArae has the capability to support a comprehensive differential diagnosis of multiple viral and bacterial pathogens simultaneously, including co-infecting pathogens either previously known, unknown, emerging or deliberately altered. The resulting pathogen-specific nucleotide sequences of this test also support epidemiological surveillance of detected pathogens, including tracking back to putative sources.

Development and deployment of such genomics-based diagnostic assays to detect and definitively identify infectious disease pathogens will significantly improve protection of the nation’s animal population, as well as the human population at risk from exposure to many zoonotic diseases directly through livestock, wildlife, companion animals or animal products. A resolution urging the USDA to fund the development of new genomics-based diagnostic technologies was unanimously passed at the 2008 USAHA conference, and we request that the Committee on Import-Export specifically recommend the application of these technologies to the testing of animals imported into the United States.
REPORT OF THE COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS

Chair: James F. Evermann, WA
Vice Chair: Chuck E. Massengill, MO

Chris D. Ashworth, AR; Beth W. Carlson, ND; Karen Conyngham, TX; Stephen K. Crawford, NH; Daniel T. Crowell, NV; Edward J. Dubovi, NY; Anita J. Edmondson, CA; Bob Frost, CA; Robert W. Fulton, OK; Jennifer L. Greiner, DC; Dale M. Grotelueschen, NE; Del E. Hensel, CO; David L. Hunter, MT; John C. Lawrence, ME; James W. Leafstedt, SD; Howard D. Lehmkuhl, IA; Janet E. Maass, CO; Annette M. O’Connor, IA; Jeanne M. Rankin, MT; R. Flint Taylor, NM; George A. Teagarden, KS; Susan W. Tellez, TX; Robert M. S. Temple, OH; Brad L. Williams, TX; William C. Wilson, WY.

The Committee met on October 11, 2009 at the Town and Country Hotel, San Diego, Calif., from 2:00 to 5:00 p.m. There were 10 members and 32 guests present. Chair Evermann welcomed members and guests and outlined the agenda, procedures and expectations. The new Vice Chair, Chuck Massengill, was introduced by Dr. Evermann.

The Committee membership was asked if they desired to continue the Bovine Viral Diarrhea Virus (BVDV) Subcommittee co-chaired by Evermann and Ridpath. The Committee voted unanimously to continue that Subcommittee. The report of that Subcommittee is included at the end of this report.

Update of New NVSL Laboratory Facilities

Dr. Sabrina Swenson, National Veterinary Services Laboratory (NVSL) gave the committee an update on the move to the new laboratory facilities at NVSL. She reported that Phase I of the transfer began in 2004. The move to the High Containment facility occurred in 2007 and the move to the Low Containment facility occurred in 2009. A total of 654 employees were relocated and there was no disruption in the delivery of diagnostic services.

Swenson reported that NVSL customers can now request email reports and preliminary reports are also available.

Report on Current Problems in Camelids

Dr. Pat Long, Camelid Healthcare Services, Corvallis, Oregon, gave a report on problems of camelids that included infectious, contagious, and management related issues. Dr. Long estimated that the numbers of alpacas and llamas in the U.S. are probably equal at about 200,000. He commented that most alpaca farms are single species facilities and therefore very little likelihood of exposure to diseases from other species.
REPORT OF THE COMMITTEE

However, the alpaca show circuit may bring over 1500 animals together at a single event. Dr. Long reported that vaccine trials have been completed in alpacas in England (Bovilis BTV8-Intervet) and has been shown to produce antibodies after two doses of the vaccines. Regarding Eastern equine encephalitis (EEE), a vaccine study has been done—no adverse events and antibody response demonstrated, but no challenge studies have been done. Dr. Long discussed a neonatal diarrhea complex and respiratory disease associated with a novel corona virus that appears to be related to exposure of animals at shows. Corona virus studies are being conducted at University of California, Davis and Oregon State University. He also reported on an emerging problem with E. Mac. This large coccidia has increased pathogenicity and a long pre-patent period as well as not being detected by common fecal flotation procedures. Both giardia and cryptosporidia affect camelids and have a zoonotic potential for animal care givers. BVD is a disease for which owners are becoming less vigilant and has the potential to become a much bigger problem. The current equine herpes virus-1 (EHV-1) situation in horses could pose a problem for camelids. *Mycoplasma haemolamae*, formally called erythrozoanosis with incidence reports of approximately 20% in Switzerland, U.S. and South America is probably a secondary concurrent problem. The anemia can be striking. Polymerase chain reaction (PCR) is best means to diagnosis, and current research funded by the Morris Animal Foundation and Alpaca Research Foundation.

**Use and Need for Farm and Ranch Biosecurity Programs**

Dr. Clint Peck, Montana State University, gave an overview on the use and need for farm and ranch bio-security programs. He described the goals of such a program to be reducing animal disease and illness there by reducing the need for treatment, increase production security for animal industries, increase consumer confidence in animal production systems and products. Mr. Peck described the three key components of a bio-security program to be maintaining immunity, maintain surveillance for potential risks, and maintain control over movement. He reviewed the Montana State University outreach that concentrates on providing educational programs that demonstrate innovative community-based bio-security and bio-containment practices for ranches and feedlots and provides a general awareness of threats from foreign animal disease and introduction of catastrophic diseases. Herd biosecurity plans are based on risk for *diseases of concern*. Plans are constructed by producers in consultation with an attending veterinarian and/or a bio-security resource team. Animal management records are designed for each unique livestock premise. Biosecurity plans are confidential and become the personal property of the livestock owner/manager.
Hemoparasitic Diseases in the Livestock/Wildlife Interface

Dr. Bob Hillman, Executive Director, Texas Animal Health Commission, gave a report on hemoparasitic diseases related to the livestock/wildlife interface. He discussed the diseases of heartwater, cattle tick fever, and ehrlichiosis. The common vector for the disease heartwater in Africa and the Caribbean is the Bont tick, *Amblyomma variegatum*. In addition, the Gulf Coast Tick, *Amblyomma maculatum*, which is widely distributed throughout the U.S. gulf coast as well as Oklahoma and Kansas is also a proven vector for heartwater disease. The causative organism *Ehrlichia ruminantium* infects cattle, sheep, goats, and water buffalo. However, every ruminant species is believed to be susceptible. The movement of cattle egrets infested with Bont ticks from Caribbean islands to the U.S. gulf coast has been documented. Feral swine tick infestations have disclosed numerous species of ticks. White tail deer and exotic ungulates are also good hosts for a number of these ticks. Therefore there is a very real risk for introduction of this disease into the U.S. livestock and/or wildlife population. Cattle Tick Fever caused by *B. bovis* or *B. bigemina* and vectored by *Boophilus microplus* and *B. annulatus* was eliminated from the U.S. by an eradication program that began in 1906 and ended with eradication of the vector ticks in 1943. Following the eradication, a permanent tick quarantine zone was established along the Rio Grande river in Southern Texas. This was intended to be a buffer zone to mitigate the risk posed by the continuing presence of the boophilus ticks in Mexico. The large number of wild ungulates which are capable of hosting the tick and the lack of the preferred host (cattle) have resulted in the spread of boophilus ticks resulted in temporary additional quarantine zones on several occasions since 2006. One hundred forty five new tick infestations were reported in Texas in the federal fiscal year 2009. Reports indicate that up to 50% of cattle imported from Mexico may carry the etiological agent, there is a serious risk for re-establishment of Cattle Tick Fever if the organism and vector tick meet. Dr. Hillman described the numerous efforts that Texas is making to prevent the movement of ticks out of the expanded quarantine area and the efforts to control the ticks on wildlife. He also gave an overview of current USDA research efforts on tick elimination. Dr. Hillman reminded the audience that development of control measures are of little value unless those measures are approved and sanctioned for use in the battle against the fever ticks.

Potential IBR Vaccine Induced Bovine Abortions

Dr. Jim England, University of Idaho-Caldwell, provided a report of potential infectious bovine rhinotracheitis (IBR) vaccine induced bovine abortions. He described a case that involved the introduction of 55 purchased cows (4-7 months pregnant) were added to a herd of 170 pregnant spring calving cows. The 170 cows had a history of being vaccinated as calves, pre-breeding heifers with modified-live virus (MLV) IBR vaccine. Those cows also received an annual re-vaccination with the
REPORT OF THE COMMITTEE

MLV IBR vaccine in December. The purchased cows were included in the December 2008 MLV IBR vaccination along with the original cow herd. In January and February, five of the purchased aborted. Conversation with the previous owner disclosed that the purchased cattle had not been vaccinated for IBR while he owned them, however some of the cows had been purchased by him and he did not have any vaccination history when they were purchased.

• Conclusions:
  • Current MLV vaccines safer?
  • Previous reports (pre-1990) indicate upwards of 40% abortion rate due to IBR.
  • Previous vaccination with MLV protects against vaccine induced abortion, 0/170 abortions in home herd during 2009 season.
  • Has averaged 0.03% fetal wastage in past 10 years. No infectious causes identified.
  • <10% abortion in previously unvaccinated pregnant cows (5/55).

Infectious Disease Concerns in Bison

Dr. Dave Hunter, Turner Enterprises, presented a variety of events involving infectious disease concerns in bison, including:

• Bacterial diseases such as Johnne’s, brucellosis, tuberculosis, mycoplasma, pasteurella and anthrax, leptospirosis, fusobacteurium, staph, strep and clostridium
• Prion diseases, like Spongiform encephalopathy
• Nutritional diseases including, micro, and macro-mineral, total digestible nutrition (TDN)
• Viral diseases like BVD, IBR, bovine respiratory syncytial virus (BRSV), parainfluenza-3 virus (PI3), Bluetongue, epizootic hemorrhagic disease (EHD)

He described the application of the “Conservation Medicine Concept”. The interactions between the host, the agent, and the environment and how they affect the balance between health and disease were the basis for the examples he used. Dr. Hunter emphasized the need to separate correlation and causation in evaluating health problems in bison. He used the example that treatment is often directed at the symptom or clinical signs and not the “problem”. He described how his approach looks at disease as another “predator”. He described how management changes used in their ranch operations had very positive outcomes on various infectious disease related problems. The intrinsic difficulties of dealing with a large number of wild animals in large expanses of land make it necessary to use innovative means for problem mitigation.
Committee Business:

The Committee approved three resolutions:

- Investigation of Risk Posed by Emerging Pestiviruses;
- Biosecurity Education; and
- Compliance with OIE Guidelines.

The Committee charged the Chair with the formation of a subcommittee to develop an outline of a National livestock biosecurity education/demonstration system.
NAHMS 2007-08 Cow-Calf Study: Control Practices and BVD Test results

Dr. Dave Dargatz of USDA presented a summary of the BVD Control Practices and BVD Test results portion of the NAHMS 2007-08 Cow-Calf Study.

The study consisted of Phase 1 when information was collected by a questionnaire administered by NASS. Phase 1 included 2159 operations. The survey included producers in 24 states. The operations consisted of herds that had at least 70% of their calves born between November 1 and June 30. Producers were asked about their knowledge of BVD. Thirty two percent considered themselves to be “fairly knowledgeable” and 32.4% felt that they knew the basics about BVD, however, 12.3% indicated that they had never heard of BVD. Forty one percent of the producers administered BVD vaccine at some point in their production system. Testing for PI calves had occurred in 4.2% of the operations in the three years preceding the survey. Fifty seven percent of those that removed PI calves felt that it resulted in improved health in the remaining cattle. However, only 15% of those that removed PI calves felt they received a financial benefit from that action. Knowledge about BVD, use of BVD vaccine, and PI testing were all herd size dependent with larger herds being more active in each of the categories. Phase 2 was a facility visit by a VMO. Phase 2 herds were offered the opportunity to submit ear notch samples. Of the 472 eligible herds, 205 herds submitted samples. Samples were collected by the producers, dry frozen until shipped overnight. The samples were tested using IDEXX Antigen Capture ELISA® following IDEXX protocols. Two hundred five operations submitted a total of 44,150 samples. There were 53 positive samples for a prevalence of 0.12%. There was no strong relationship between calf age and PI positive status. The positive samples came from 18 of the 205 herd, for a herd prevalence of 8.8%. Dr. Dargatz presented the conclusions that:

1) Herds represented in BVD PI testing were the more progressive producers
2) Individual prevalence was low (0.12%), herd prevalence was moderate (8.8%)
3) Few operations test for BVD PI, possibly uncertain of the value of testing
**Pestivirus Strain Diversity**

Dr. John Neill of USDA, ARS made a presentation on Pestivirus Strain Diversity.

Pestiviruses have been recognized to cause significant losses to livestock producers for many years. Members of the Pestivirus genus of the *Flaviviridae* include bovine viral diarrhea virus, border disease virus as well as the foreign animal disease agent classical swine fever disease virus. The pestiviruses are differentiated from other flaviviruses by the presence of an additional protein encoded at the start of the single, large viral protein. This additional protein, Npro, plays a role in the inhibition of the interferon response in infected cells.

Recently, several new pestiviruses have been isolated that do not neatly fit with the pre-existing Pestivirus species. These viruses possess significant differences at the genetic as well as the antigenic levels that make them difficult to categorize. To date, there are 5 new virus groups that have temporarily been termed ‘atypical’ pestiviruses. These include the giraffe, Tunisian, pronghorn, Bungawannah and Hobi pestiviruses. To date, little is known concerning these viruses. All have had their genomic RNAs sequenced which has allowed their genetic relationships to be determined. However, most of the basic knowledge concerning these viruses has not been determined. There is little data available about their host ranges, mode of transmission, severity of disease, or antigenic cross-reactivity. There are currently no diagnostics tests available for most of these viruses. Based on this, there is little information available to gauge how great a risk these new viruses pose to the U.S. livestock industry. New research is required that first of all examines the basic biology of these ‘atypical’ pestiviruses. Studies examining the host species, mode of transmission and severity of disease in domestic livestock species is required. Next, the ability of commercially available diagnostic assays to detect and differentiate these viruses from other pestiviruses must be evaluated. Once diagnostic tests have been validated a survey should be conducted to determine if any of these viruses are present in the US. If so, vaccines that confer protection to the identified viruses must be developed. It is not certain at this time how great a threat these agents are to U.S. livestock herds but they certainly should not be ignored.

**Serological Survey of Alpacas in Southern California**

Ms. Lisa A. Shimeld, Crafton Hills College, Alpacas del Valle Cereza, reported on a serological survey of alpacas living or breeding in Southern California. She gave a short history of the introduction, uses, population and history of bovine viral disease virus (BVDV) in alpacas in the U.S. Serum neutralization testing was used to detect seropositive animals in her study. The purpose of the study was to identify seropositive alpacas from 21 ranches in Southern California, identify seropositive alpacas from facilities outside Southern California that were breeding in Southern California (11 additional facilities), and determine the BVDV
seroprevalence of alpacas in Southern California. Ms. Shimeld discussed
the transmission of BVDV in alpacas and the means by which alpacas
could become exposed/infected. She commented on the absence of
information indicating that transmission of BVDV in alpacas was different
that transmission in cattle.

Four hundred twenty nine alpacas living in Southern California, or
present in Southern California to breed, were included in this study,
the majority being located in either Riverside (288) or Los Angeles (88)
county. Herd size ranged from four to 280 alpacas. All alpacas appeared
clinically normal at the time of sampling. The samples were shipped to
the California Animal Health & Food Safety Laboratory System in Davis,
California for serum neutralization testing for BVDV. The use of BVDV
vaccines was not reported in any of the alpacas in this study. Serum
virus neutralization (SN) was performed to measure the titer of circulating
antibody to BVDV type 1 and to BVDV type 2, using NADL and c125
BVDV as reference strains, respectively. Results were reported as the
endpoint serum dilution that demonstrated no observed cytopathic effect
in the assay. Fifteen of the alpacas seropositive to BVDV type 1 were
seronegative to BVDV type 2. BVDV type 1 titers ranged from 1:8 to
\( \geq 1:8192 \) and BVDV type 2 titers were between 1:8 and 1:2048. Three
persistently infected (PI) alpaca crias were identified and were born on
different ranches participating in this study.

Discussion and Conclusions from this study were:

1) This study was designed to determine the prevalence of
   alpacas seropositive to BVDV in Southern California.
2) The results of the current study suggest that alpacas
   seroconvert when exposed to BVDV but clinical disease is
   unusual
3) 20.0% of the alpacas SN tested in this study were seropositive
   for one or both BVDV genotypes
   a. 18.6% of males tested were seropositive to one or
      both BVDV genotypes
   b. 20.6% of females tested were seropositive to one or
      both BVDV genotypes
The Committee convened at 1:00 p.m. on Monday, October 12, 2009 at the Town and Country Hotel, San Diego, Calif. The meeting adjourned at 6:00 p.m. There were 25 members and 43 guests present. The meeting was Chaired by Kent Fowler with the assistance of the Vice Chair, James Watson.

In drawing up the agenda for this year’s meeting, emphasis was placed on a limited number of diseases and health-related issues of interest and concern to the equine industry. As in recent years, the number of topics was restricted in order to provide ample time for discussion of each agenda item. One of the agenda items was a summary of the First Conference of Experts on Contagious Equine Metritis that took place on October 9, 2009.

Recent Advances in Our Knowledge of Equine Influenza

Thomas Chambers, Maxwell H. Gluck Equine Research Center, Department of Veterinary Science, University of Kentucky presented the following report.

Equine influenza of the H3N8 subtype remains one of the most common infectious diseases of horses worldwide. Like all influenza A viruses, equine influenza viruses in circulation undergo antigenic drift over time, which eventually renders vaccines obsolete. To combat antigenic...
drift, surveillance and characterization of virus isolates is necessary so that appropriate virus strains for vaccines can be selected. Equine influenza is not a notifiable disease in the U.S., which hinders surveillance efforts. However, equine influenza is also a disease that is spread by international transport of horses, and some countries have stringent horse importation requirements to provide barriers to entry of equine influenza.

An international Expert Surveillance Panel under the auspices of the OIE was established in 1995 which annually collects and reviews epizootiological data on equine influenza virus, including comparisons of circulating strains with vaccine strains and evidences for vaccine failures in the field. In addition to the now-standard analysis of phylogenetic relationships among strains based on sequences of the viral hemagglutinin (HA) major surface antigen, a new analytic method called antigenic cartography now permits visualization of antigenic relationships among multiple strains that were previously hidden in masses of serologic data. Based in part upon antigenic cartography results, the most recent (January 2009) report of the Expert Surveillance Panel makes the following conclusions: (1) the vaccine strain recommendation of an American-lineage strain antigenically resembling South Africa/2003 virus is still supported. Vaccines meeting this recommendation (using the Ohio/2003 strain) are now available in the U.S. (2) The previous recommendation that vaccines include a Eurasian-lineage strain resembling Newmarket/2/1993 is no longer supported. Viruses of the Eurasian lineage are still isolated sporadically, but have not been responsible for significant outbreaks in many years. (3) The American lineage continues to undergo antigenic drift. Antigenic cartography suggests that the American lineage is splitting into two antigenically distinct sub-clades. It is reasonable to expect that eventually these will become sufficiently dissimilar that South Africa/2003-like vaccine strains will no longer be effective.

Recent evidences have arisen that equine H3N8 influenza viruses can transmit to other species: canine influenza is now well established in the U.S., a report has appeared of the isolation of equine influenza viruses from diseased swine, and a serological survey suggests that humans can potentially become infected.

The next agenda item was a summary presentation of the First Conference of Experts on Contagious Equine Metritis. Summary comments were presented by Kent Fowler, Barbara Porter-Spalding, Tom Bunn, Michaela Kristula, Stan Bruntz and Peter Timoney. This conference, in its’ entirety, appears in these proceedings.

Review of USDA Funding for Equine

John Clifford, Deputy Administrator for Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), presented a review of USDA funding for equine line items. Dr. Clifford acknowledged the importance of equine issues to the national economy and reinforced that
there must be recognition of the funding limitations for equine programs. The only equine line item funding is for equine slaughter transport; none exist for equine disease programs. The 2009 Contagious Equine Metritis Incident brought these limitations to the forefront. The Equine Program Senior Staff Veterinarian position funding comes from user fees for slaughter horse transportation. Dr. Clifford reinforced that this recently vacated position will be filled to provide leadership and oversight for equine programs and equine import issues. Dr. Clifford reinforced that USDA does provide support for equine disease issues through diagnostic laboratory support, and that if an incursion of a disease such as African Horse Sickness were to occur, USDA Credit Commodity Corporation (CCC) funds would be made available.

The Committee Chair expressed to Dr. Clifford the Committee’s desire and strong support for prompt hiring into the recently vacated Equine Program Senior Staff Veterinarian position.

**Subcommittee on Equine Piroplasmosis (EP)**

Mike Short, Florida Department of Agriculture and Consumer Affairs, Division of Animal Affairs and Chair of the Subcommittee on Equine Piroplasmosis (EP), gave the Subcommittee Report. The Subcommittee’s activities the past year have revolved around the EP serosurvey and discussions concerning the research and treatment of EP positive horses at ARS in Pullman, Washington.

The samples used for the National EP Sero-survey were obtained from all National Animal Health Laboratory Network (NAHLN) laboratories conducting EIA testing and two additional non-NAHLN laboratories that performed a large number of EIA tests. The National Veterinary Services Laboratory (NVSL) received over 43,000 samples of EIA banked sera from 38 EIA laboratories representing 35 states. The numbers of samples used from each laboratory were weighted proportionally by the number of EIA tests performed by each laboratory annually and the samples used from each laboratory were then randomly selected. Fifteen thousand serum samples were tested at NVSL using the commercial VMRD enzyme-linked immunosorbent assay (ELISA) test kits. All positive samples and 80 negative samples close to the positive cutoff were submitted to USDA-ARS in Pullman, Washington for confirmation testing by Western Blot. The sample data including the number of confirmed positives was submitted to Center for Epidemiology and Animal Health (CEAH) in Fort Collins, Colorado for analysis and calculation of a prevalence number. When a prevalence number is determined, the EP Working Group will meet to discuss the results and produce the summary report. It is anticipated that the sero-survey results will be released by the end of November 2009. The Subcommittee Report was approved by the membership and is included following the report in these proceedings.
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Persistent *Babesia caballi* Infection

Don Knowles, USDA, Agriculture Research Service (ARS), authored a treatment result research publication concerning imidocarb dipropionate clearing persistent *Babesia caballi* infection with elimination of transmission potential. In addition, research is ongoing at NVSL concerning treatment options for *B. equi* infected equids using ponazuril as a proposed effective treatment.

Research Update: Imidocarb Treatment for Horses Infected with *Theileria (Babesia) equi*

Tom Bunn, National Veterinary Services Laboratory (NVSL), Director of Diagnostic Bacteriology Laboratory, reported about ongoing research to demonstrate the ability of imidocarb to clear horses infected with *Theileria (Babesia) equi*. Twelve ponies were inoculated with *B. equi* and 8 of these ponies were treated with imidocarb. Clearance was defined by a negative PCR, failure to establish infection after sub-inoculation and failure of ticks to acquire parasites after feeding. Cleared animals may or may not be serologically negative. Three naïve intact horses were inoculated with red blood cells (RBCs) from treated, PCR negative horses and showed no sero-conversions after 90 days. Two naïve intact horses inoculated with RBCs from untreated horses sero-converted by both complement fixation test (CFT) and cELISA after 90 days. The next steps in the project are to continue sub-inoculation of sero-negative horses. If sub-inoculation horses fail to seroconvert, tick acquisition will be performed on donor ponies. As a final test of clearance, splenectomies will be performed.

Review of Piroplasmosis Cases in Missouri and Kansas

Angela Pelzel, USDA-APHIS-VS, Western Regional Epidemiologist, presented a review of piroplasmosis cases in Missouri and Kansas. The initial case was a quarter horse bush track racehorse presented to Kansas State University and found to be positive for *B. equi*. An additional six horses were found to be positive for EP on the Missouri index premises. In addition, traceouts led to six other premises in Missouri and Kansas. Two of the seven positive horses were illegally removed from the quarantined Missouri premises and have yet to be located. The Kansas positive EP horse left the state prior to a quarantine being placed on the premises and has also not been located. This incident highlighted challenges the bush track racing industry poses to veterinary regulatory officials. Challenges include underground and illegal activities, unsanitary practices, limited use of licensed veterinary care, unknown scope of participants, highly mobile participants and often a language barrier. Outreach and education to address this issue should be offered to veterinarians, racing commissions, breed registries, horse owners and bush racing track participants.
USDA Role in World Equestrian Games (WEG) 2010

Ellen Buck, USDA-APHIS-VS, National Center for Import Export, presented a summary of the USDA role in planning for the World Equestrian Games (WEG) 2010. The hosting of the WEG in North America and Kentucky was based on the USDA acceptance that Equine Piroplasmosis (EP) positive horses be allowed to compete in all phases of WEG competitions, including field and stadium events. Equine industry support for this provision existed. Planning and risk assessments, including tick and wildlife surveys, began in 2002. The conclusion was that the risk posed for transmission from positive horse participation in the WEG was low. Quarantine facilities for positive horses were toured. An EP Control Plan developed and approved by USDA includes identification of positive horses before arrival in the U.S., testing of horses upon arrival, fines for horses test positive without previous history, color identification of all positive horses, separate temporary quarantine facilities, separate positive horse stables, designated stewarded schooling and grazing areas for positive horses, specific standard operating procedures for restrictions on dog accessibility to the grounds, and tick inspections and acaricide treatments of horses and facility application. Additionally, EP positive horses must depart the country within 0 days of the end of the event.

Alltech FEI World Equestrian Games 2010 – Veterinary Preparedness Plan


During the period September 25 through October 0, 2010, the Kentucky Horse Park (KHP) in Lexington, Kentucky will serve as host to the Alltech FEI World Equestrian Games (WEG). In excess of 700 equine athletes from all parts of the world will be imported into Kentucky to compete in one of the eight World Championships offered during the 6-day period of the Games.

Outbreaks of communicable disease occur sporadically among equine populations congregated at training facilities, public boarding stables and other similar facilities. The Kentucky State Veterinarian’s Office has regulatory responsibility to contain, manage and resolve outbreaks of communicable equine diseases occurring in these public environments. Effective procedures and strategies developed over the years have been customized to best meet the unique challenges presented by the 2010 Alltech FEI World Equestrian Games. To further reduce risk of introducing disease-causing agents, the Kentucky Department of Agriculture’s Office of the State Veterinarian (OSV), worked jointly with the USDA Veterinary Services (USDA), the Federation Equestre Internationale Veterinary Committee (FEI) and the WEG Veterinary Services Coordinator to develop specific procedures of importation, disease mitigation and infectious disease protocols to be utilized in conjunction with the standard Kentucky
REPORT OF THE COMMITTEE

Horse Park equine disease surveillance procedures. These procedures and protocols include heightened biosecurity practices, strategically prescribed immunizations and acaricide treatments, daily physical examinations, and a centralized reporting system of any and all abnormal findings. The summary details of the WEG Veterinary Preparedness Plan for the Games were provided to IDOHC members.

EIA Laboratory Approval Working Group

Eileen Ostlund, Head of Equine and Ovine Viruses Section in the Diagnostic Virology Laboratory, NVSL, gave an update on the EIA Laboratory Approval Working Group.

The USDA-APHIS-Veterinary Services (VS) Equine Infectious Anemia (EIA) Laboratory Approval Working Group was formed in mid-2009 to develop appropriate criteria for obtaining and maintaining EIA approved laboratory status. The group is comprised of representatives from NVSL, VS Animal Health Program staff, Eastern and Western Region Area Veterinarians-in-Charge (AVICs), and VS Regional and Area epidemiologists. Activities for the first few months since group inception are reported herein.

The EIA working group is evaluating the frequency of laboratory inspections and application of user fees for inspections with a goal of increased consistency in these activities. Current approved EIA laboratories were queried in late summer of 2009 regarding their operations. Specific questions addressed the number of tests and methods used by the laboratories, the clientele served, primary purposes for testing and anticipated EIA training needs. Data analysis is underway.

The EIA laboratory approval working group aims to refine guidelines for obtaining and maintaining laboratory approval, taking into account EIA control program needs and VS resources. Outcomes, including any recommended changes to VS policies, will be shared with relevant stakeholders including AVICs, State Animal Health Officials, and the USAHA Committee on Infectious Diseases of Horses, as well as its EIA Subcommittee.

Subcommittee on Equine Infectious Anemia

Dee Ellis, Assistant State Veterinarian, Texas Animal Health Commission and Chair of the Subcommittee on Equine Infectious Anemia, gave the Subcommittee report. The Subcommittee focus was to continue outreach activities related to the implementation of the 2008 USAHA Resolution to change the EIA control program to an eradication program. Outreach to the American Association of Equine Practitioners (AAEP) Health Committee and the National Institute for Animal Agriculture (NIAA) Equine Committee resulted in passed resolutions by both groups in support of the enhanced EIA eradication program. A second Subcommittee focus was to explore and enact actions that “at risk” states (Texas, Mississippi, Arkansas, Louisiana and Oklahoma) could
independently initiate regardless of future USDA cooperative funding or rule modification. Meetings with USDA-APHIS-VS equine staff and “at risk” states resulted in cooperative state-initiated plans and efforts to raise awareness of EIA issues by coordinating simultaneous interstate road stop activities along the common borders, post road stop public information releases emphasizing the importance of compliance with EIA and other health regulations, initiating implementation of the recommended 3-tiered laboratory concept within each state if possible, and the preparation and submission of the state’s conceived uses of USDA cooperative funds. Conceived uses of funds were for surveillance, epidemiology, mapping initiatives, indemnity, and accelerated compliance activities. In addition, productive meetings were held with USDA leadership on cooperative funding needs to support EIA programs in the at-risk states. USDA consideration is being given to limited-level cooperative funding support to assist these states with their outlined planned activities.

Contingent upon the Committee Chair approval, Dr. Becky Brewer will be the new EIA Subcommittee Chair. The Subcommittee Report was approved by the membership and included following this report in these proceedings.

Committee Business:

Following conclusion of the scientific program, the Committee went into Business Session. One resolution on Contagious Equine Metritis (CEM) was considered, approved and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. A proposed resolution on microchipping Equine Infectious Anemia tested equids was considered but lacked Committee support. In addition, the Committee considered and approved support for a resolution approved and forwarded by the Committee on Import-Export concerning the failure of importing countries to follow OIE guidelines for importations of animals. The Committee also considered and approved a recommendation to USDA-APHIS-VS that the recently vacated Equine Programs Senior Staff Veterinarian position in Riverdale be filled as soon as possible.
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REPORT OF THE SUBCOMMITTEE ON EQUINE PIROPLASMOSIS (EP)

Dr. Mike Short, Chair
Florida Department of Agriculture and Consumer Services

The EP Subcommittee for 2008-2009 met via four conference calls to continue work on the completion and support of the National EP Sero-survey, obtain and discuss the latest updates and research into methods of treatment of EP infected horses and to discuss the implications of the Missouri and Florida EP positive horses.

During the Subcommittee meetings, the following was concluded:

1. In light of the recent clinical and positive EP horses detected in Missouri and Florida and the knowledge that prior to February 1, 2004 the complement fixation (CF) test, which lacks sensitivity, was used for import testing, the National EP Sero-survey is very important in allowing assessment of the actual prevalence of EP in the United States' horse population. The results of the Sero-survey will play a significant role in the future actions and recommendations of this committee as well as potential testing requirements from foreign countries.

2. The samples used for the National EP Sero-survey were obtained from 36 of the NAHLN laboratories conducting EIA testing and two additional non-NAHLN laboratories that performed a large number of EIA tests. NVSL received over 43,000 samples of EIA banked sera from 38 EIA laboratories representing 35 states. The numbers of samples used from each laboratory were weighted proportionally by the number of EIA tests performed by each laboratory annually and the samples used from each laboratory were then randomly selected. Fifteen thousand samples were tested at NVSL using the commercial VMRD ELISA test kits. All positive samples and 80 negative samples close to the positive cutoff were submitted to ARS in Pullman, Washington and confirmation testing was done using the Western Blot.

3. Currently, the sample data, including the number of confirmed positives, has been submitted to CEAH in Fort Collins, Colorado for analysis and calculation of a prevalence number. Once a prevalence number is determined, an EP Working Group will meet to discuss the results and produce an out report.
4. The USDA Draft Policy for Domestic EP Reactor Horses needs to be reviewed and possibly modified to include more descriptive definitions of contact and exposed horses, longer traceback and forward periods and potential allowance of treatment of B. caballi horses, with the recent release of treatment research from ARS in Pullman, indicating the clearance of the organism from treated horses.

5. While both ARS in Pullman, Washington and the NVSL have ongoing research into effective treatments for EP infected horses, the EP Subcommittee recognizes the need for, and strongly supports, funding for continued research. Much of the recent research has been done using the drug imidocarb with some new trials beginning using other antiprotozoal drugs. Continued research is needed to find an effective, validated method of treatment of infected horses as well as methods of stopping the spread of the EP organism, such as vaccines which result in sterilization of the tick after feeding on vaccinated animals.

6. The introduction or spread of tick vectors that can transmit EP is of continued concern. There is unknown but inherent risk from the introduction of foreign origin ticks, which are competent EP vectors, the spread of the Boophilus ticks north from Texas and the unknown potential for some domestic ticks to play a role in transmission. These risks require continued efforts to prevent the introduction of foreign ticks, halt the spread of the Boophilus ticks from South Texas and continue research into tick control methods.

7. Funding and risk assessments are important to prevent sero-positive horses from entering the United States. Anecdotal reports of horses being pretreated with drugs, including steroids, to produce false positives on import testing and horses being illegally imported from piroplasmosis endemic countries have been reported.

The Equine Piroplasmosis Subcommittee introduced two resolutions at the 2008 USAHA Annual Meeting. The two resolutions were approved:

RESOLUTION 27:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to revise the Code of Federal Regulations (CFR) to require all equids imported into, or returning to, the United States be identified with an implanted radio frequency identification (RFID) microchip as recommended by the National Animal Identification System (NAIS) Equine Species Working Group that complies with the International Organization for Standardization (ISO)
REPORT OF THE COMMITTEE

11784 and 11785 standards (134.2 kHz), unless already implanted with a readable 125 kHz microchip. Universal RFID readers should be present at all import centers and border stations to read both 125 and 134.2 kHz microchips.

Resolution 27

FINAL RESPONSE:

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services (VS) recognizes the concerns of the United States Animal Health Association (USAHA). The Code of Federal Regulations currently does not require permanent identification for horses being imported into or returning to the United States. However, VS’ traceability goal is to provide timely traceback of animals in the event of a disease outbreak. VS is developing a proposed rule that will address the identification of several species of imported animals, including horses.

RESOLUTION 28:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and USDA, Agricultural Research Service (ARS) to request expanded funding for research into finding an effective and safe treatment for elimination of the carrier state for Babesia caballi and Babesia equi.

FINAL RESPONSE:

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), Veterinary Services recognizes the concerns of the United States Animal Health Association (USAHA). The partnership between APHIS and the Agricultural Research Service (ARS) has provided for an active research program at the ARS Pullman location to solve problems relevant to equine piroplasmosis, including the development of new treatments for this disease, and we agree that this work is critical to ensuring the protection of the U.S. horse population.

Further, through an ARS/APHIS/University collaboration we have completed research concerning treatment to remove transmission risk from Babesia caballi-infected horses. We have also shown, through research, that Dermacentor nitens ticks are reservoirs for Babesia caballi infection through only one generation. In addition, we have provided data affirming the current regulatory policy of equating positive serology, infection, and transmission risk with Babesia caballi.

Although immediate and long-term budget uncertainties prevent us from making any commitments regarding future funding requests, we will consider USAHA’s input as we formulate future budgets.
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No resolutions have been submitted by the EP Subcommittee this year as most of the pertinent information needed to put forth viable resolutions has just been released or is forthcoming, most notably the pending sero-survey results, the need for modifications to the USDA Draft Policy for Domestic EP Reactor Horses in light of the Missouri EP positive horses and the recent research results indicating certain strains of $B.\ caballi$ may be treatable.
The focus of the Subcommittee on Equine Infectious Anemia (EIA) activities in 2008-2009 was two pronged. First, members continued outreach activities encouraging/facilitating change from a national EIA control program to an eradication program, and non-USDA employees of the Subcommittee continued to encourage that agency to implement internal changes related to laboratory protocols, funding, and rule/regulation changes, as outlined in the IDOHC USAHA resolution passed in 2008.

As the Subcommittee chair, I traveled to the American Association of Equine Practitioners (AAEP) meeting in San Diego, to present the USAHA EIA resolution and concept to that organization’s “Health Committee”. It is my understanding that the organization passed the resolution to support the enhanced EIA program.

I also presented the same resolution to the National Institute for Animal Agriculture (NIAA) Equine committee in Kentucky in April, and that organization also passed the resolution.

The second focus of the Subcommittee was to explore and enact any actions that the “At risk” states could begin on their own, regardless of future USDA cooperative funding or rule modification. As a result, the state veterinarians from four of the five at-risk states met in Ruston, Louisiana, in June along with USDA equine veterinary staff.

The attendees at the meeting agreed to:

- Raise the awareness of EIA issues by initiating and coordinating simultaneous interstate roadstop activities along the common borders. Texas and Louisiana will hold coordinated activities in October, and Texas and Oklahoma will do the same in November. Before and after the events, the need for compliance with EIA rules will be released through public information releases, and the awareness of the importance for compliance with EIA and other health regulations will be raised.
- Begin to implement the recommended 3-tiered laboratory concept within each state if possible. Oklahoma has already accomplished this, and Louisiana animal health officials recently met with their laboratory directors. The other states are currently considering how best to move forward, but agree in principle with the concept.
- The group also prepared at the request of USDA staff how any future cooperative funds might be best utilized in an enhanced program in their state. The suggestions included using funds for
INFECTIONOUS DISEASES OF HORSES

surveillance, epidemiology, mapping initiatives, indemnity, and accelerated compliance activities.

On behalf of the Committee, Dr. Becky Brewer of Oklahoma, met with USDA leadership on two occasions late in the summer to further discuss the need for cooperative funds to support EIA programs in the “at-risk” states. The interaction was productive and evidently USDA is at least considering future financial (cooperative funding) support at a limited level to assist those states with some of the activities mentioned above.

Finally, Dr. Brewer has also agreed to accept the EIA Subcommittee chair position, effective the date of this report, contingent upon Committee Chair approval.

The Equine Infectious Anemia Subcommittee introduced one resolution at the 2008 USAHA Annual Meeting. The resolution was approved:

RESOLUTION 26:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), in cooperation with states and the equine industry, such as the American Horse Council, state horse councils, American Association of Equine Practitioners and breed registries, request funding to support an enhanced equine infectious anemia (EIA) control/eradication program. Three (3) basic components encompass:

Section A: Fund Program

1. USDA-APHIS-VS to incorporate specific elements of the equine infectious anemia (EIA) Uniform Methods and Rules (UMR) into the Code of Federal Regulations (CFR), Title 9, part 75, Communicable diseases in horses, asses, ponies, mules, and zebras, in order to assure that only equines having negative EIA testing status are moved interstate except as described under section 6;

   a. Requests funding for an enhanced EIA control program leading to eradication with new money:

2. At-risk states are to receive focused federal funds in an eradication program; the initial funding emphasis should be in the states with historically higher rates of infection (Louisiana, Arkansas, Oklahoma, Texas, Mississippi); and

3. At-risk states must meet certain minimum standards including: change of ownership testing, minimum 12 month negative test for interstate movement, required euthanasia of reactors (grandfather existing reactors that are isolated), individual permanent identification of tested horses, utilization of a 3-tiered testing system.

Section B: Prevalence Working Group
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1. USDA-APHIS-VS should create a national EIA prevalence working group that includes representatives from all “At Risk” states.
2. The EIA prevalence working group would continue collaboration with the National Surveillance Unit (NSU), Centers for Epidemiology and Animal Health (CEAH) existing equine prevalence model for:
   a. Identification of industry stakeholders;
   b. Accurate equine census;
   c. Accurate prevalence data;
   d. Consistent case definition – herd vs. head; and
   e. Address other issues as appropriate.

Section C: Diagnostic Laboratory Component
1. USDA-APHIS-VS should adopt national laboratory reporting system for accurate electronic test data.
2. Re-evaluate laboratory certification (moratorium) policy with input from state/federal regulatory authorities and National Veterinary Services Laboratory (NVSL).
3. Utilize and request funding for a 3-tiered laboratory testing system (enzyme linked immunosorbent assay (ELISA), agar gel immunodiffusion (AGID), immunoblot).
4. USDA-APHIS-VS should request funding for the NVSL laboratory system to fully support an expanded program.

FINAL RESPONSE:

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (VS) appreciates the United States Animal Health Association’s (USAHA) interest in an enhanced equine infectious anemia (EIA) control/eradication program, and we concur with the science and intent of the proposals. We also agree that currently funding for such efforts is not available. Although immediate and long-term budget uncertainties prevent us from making any commitments regarding future funding requests, we will consider USAHA’s input in light of the priorities of the new Administration as we formulate future budgets.

VS is drafting a proposed rule that incorporates specific elements of the EIA Uniform Methods and Rules into title 9 of the Code of Federal Regulations, part 75.

VS will continue to work closely with the USAHA Infectious Diseases of Horses (IDOHC) EIA subcommittee. If a specific national EIA prevalence working group is to be developed, it should fall under the purview of the IDOHC EIA subcommittee. VS’ National Surveillance Unit (NSU) will continue its close collaboration with the EIA subcommittee in adapting and updating the existing equine prevalence model to include recent equine census data, current testing information, and a review of risk categorization options (i.e., cluster of EIA cases). NSU also will address other issues as appropriate.

The National Veterinary Services Laboratories (NVSL) supports a national laboratory reporting system for accurate electronic test data. The
moratorium on training personnel for new EIA laboratories has ended. However, due to budgetary issues, NVSL will continue to schedule the same number of EIA training sessions for the foreseeable future and to use the selection criteria that have been reviewed and approved by the USAHA IDOHC EIA subcommittee.

In late May 2009, a memorandum was sent from the NVSL Director to the Regional Directors for distribution to the AVICs and State Veterinarians describing post-moratorium procedures concerning EIA laboratory approval. At the request of the VS Eastern and Western Regional Directors, a VS Equine Infectious Anemia Laboratory Approval Working Group was formed. The working group is composed of veterinarians and epidemiologists from both regions, as well as representatives from the NAHP Equine Program and NVSL. The group has begun to analyze data from the current approved EIA laboratories, review inspection procedures, and consider appropriate laboratory approval criteria, with a view towards establishing a more consistent basis for obtaining and maintaining EIA approved laboratory status throughout the country.

No resolutions were submitted by the Subcommittee at the 2009 USAHA Annual Meeting.
REPORT OF THE COMMITTEE ON INTERNATIONAL STANDARDS

Chair: Dr. Richard D. Willer, HI
Vice Chair: Dr. Norman G. Willis, CAN

Annette Whiteford, CA; Joan M. Arnoldi, WI; Debbie Barr, CAN; Corrie C. Brown, GA; Stan Bruntz, CO; Tony A. Caver, SC; John R. Clifford, DC; Karen Conyngham, TX; Michael J. David, MD; Ron DeHaven, IL; Brian R. Evans, CAN; Peter J. Fernandez, AE; John R. Fischer, GA; Bob Frost, CA; Cyril G. Gay, MD; Paul Gibbs, FL; Donald E. Hoenig, ME; Pamela Ibarra, MEX; Paul Kitching, CAN; Elizabeth A. Lautner, IA; Randall L. Levings, IA; Linda L. Logan, TX; John R. MacMillian, AR; Bret D. Marsh, IN; Andrea Mikolon, CA; Fonda A. Munroe, CAN; Elizabeth J. Parker, DC; James A. Roth, IA; Mo D. Salmon, CO; A. David Scarfe, IL; Peter J. Timoney, KY; Alfonso Torres, NY; Matthew Torres, MD; Jesse L. Vollmer, ND; Stephen E. Weber, CO; Annette Whiteford, CA; John Williams, MD; Rob S. Williams, DC.

The Committee met on Monday, October 2, 2009 at the Town and Country Hotel, San Diego, Calif., from 1:00 to 6:00 p.m. The meeting was attended by 5 Committee members and 27 guests. The Chair welcomed attendees, made a few opening remarks and indicated that there were no pending action items from the 2008 meeting. He thanked Vice Chair Norm Willis and Dr. Michael David, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Center for Import and Export for their efforts during the 2008 Committee meeting.


Dr. John Clifford, Deputy Administrator, USDA-APHIS-VS, provided the USDA report for the 77th Annual General Session of the World Organization for Animal Health (OIE) held May 24-29, 2009 in Paris, France. He indicated that the OIE now has 176 member countries. He overviewed the subject material discussed during the session including the two technical items. He identified the diseases selected as of importance and discussed the reports of the Specialist Commissions, the Ad Hoc Groups, and the disease status questionnaires. He made special note of the new and updated chapters of the Terrestrial Animal Health Code and of the publication of the 6th Edition of the Manual of Diagnostic Procedures in 2008. Dr. Clifford referred to the two Working Groups of the Code Commission, namely the Animal Welfare Working Group and the Food Production and Safety Working Group. The OIE held a global conference on animal welfare in 2008. Also during the session, elections were held for all of the Commissions and for President of the OIE. The new President of the World Assembly of Delegates...
(International Committee) is Dr. Carlos Correa Messuti from Uruguay. Dr. Alex Thiermann, USDA-APHIS, International Services (IS) was re-elected as President of the Code Commission, Dr. Beverly Schmitt, USDA-APHIS-VS, National Veterinary Services Laboratories (NVSL) was re-elected to the Standards Commission and Dr. Donald Lightner, University of Arizona, was re-affirmed as expert observer on the Aquatic Animal Health Commission. Dr. Clifford described the activities of the Regional Commission for the Americas and his role as second Vice-President. A brief discussion followed his presentation. A complete report of the USDA report on the OIE General Session is included at the end of this Committee Report.

Vice Chair Dr. Norman Willis, who also attended OIE’s 77th General Session, offered several items of particular interest from the meeting. He indicated that for the first time, there was identification of Reston ebola virus in swine in the Philippines. Although there was no clinical illness, there was evidence of on-going viral transmission in pigs, and six people had high antibody titers. He indicated that a technical presentation was given on climate change and environmental changes on emerging and re-emerging animal disease and animal production. The complexity of the interconnectedness between a wide range of factors influencing disease emergence means that uncertainty will continue to be a feature of the future. Many OIE members are concerned that professionals are not being prepared to be capable of understanding the impact of climate change and environmental change on disease. Finally, Dr. Willis said that in the discussion of the bovine spongiform encephalopathy (BSE) chapter of the OIE Terrestrial Animal Health Code, it became necessary to conduct a vote of OIE members to resolve divergent opinions on the age restriction of deboned skeletal muscle meat as a safe commodity, on the conditions of tallow as a safe commodity, and on the safe importation of gelatin. This was a deviation from the usual practice of decision-making by consensus.

**Vision for the OIE Biological Standards Commission**

Professor Vincenzo Caporale, newly appointed President of OIE’s Biological Standards Commission (BSC), also known as the Laboratories Commission, former President of OIE’s Scientific Standards Commission, and Director of the Instituto Zooprofilattico Sperimentale dell’ Abruzzo e del Molise “G. Caporale” discussed his vision for the Laboratories Commission. He identified a series of priorities which he was considering for the Commission including:

- Vaccine quality – He emphasized it was not only the quality but also the availability of vaccines especially for emerging diseases and at an acceptable price.
- Diagnostic test performance in mass screening – He mentioned it was essential for disease control, that it is necessary to have guidelines for the use of diagnostic tests to achieve area accreditation, and that the original purpose was to define the
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health status of countries.

- Laboratory reference material – He said there is a problem with the availability of standard reference material on a national scale, that these reference materials should be validated and made available by OIE Reference Laboratories as part of their agreement with OIE, and that there should be a catalogue of these materials.

- Laboratory quality, biosafety and biosecurity – He indicated that there are presently two standards for laboratory quality – ISO 17025, where the emphasis should be, and a lesser OIE standard – and that the goal should be to work toward a single standard. He also mentioned that the OIE has two separate chapters, one on quality management and one on biosafety and biosecurity, and that they should be combined into a single chapter. He also felt inter-laboratory proficiency testing should be implemented for OIE Reference Laboratories.

- Reference Laboratories and Collaborating Centers – He stated that it was the Chief Veterinary Officer of a country that requests that OIE recognize a laboratory and once approved, it has a very clear mandate. He felt there should be a minimum, common performance standard for these laboratories assured worldwide, that there should be no or minimal charge for delivering the mandate and there should be closer collaboration between Reference Laboratories and Collaborating Centers.

- Diagnostic test registration procedures – He felt this process should also apply to diagnostic reagents that were “fit for purpose” and not be restricted to diagnostic kits only.

- Networking and working together – He stated that world-wide problems require world-wide response capabilities and trust was important to working together, sharing of resources and harmonizing standards. The culture should be one of inclusiveness, sharing of knowledge, implementing a cohesive architecture and an exchange of data and reference material. He emphasized the need for effective communication, transparency and accountability.

Brief discussion following Dr. Caporale’s presentation highlighted the problem with the lack of trust in sharing of reference materials and pathogen isolates. In addition, Dr. Juan Lubroth, Chief Veterinary Officer of the Food and Agriculture Organization (FAO) of the United Nations suggested the need for an OIE process to ensure that vaccine manufacturers were following good manufacturing practices.

Activities of the OIE Biological Standards Commission

Dr. Beverly Schmitt, Director of the Diagnostic Virology Laboratory, National Veterinary Services Laboratories (NVSL), USDA-APHIS-VS,
in Ames, Iowa, and Vice-president of the OIE Biological Standards Commission (BSC) provided a brief summary of the past year’s activities of the BSC. She affirmed that Professor Caporale was elected as the new President and that she was re-elected as Vice-President. Additional members elected to the BSC were from Morocco, Argentina, China and the United Kingdom, Dr. Steve Edwards would serve as Editor and two advisors were added from Canada and International Atomic Energy Agency. The BSC meets twice a year to review and approve submissions for new Reference Laboratories and Collaborating Centers, develop reference standards, and review the recommendations presented by subject-specific ad hoc groups. She reported that the project on twinning of laboratories – an effort to improve the laboratory expertise in developing countries with respect to specific diseases - was progressing successfully with 13 approved and funded projects with another 11 awaiting approval. She said that avian influenza and Newcastle disease were the focus of most projects. Others included Classical swine fever, rabies, brucellosis, contagious bovine pleuropneumonia, foot-and-mouth disease, bluetongue, African horse sickness, trichinellosis, and piroplasmosis. She also described the publication of the 6th Edition of the Diagnostic Manual but indicated that in the future, the process would change in that each year 25-30 chapters would be updated and placed on the web, with a hard copy being published every four years.

Other activities of the BSC included the OIE Register of Diagnostic Tests in which the validation requirements of commercial diagnostic kits are established. Currently there are five registered tests. Submissions continue from Reference Laboratories and Collaborating Centers but there is need for geographic balance. There is concern about ad hoc reference laboratory networks that operated outside of guidance from the BSC. Dr. Schmitt mentioned the OIE/FAO Network of Expertise on Animal Influenza (OFFLU) and indicated they provided quick response to the novel Influenza A H1N1 outbreak. Finally, she indicated that there would be a second conference of OIE Reference Laboratories June 21-22, 2010 in Paris, France.

**Novel H1N1 influenza A virus in an Alberta Swine Herd**

Dr. Jim Clark, National Manager, Disease Control Section, Terrestrial Animal Health Division, Canadian Food Inspection Agency (CFIA) discussed an outbreak of the novel influenza A/H1N1 in a swine herd in Alberta, Canada. Novel H1N1 influenza A virus in an Alberta swine herd and focused his comments on international standards challenges and opportunities.

In March 2009, the world became aware of the existence of a novel H1N1 virus that was circulating in the human populations in Mexico and the southern United States. The genetics of that virus were determined to be those historically associated with a triple re-assortment H1N1 swine influenza A virus that has occurred in the North American swine...
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population since the late 1990’s with the addition of Eurasian swine genetics on the matrix and neuraminidase genes.

Questions related to the risks this novel virus could represent for animal populations lead to widespread communication with the veterinary and swine production communities in Canada about the need for enhanced awareness and reporting of influenza-like illness in swine herds. In late April 2009, a swine herd in Alberta with a history of influenza-like illness and contact with an individual with a travel history to Mexico and subsequent influenza-like illness following his return to Canada, was identified. CFIA imposed a precautionary quarantine and investigated the herd. A novel H1N1 influenza A virus was isolated. On May 15th, the CFIA reported that the full sequence of the virus indicated that the virus found in the pigs was the same as the virus causing illness in humans around the world.

The OIE does not list influenza A viruses in most species as notifiable disease agents within the Terrestrial Animal Health Code due to their ubiquitous presence in animal populations globally. The swine influenza viruses are generally regarded as production limiting diseases that occur frequently, have mild impact on the general health status of a swine herd and have a seasonality similar to the human influenza A viruses. Historical evidence indicates the swine influenza A viruses will infect people and human influenza A viruses will infect swine. Influenza A viruses do not represent a food safety concern. Other than OIE Notifiable Avian Influenza viruses, trade restrictions on animals including live swine and animal products have rarely been placed on countries due to influenza A infections in animals or people.

The science available indicates trade restrictions have not been necessary to manage influenza A infections in swine. However, restrictions were placed on countries where the pandemic H1N1 (pH1N1) virus appeared at first in the human populations (Mexico, USA and then Canada). Infected swine herds were not necessary for restrictions to be implemented. The primary justification for the trade measures appeared to be the perception that infected people posed a risk of contaminating pork products while they worked in meat processing establishments. The restrictions were only applied to pork products despite similar opportunities for any type of product or thing to be contaminated under similar circumstances. Despite the scientific information available, it has proved difficult to change these perceptions of risk once the restrictions were put in place. The general public also believed pork represented a food safety risk resulting in a substantial drop in the demand for pork products.

The challenges in this scenario relate to the development of credible risk communication messages based in science that provide reassurance to the public that pork products do not represent a food safety risk. Additional challenges are associated with establishing international standards that reflect the science and associated risks of
infection and transmission of the virus in animals and people.

The exposure of swine to people infected with pH1N1 will increase in the coming months as the prevalence of the pandemic virus increases in the human population. It is the responsibility of the scientific community to provide accurate and timely information related to the risk to the general public and the international community associated with the role of swine in the epidemiology of the ongoing pandemic and the food safety aspects associated with consumption of pork or other animal products.

There have been and will continue to be opportunities to engage with animal and public health authorities at the international, continental and country levels to put into perspective the role of animals and people in the transmission of the pandemic virus. This will assist with the adoption and implementation of appropriate methods to control transmission and exposure of susceptible animals and people. There is also the opportunity to develop effective surveillance programs to detect novel strains of influenza A viruses in animal and human populations that would provide early warning of the emergence of a virus with pandemic potential. The success and implementation of surveillance programs will greatly depend on the reaction of individual countries to the notification of pH1N1. Adverse reaction to the notification of the existence of the pandemic virus, in the form of trade restrictions, will be a disincentive for most countries to engage in surveillance programs in their animal populations. This reluctance to look could result in the emergence of a virus with the potential to cause greater morbidity and mortality at a point in time when it is too late to implement measures that would minimize its impact.

Dr. David Scarfe, American Veterinary Medical Association (AVMA), presented a paper that was jointly authored by Dr. Alex Thiermann, President of OIE’s Terrestrial Animal Health Standards Commission (Code Commission) entitled “Incorporating Zoning and Compartments into Effective Biosecurity Programs”.

For biosecurity plans and programs to be justifiable and effective in preventing, controlling, and possibly eradicating infectious and contagious diseases, they need to adequately incorporate a number of issues. These include: hazard and risk analysis (hazard identification and prioritization, risk assessment/evaluation, risk management/mitigation and risk communication); analysis and remediation of critical control points (including evaluation and mitigation plans for correcting practices where disease could enter or leave the epidemiological unit); epidemiological principles (including necessary diagnostics, surveillance, monitoring and determining the status or freedom of diseases in the epidemiological unit); emergency preparedness (contingency protocols for disease control and eradication); and, auditing of procedures and records, and certification (providing assurance of disease freedom and useful as compliance incentives). Figure 1 below illustrates generalities
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of how these processes and procedures might be integrated into biosecurity plans and programs.

**Figure 1.** Ideal process of integrated steps for developing, implementing, auditing and certifying a biosecurity program intended to prevent, control and possibly eradicate disease in any epidemiological unit¹ (farm, compartment, zone, etc).

<table>
<thead>
<tr>
<th>Questions a Farmer Might Ask</th>
<th>Formal Biosecurity Process/Step</th>
<th>Necessary Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which diseases are serious potential hazards?</td>
<td>Hazard Identification &amp; Prioritization</td>
<td>Prioritized Disease List</td>
</tr>
<tr>
<td>Is my farm at risk, if so, how much risk, what's the impact?</td>
<td>Risk Assessment</td>
<td>Evaluation of Disease</td>
</tr>
<tr>
<td>Where can these hazardous diseases get in?</td>
<td>Critical Control Point (CCP) Evaluation &amp; Clinical Evaluation</td>
<td>Correctable CCPs to Monitor</td>
</tr>
<tr>
<td>Are any of these diseases on the farm?</td>
<td>Risk Mitigation/ Management</td>
<td>CCP Corrective</td>
</tr>
<tr>
<td>What can be done to prevent disease getting in or escaping?</td>
<td>Contingency Planning</td>
<td>Isolation Treatment, Depopulation</td>
</tr>
<tr>
<td>What do I do if disease gets in?</td>
<td>Surveillance/Monitoring</td>
<td>Farm, Lab &amp; Vet Records</td>
</tr>
<tr>
<td>How do I continue to monitor disease absence/presence?</td>
<td>Veterinarian Auditing &amp; Certification</td>
<td>Certificate of Veterinary Inspection</td>
</tr>
<tr>
<td>How do I get third-party recognition of disease freedom?</td>
<td></td>
<td>Government Endorsement</td>
</tr>
</tbody>
</table>

¹ Epidemiologic Unit — a defined population of animals, separated to some degree from other populations, in which infectious and contagious diseases can be transmitted.
Understanding how these processes may be applied to any epidemiologic unit (EU), including zones and compartments, is pivotal for developing and implementing justifiable and effective biosecurity plans and programs—from the farm to the nation. This approach utilizes core principles from epidemiology and applied population medicine. If applied correctly they will support continuing movement and trade of animals free of disease, while still allowing disease control and eradication responses in areas affected by disease. Building on the OIE definition of an EU and applying the principles to examples of farmed animal populations in zones and compartments, these concepts will be illustrated.

Report of UN FAO Activities

Dr. Juan Lubroth, Chief Veterinary Officer for the United Nations Food and Agriculture Organization (FAO), talked about the FAO and a number of FAO-related activities. While FAO is headquartered in Rome, Italy, it maintains regional offices in Santiago, Chile; Accra, Ghana; Cairo, Egypt and Bangkok, Thailand. It also has sub-regional offices in Addis, Ethiopia; Harare, Zimbabwe; Panama; Barbados, Fiji and Ankara, Turkey, and liaison offices in Washington, D.C., New York, Brussels, Belgium; Geneva, Switzerland and Tokyo, Japan. FAO has many partners including the OIE and the World Trade Organization. He stated that FAO’s livestock activities sought to improve the human condition by using livestock as a pathway out of poverty utilizing veterinary public health expertise because the majority of infectious diseases stem from the animal kingdom, and keeping in mind the importance of maintaining the sustainability of natural resources.

Dr. Lubroth responsibilities as Chief Veterinary Officer include oversight of the programs of the Emergency Preparedness System (EMPRES) for Transboundary Animal and Plant Diseases and Pests, Veterinary Public Health, Parasitic and Vector-Borne Diseases, Livestock Information, Sector Analysis and Policy, Animal Genetic Resources, and Sustainable Livestock Systems Intensification.

He said that FAO global animal health service activities over the past two years focused on information systems, vaccine production, diagnostic equipment, health and production, legislation, workshops, study tours, strategy development, contingency planning, legislation reviews, and risk analysis.

Regarding activities on farm animal welfare, Dr. Lubroth indicated that FAO served as a gateway for countries to access information on farm animal welfare. This is in recognition that animals that are well taken care of are more productive, and thus supports the goal of alleviation of poverty.

Activities related to Highly Pathogenic Avian Influenza H5N1 included a number of regional projects with donors supplying $300
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million USD. This involved establishing networks in epidemiology, diagnostic laboratories, socio-economic studies and wildlife expertise, building of capacity, cross border coordination and assistance with laboratory equipment, reagents, supplies, personal protection and disinfection equipment, and vaccines.

Relative to the 2009 pandemic H1N1 influenza, FAO voiced their concern about the naming of the problem in geographic or species terms and coordinated with OIE on a press release. They have received $5 million for projects to address surveillance for H1N1. He indicated that disease “hopping” was a symptom of unregulated growth and that what is needed is a profound understanding of the drivers, scanning surveillance with robust diagnostic laboratories and strong epidemiologic capabilities which are “glocal” (global, central and local), and an effective response capability to tackle diseases at their source. This will take a holistic approach to include knowledge of disease ecology and environment, the etiological agent(s), farming and marketing systems (value chains), husbandry practices and biosecurity, socio-economic factors, commerce, movement and trends, land use, climate and environment, and disasters and rehabilitation.

Dr. Lubroth explained the goals of the global framework for transboundary diseases (GF-TAD) were to improve the protein food security, alleviate poverty, and improve the incomes of developing countries, to safeguard the world livestock industry of developed as well as developing countries from repeat shocks of infectious disease epidemics, and to promote safe and globalized trade in livestock and animal products.

He touched on the Global Early Warning System (GLEWS), which was formalized by the FAO, OIE and WHO in 2006, which links existing early warning systems through a common and confidential platform. GLEWS is an early warning system that formally brings together human and veterinary public health systems to share zoonotic disease outbreak information including epidemiology and risk analysis. It has a desired outcome of triggering appropriate action, being timely, allowing for information driven decision making, avoidance or decreases in zoonotic disease burden with coherent messages from participating organizations. The issues that trigger GLEWS include whether the public health impact of the event is serious, such as an emerging disease with significant mortality and/or morbidity or zoonotic potential and if it has high morbidity and/or high mortality in humans and/or animals; whether the event is unusual or unexpected, such as the first occurrence or reoccurrence of a disease/strain, an unusual event for the area or season or the event is associated with an unknown agent; and whether there is significant risk of international spread with potential for transboundary spread or significant risk of international travel or trade restrictions.

Dr. Lubroth mentioned several FAO works in progress including the
implementation of Integrated National Action Plans (INAP's) in an effort to control transboundary diseases. This effort is funded by the European Community and implemented by joint FAO, OIE and WHO teams. The objectives of INAP's are to evaluate the country's veterinary and public health services, communication network and capacity to respond to animal health incidents, to strengthen national avian and human influenza prevention and response capacity, to provide first guidelines for further strengthening of the veterinary services and to determine financing needs to achieve the above objectives.

Finally, Dr. Lubroth touched on Foot and Mouth Disease eradication projects that are currently tracking the spread of a new strain A Iran 05; the spread of Rift Valley Fever that he thought would be in Europe in five years; the recent occurrence of Pest de Petits Ruminants in Morocco; and the Emergency Center for Transboundary Animal Diseases (ECTAD) that was supporting 39 missions in 28 countries in response to Highly Pathogenic Avian Influenza and other Transboundary Diseases.

Update on the Global Foot and Mouth Disease Research Alliance (GFRA)

Dr. Luis Rodriguez, USDA, Agricultural Research Service (ARS), provided an update on the Global Foot and Mouth Disease Research Alliance (GFRA). GFRA was first established in 2004 by five Foot and Mouth Disease (FMD) laboratories in Australia, Canada, United Kingdom, the United States and the International Livestock Research institute (ILRI) in Kenya with the purpose on collaborating in a research proposal aimed at providing the next generation of technologies to enable the global eradication of FMD virus. Soon it was realized that in order to achieve its goals GFRA needed to be truly global and include many more members, particularly those from countries affected by the devastating disease. Therefore, in May 2008, a group of international animal health experts met on Plum Island to define the purpose and goals of GFRA. The group agreed that the purpose of GFRA should be to establish a coordinated global alliance of scientists to produce evidence and innovation that will enable the progressive control and eradication of FMD. The group also agreed that the following five strategic goals should drive the work of GFRA: 1) Facilitate research collaborations; 2) Conduct strategic research to better understand FMD; 3) Development of the next generation of control measures and strategies for their application; 4) Determine social and economic impacts of new generation of improved FMD control; and 5) Provide evidence to inform development of policies for safe trade of animals and animal products in FMD endemic areas. From that meeting, an Executive Committee was established with a rotating coordination. Drs. Cyril G. Gay and Luis Rodriguez, USDA-ARS, coordinated the alliance from May 2008-May 2009. During this period the priority was to grow to Alliance to make it truly global, with participating countries...
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from all continents and regions, particularly those affected by FMD. Membership rose from five to over twenty including members, associates and collaborators, ranging from National Institutes, to Regional and International institutions (e.g. FAO, EUFMD). A web site was established and membership is growing (http://www.ars.usda.gov/GFRA/info.htm). Following the Plum Island meeting in 2008, there have been two meetings of GFRA, one held during the European Union FMD Open Session in Sicily, Italy in October 2008 and another during the Epizone meeting in Turkey in April 2009. These meetings were held to provide updates of GFRA scientific collaborations and to promote new memberships. There are two upcoming GFRA related meetings, the International Symposium on FMD Integrating Science and Management to be held in Melbourne, Australia in April of 2010 (http://www.fmd2010.com.au/) and a proposed meeting on FMD Virus Pathogenesis to be held at the Institute of Animal Health (IAH), United Kingdom in early 2010 that would be announced soon. GFRA provides a forum to discuss current research and forward plans in an environment of trust and confidentiality. The focus of the alliance is to increase our fundamental knowledge of FMD to underpin the development of new tools to control this disease. The development of new tools is only one element of the global effort to eradicate FMD and synergistic interaction with key stakeholders involved in regional control programs is essential. GFRA is already active, collaborative agreements have been developed, joint programs of work initiated and substantial funding secured, which would not have been possible without the backing of GFRA. One example of this is a project recently approved by the Wellcome Trust, United Kingdom for £1.3M for a research project aimed at enhancing FMD virus vaccine production. Partners on this project include IAH and Oxford University, United Kingdom, Intervet, Netherlands, Onderstepoort Veterinary Institute, South Africa and USDA, ARS Plum Island Animal Disease Center. There is no single country or organization or laboratories with the necessary critical mass and support structures to achieve GFRA strategic goals. Only concerted efforts and coordinated collaborative research will allow the development of the necessary tools for the progressive global control and eradication of FMD.

WSU School for Global Animal Health

Dr. Terry McElwain, Executive Director, Washington Animal Disease Laboratory, Director of the Animal Health Research Center at Washington State University (WSU) and Professor at the WSU School for Global Animal Health, provided some background on the School and reviewed the first year of activities. The WSU School for Global Animal Health mission is to provide innovative solutions to global infectious disease challenges through research, education, global outreach, and application of disease control at the animal-human interface. Our vision is to advance science, people, and policy to discover novel approaches
for disease intervention and delivery of preventive health care for animals and humans. The School was founded in 2008 with a $25M Challenge Grant from the Bill and Melinda Gates Foundation for a new building to house the School.

The animal human interface is defined within the mission of the School to include infectious diseases which are transmitted from animal reservoirs to infect humans (zoonotic agents), and those which impact human health through reduced productivity. The human focus is primarily on the 2.7 billion people living on less than USD $2/day, which currently comprise over 70% of the population in sub-Saharan Africa, and nearly a third of the population in Central American and Andean countries. These individuals are highly dependent on livestock for their health, economic and social well being.

Intervention at the animal human interface in the vision of the School may occur through disease surveillance for early detection and response, investigating novel mechanisms to reduce transmission of zoonotic agents, and vaccine development to prevent transmission of infectious agents, both among animals and from animals to humans. The educational component is currently limited to MS and PhD level graduate education, with two tracks, one a more traditional infectious diseases and immunology track, and the second an animal health policy and metrics track. All students in the School will have at least minimum level courses in animal health policy and metrics.

Progress in the past year includes acquisition of a permanent budget, finalizing formal appointments for existing faculty at WSU, initiating searches for two new faculty positions, development and offering of an experiential learning animal health policy course with State, National, and International components, admission of the first group of graduate students, acquisition of the first large grant (a vaccine development project for E. coli O157), and receipt of the entire matching requirements for the Gates Foundation challenge grant. Schematic design for the new building has been completed, and groundbreaking is scheduled for May, 2010. In addition, important human health partnerships have been developed with the University of Washington Medical School (Department of Global Health), the School of Community and Public Health, the Fred Hutchison Cancer Research Center, PATH, the Seattle Biomedical Research Institute, and the Infectious Disease Research Institute, all of which are located in the Seattle, Washington area.

**North American Animal Health Laboratory Network Collaborative Effort**

Dr. Samia Metwally, Head of the Diagnostic Services Section of the USDA-APHIS-VS National Veterinary Services Laboratories (NVSL), Foreign Animal Disease Diagnostic Laboratory, provided an update on the North American Animal Health Laboratory Network collaborative effort.
effort. Because animal production systems across North America are highly integrated and interconnected, several years ago USAHA helped facilitate a collaborative effort between the animal health laboratory systems of Canada, the U.S. and Mexico. One component of that effort is to harmonize test procedures in order to support the movement of animals between the countries thereby avoiding border delays or other disputes which can result from discrepant test results. The current focus has been on harmonizing tests for vesicular diseases (FMD), avian influenza and bovine tuberculosis. Workshops have been held in the participating national laboratories and proficiency panels, reagents and protocols have been shared. During 2009, the following diagnostic tests were harmonized: Antigen ELISA for FMD, Agar Gel Immunodiffusion (AGID) and Hemagglutination Inhibition (HI) for avian influenza, and histopathology/fixed tissue PCR for bovine tuberculosis. Additional tests will be included in the future, subject to adequate resource support. This collaborative work supports the Security and Prosperity Partnership (SPP) efforts which, among other things, commit the three countries to work together to build a safer and more economically dynamic North America.

Committee Business:

During the business section of the Committee meeting one resolution was passed and forwarded to the Committee on Resolutions. The resolution addressed the failure of importing countries to follow OIE guidelines for the importation of animals and animal products. The Chair mentioned the OIE/FAO Global Conference on Foot and Mouth Disease held in Paraguay earlier this year. Dr. Dorothy Geale, Senior Staff Veterinarian with the Terrestrial Animal Health Division of the Canadian Food Inspection Agency, was scheduled to make a comprehensive presentation on the Conference the following day at the Committee on Foreign and Emerging Diseases and the details of her presentation can be found in that committee report.

Because the Committee had evolved since its establishment in 2002/2003 and membership had grown significantly, the Chair briefly discussed the original purpose of the Committee. It was the intent that the Committee would help the USAHA and AAVLD membership gain an understanding of the way international standards were established and how those standards can influence the activities and policies of North America relative to animal health and welfare. Particular emphasis was placed on the actions, activities and decisions of the OIE. By making members of both Associations aware of these international influences, the two Associations would have an opportunity to proactively consider the most appropriate response. The Committee was to serve as a clearinghouse for international information and to provide an opportunity for others within the two Associations to comment rather than providing that comment directly.
The Committee members supported the Chair’s suggestion that he include in this Committee report a historical account of how the OIE Code commenting process had evolved over time. The historical account follows:

The founding members of the Committee felt it was not a function of the Committee itself to provide comments on proposed OIE Code changes and related documents. When the Committee’s current Chair, Rick Willer, was appointed to replace the first Chair at the conclusion of the 2005 Annual Meeting, and in fact prior to that time when he was serving as President-Elect in 2004 and then as President in 2005, key personnel in USDA asked for his help in obtaining improved feedback from USAHA. Knowing the stance of the founders of the Committee relative to the issue, Dr. Willer offered to send all USAHA chairs a copy of all documents covering proposed changes to the Code and related Code Commission documents seeking their review and feedback. That feedback would then be forwarded to USDA. In essence, the Committee would act as the facilitator to obtain the desired feedback. The first attempt at this process occurred in late 2005 when the Dr. Willer forwarded all Code Commission documents to all of the USAHA committee chairs requesting feedback. That first attempt resulted in few substantive comments due, in part, to the overwhelming number of documents in the comment package. Over time, the process has been refined by the Chair and Vice Chair, and the current procedure involves forwarding only those documents that pertain to a specific committee to that committee chair. This has drastically reduced the volume of material for review by the chairs. In addition to seeking comments from other committees, the Chair and Vice Chair review all of the documents themselves in order to identify any items they feel deserve close scrutiny. Any items thus identified are sent to the appropriate committee chair for closer review. Dr. Willer indicated that almost without exception, the proposed Code changes and Code Commission documents have been technical or procedural in nature. The Chair could not recall an instance where an OIE proposal was covered by a previous USAHA resolution, nor any controversial issue. The only issue that even approached a controversial issue was a proposal to re-define “animal welfare”. The comment forwarded to USDA was simply a suggestion to have the definition tabled at the OIE General Session so that it could receive further review from stakeholders, including USAHA. Because the turnaround time to submit comments is extremely short, adding an additional layer of review to comments received from the chairs would be nearly impossible. USDA has indicated they are pleased with the improved amount of feedback received and have expressed their appreciation.
Introduction
The 77th General Session of the World Organization for Animal Health (OIE) was held May 24 to 29, 2009, in Paris, France. The International Committee meeting was attended by 159 delegates of the 174 Member countries and Territories, as well as observers from more than 30 regional and international organizations. Ministers of Agriculture from ten Member countries attended the opening ceremonies.

The OIE has been recognized by the World Trade Organization as the standard setting body for animal health. As such, the OIE develops and establishes the health standards for the safe trade of animals and animal products and makes recommendations for the overall well-being of animals.

The OIE bases the development of standards on the best and most currently available science. The OIE will not develop or change any existing standards based on political science. Members should respond to health events in a manner that is proportionate to the risks associated with that event and not impose measures that are burdensome, costly, and technically unjustified.

Technical Items
The technical items and special topics presented at this year’s General Session were:
1. Technical Item: Impact of climate change and environmental changes on emerging and re-emerging animal diseases and production.
2. Special topic: Review and update on the Ebola-Reston and novel H1N1 virus events

World Animal Health Situation
The OIE Animal Health Information Department summarized the most significant animal health events that occurred in 2008 and early 2009. The World Animal Health Information System (WAHIS) is OIE’s Web-based system for disease notification. All OIE animal health information is now available through the OIE database commonly known as WAHID (World Animal Health Information Database).

The following disease events and trends were highlighted:
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- Peste des petit ruminants: This disease is endemic in sub-Saharan Africa. Affected herds and flocks of small ruminants experience up to a 20 percent mortality rate. The disease is spreading east and north into Kenya, Tanzania, Uganda, and Niger, has moved to many countries of the Middle East, and has spread into western China.
- African swine fever: This disease has been reintroduced into central Europe, spreading from Russia into Armenia and Georgia. Its spillover into the wild boar population indicates that the disease will continue to spread.
- Highly pathogenic avian influenza (HPAI): Since 2003, 62 countries have reported outbreaks of HPAI H5N1. Although occurrences of the disease are still being reported, fewer countries are reporting HPAI H5N1 outbreaks.
- Bluetongue virus (BTV): The range of BTV-8 has extended beyond the 58th parallel in northern Europe. BTV-8 is the most common serotype detected; however, other serotypes (BTV-1, BTV-2, BTV-6, BTV-11, and BTV-16) have also been detected in Europe. The use of vaccine against BTV-8 has helped decrease the incidence of clinical disease associated with this serotype.
- Foot-and-mouth disease (FMD): Outbreaks of FMD continue to occur in the Middle East, the Indian subcontinent, Southeast Asia, most of Africa, and northern South America (Colombia, Venezuela, and Ecuador).

Reports of the Specialist Commissions
I. Scientific Commission (SC) – The major activities were as follows:
   A. Updates to the FMD Code chapter
      1. Buffer/Protection Zone – Replaced the term *buffer* with the term *protection* in the Code Chapter for FMD. It was further clarified that an outbreak of FMD within the protection zone would not affect the free status of a free zone or country.
      2. The OIE is suggesting that the concept of compartmentalization could be applied to FMD with the implementation of proper mitigations.

B. Developing guidelines for animal health surveillance in wildlife
C. Recommending that any guidelines for vector-borne surveillance will be developed wherever needed by disease.
D. Developing a handbook on epidemiological modeling
E. Integrating surveillance for wildlife diseases into the corresponding chapters in the Terrestrial Animal Health Standards Code
F. Including the disease questionnaires for status recognition at the end of those corresponding chapters
G. Evaluated country submissions for FMD, rinderpest, contagious bovine pleuropneumonia (CBPP), and bovine spongiform encephalopathy (BSE) status:
   1. Moldova, Botswana, and Colombia were added
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to the OIE list of FMD countries or zones with or without vaccination.

2. Various countries were added to the list of rinderpest-free countries or zones.

3. The following country was classified as having “negligible risk” for BSE: Chile (upgraded from “controlled risk”).

4. The following countries were classified as having “controlled risk” for BSE: Colombia and Japan.

5. The following country was added to the list of CBPP-free countries or zones: Switzerland.

II. Terrestrial Animal Health Standards Commission (Code Commission) – More than 50 Code chapters were amended or rewritten and presented for adoption during the General Session. The following Code chapters are of particular interest to the United States:

A. Zoning and compartmentalization (Chapters 4.3 and 4.4) – There were no substantive changes to the Chapter; however a few revisions were made to provide clarity.

B. Classical swine fever (Chapter 15.3) – The new 2009 version was approved following a request by the European Union (EU) in 2008 to delay adoption of the Chapter.

C. BSE (Chapter 11.6) – Two small but significant changes were adopted. These revisions were as follows:
   1. Removing the 30-month age limit so that deboned skeletal muscle can be traded freely from any BSE risk country
   2. Allowing countries to source bone vertebrae for gelatin production from cattle 30 months of age and younger from countries of either undetermined or controlled risk

D. Avian influenza (Chapter 10.4) – A few non-substantive changes and clarifications were made to this Code chapter. The United States requested that poultry meal be included with feather meal because the processing for the two products is the same. Additionally, the U.S. delegates asked the OIE to combine two Articles in the Chapter into one to minimize selective interpretation by importing Member countries.

E. Bovine tuberculosis (Chapter 11.7) – A new chapter on bovine tuberculosis (TB) was adopted, which retains the herd as a means for countries to manage the disease (instead of just compartment, since most countries have not yet implemented the concept of compartmentalization). Further, bovine TB continues to be defined as infection with Mycobacterium bovis rather than “TB complex” as proposed
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by the OIE.

F. Bovine tuberculosis in farmed cervidae (Chapter X.X.X) – This new chapter incorporates many of the recommendations included in the bovine TB chapter.

G. Newcastle disease (Chapter 10.13) – This chapter was modified to clearly explain its recommendations. Requests were made by the United States to fine-tune the recommended time and temperature parameters for the inactivation of the virus in some poultry products.

H. Scrapie (Chapter 14.9) – A new chapter was adopted, leaving a few Articles “under study” that address surveillance.

The new and updated chapters became effective at the conclusion of the General Session on May 29.

III. Aquatic Animal Health Standards Commission (AAHSC) – Highlights of the Aquatic Commission activities include the following:

A. Member Country Participation – National aquatic focal points were identified by 116 Member countries, an increase from 100 Member countries the previous year. The focal points receive copies of the Aquatic Animal Commission reports and are responsible for ensuring in-country consultation with experts on proposed text to the Aquatic Animal Health Code and the Manual of Diagnostic Tests for Aquatic Animals. These focal points should also be responsible for preparing comments for the Delegate on meeting reports, including revised and new proposed standards.

B. Trade in ornamental amphibians is completely unregulated, with the exception of amphibians listed under the Convention on International Trade in Endangered Species. Chytrid fungus and ranavirus are implicated in the worldwide decline of amphibians, and at least 30 species are now extinct.

C. Text for adoption:

1. Four crustacean diseases were proposed for delisting: tetrahedral baculovirus, spherical baculovirus, hepatopancreatic parvovirus and mourilyan virus disease; milky haemolymph disease of spiny lobster will be listed as “under study”; and the proposal to list sabellid worm of mollusks has been withdrawn.

2. Crayfish plague.

A. Updated the model live aquatic animal and gamete health certificate.

B. New OIE reference laboratories approved:

2. Crayfish plague – Finland

3. Batrachochytrium dendrobatidis – Australia
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4. Ranavirus – Australia

A. Other activities
   559. An ad hoc group will review the handling and disposal of carcasses and waste of aquatic animals.
   560. The Aquatic Animals Commission will expand into the area of animal production food safety. Antimicrobial resistance will be addressed as the first priority.
   561. An ad hoc group completed the OIE Guide on Aquatic Health Surveillance. This publication is expected to be available in late 2009.
   562. The development of guidelines on surveillance for specific diseases is planned. The diseases to be initially addressed are viral hemorrhagic septicemia, *Bonamia ostreae*, and white spot disease.
   563. The Commission is also considering incorporating the OIE Performance of Veterinary Services Tool to assess aquatic animal health infrastructures.

IV. Biological Standards (Laboratories) Commission: the Commission’s activities during 2008 included:

   A. Reference Laboratories – The Commission reviewed and approved several applications for OIE Reference Laboratory status for the following diseases:
      1. Avian influenza – India
      2. Bovine brucellosis – Korea
      3. BSE and scrapie – Argentina
      4. Camel pox – United Arab Emirates
      5. FMD – Thailand
      6. Equine Influenza – Ireland
      7. Glanders – United Arab Emirates
      8. Rift valley fever and Crimean-Congo hemorrhagic fever – France
      9. Theileriosis – Belgium

   B. Collaborating Centers – The Commission reviewed and approved the applications of several OIE Collaborating Centers:
      1. A Collaborating Center in Italy was approved for addressing diseases at the animal/human interface.
      2. A Collaborating Center in South Africa was approved for providing training in integrated livestock and wildlife health management.
      3. A Collaborating Center in Japan was approved for providing support on animal feed and safety analysis.
      4. A Collaborating Center in Cuba was approved for the development and production of vaccines, pharmaceutical products, and veterinary diagnostic systems using biotechnology.

   C. International Standardization of Diagnostic Kits – importance of
the Commission’s work related to the preparation of internationally accepted standard reference materials for listed diseases was reiterated. Efforts to develop such standards for avian influenza, enzootic bovine leucosis, ovine, caprine and porcine brucellosis, rabies, and dourine are on-going.

D. OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals – The Manual will no longer be published in hard copy. Selected chapters will now be updated on a yearly cycle and will be available online.

E. Register of OIE-Validated and Certified Diagnostic Tests – The OIE’s Technical and Scientific Department continues to encourage diagnostic kit manufacturers to submit their validation dossiers for evaluation and listing on the OIE Register.

F. Ad hoc groups – The Commission convened and requested the input and expertise of several ad hoc groups:
   1. Ad hoc group on the validation of diagnostic tests
   2. Ad hoc group on biotechnology
   3. Ad hoc group on diseases of camelids
   4. Ad hoc group on tests for trypanosomes

G. OIE/Food and Agriculture Organization Network of Expertise on Avian Influenza (OFFLU) – The activities of the OFFLU Network during the past year included:
   1. Guidance on minimum biosafety requirements for handling AI viruses
   2. Development of a standard H5 antiserum
   3. Development of an RNA standard
   4. Harmonization of proficiency testing
   5. Avian influenza vaccine quality assurance

H. Global rinderpest status - The Commission acknowledged the ongoing dialogue between the OIE and the Food and Agriculture Organization of the United Nations (FAO) on progress towards the global eradication of rinderpest, and advised on a strategy for handling repositories of both virulent virus and live vaccines stocks. A resolution reflecting these recommendations was adopted by the International Committee.

Reports of the OIE Working Groups

I. Working group (WG) on Animal Production Food Safety and Production. This WG was established to strengthen OIE’s activities in food safety and to increase collaboration with the Codex Alimentarius Commission (Codex). The WG’s main activities in 2008 included:
   A. OIE-FAO “Guide to Good Farming Practices for Animal Production Food Safety” – This guide has been finalized and published by the FAO as a booklet in English, French, and Spanish.
   B. Salmonellosis – The WG recommended that the Code Commission continue to collaborate with the Codex Committee on food hygiene,
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particularly with regard to the work on food safety aspects of salmonellosis and campylobacteriosis.
C. Antimicrobials of veterinary importance – The WG encouraged the OIE to continue to closely engage with the Codex, FAO, and World Health Organization on antimicrobial resistance.
D. Biotechnology – The OIE ad hoc group on biotechnology has divided into two groups: one focused on vaccine technologies and the other on molecular diagnostic tests. The OIE will consider animal health implications first, then address the food safety implications on the use of biotech-derived vaccines in animals.

II. Working group on Animal Welfare – The chair of this WG reiterated that, given its complexity, animal welfare recommendations must be science based, input must come from many scientific disciplines as well as all stakeholders, and changes will occur in increments. The chapter entitled “Guidelines for Stray Dog Control” was adopted in May 2009. Upcoming priorities for the WG include the following:
   A. Completing the standards for the welfare of farmed fish during transport;
   B. Establishing an ad hoc group to address gaps in the already adopted standards for poultry slaughter and transport;
   C. Completing the standards on the use of animals in research, testing, or teaching; and
   D. Establishing ad hoc groups to draft standards for the welfare in livestock production systems (broiler chickens and beef cattle).

The chairperson referenced the 2nd Global Conference on Animal Welfare held in Cairo, Egypt, in October 2008. The goal of this meeting was to encourage Member countries to implement the adopted OIE standards on animal welfare. The delegate of Canada expressed concerns over the adoption of the Cairo animal welfare resolution/recommendations and proposed that the International Committee (i.e., the Member countries) “note” the recommendations and make a commitment to the implementation of the standards as appropriate.

III. Working group on Wildlife Diseases: The chairperson provided a summary of significant disease events that affected wildlife in various regions of the world in 2008:
   E. Yellow fever in nonhuman primates – The range in the Americas has extended from Trinidad and Tobago into Argentina.
   F. Novel arena virus – South Africa
   G. Crocodile mass mortality – Kruger National Park, South Africa
   H. Trichomonas infection in small passerine birds – Europe
   I. Bluetongue in cervidae – Europe
   J. Chronic wasting disease in cervidae – North America

The chair noted that climate change is having an impact on wildlife as a result of changing pathogen ecology. Wildlife species are very sensitive to any changes and are good indicators for changes in the environment.
The WG on Wildlife disease will become more involved in the work of the Code and Standards Commissions, and, where appropriate, will integrate wildlife into the Code and Manual chapters.

Regional Commission Meeting of the Americas
The Regional Commission of the Americas met on May 25 to summarize activities during the past year. Twenty-one of the 29 Member countries of the Region for the Americas were represented at the meeting. Additionally, nine Regional organizations attended the session. In 2008, several countries in the Americas Region hosted meetings and seminars, including a Global Conference on Animal Identification in Buenos Aires, Argentina; a Regional Aquatic Animal Health meeting in Mexico; Regional Poultry Health meetings in Mexico and Atlanta, Georgia; a Regional meeting of Veterinary Biologics in Mexico; and the biennial OIE Conference of the Regional Commission for the Americas in Cuba.

Technical Item for the 78th General Session (May 2010)
The following technical item was selected by the International Committee for presentation at the 78th General Session in 2010: The critical contribution of veterinary activities to the global security of food derived from terrestrial and aquatic animals.

Elections
This year, the OIE International Committee held elections to elect members to the Specialist and Regional Commissions. Dr. John Clifford, Deputy Administrator for Veterinary Services, and Chief Veterinary Officer of the United States, was elected second Vice-President of the Regional Commission for the Americas.
REPORT OF THE COMMITTEE ON JOHNE’S DISEASE

Chair: Andy L. Schwartz, TX
Vice Chair: Elisabeth A. Patton, WI

John B. Adams, VA; J. Bruce Addison, MO; Paul L. Anderson, MN; Robert D. Angus, ID; Joe B. Baker, NM; Marilyn F. Balmer, MD; Richard E. Breitmeyer, CA; Charles E. Brown, II, WI; Todd M. Byrem, MI; Yung Fu Chang, NY; Michael T. Collins, WI; Thomas F. Conner, OH; Ed Corrigan, WI; Stephen K. Crawford, NH; Ned A. Cunningham, OH; Ria de Grassi, CA; Anita J. Edmondson, CA; Robert G. Ehlenfeldt, WI; John I. Enck, Jr., PA; William H. Fales, MO; Kathy D. Finnerty, NY; Keith R. Forbes, NV; Geoffrey T. Fosgate, TX; Charles P. Fossler, CO; Bob Frost, CA; L. Wayne Godwin, FL; Jeffrey J. Hamer, NJ; William R. Hare, MD; Beth Harris, IA; William L. Hartmann, MN; Linda Hickam, MO; Donald E. Hoenig, ME; Sam D. Holland, SD; John P. Honstead, CO; Ernest P. Hovingh, PA; David L. Hunter, MT; Jamie S. Jonker, DC; Karen R. Jordan, NC; Susan J. Keller, ND; Sung G. Kim, NY; Bruce L. Lamb, IN; John C. Lawrence, ME; Donald H. Lein, NY; Tsang Long Lin, IN; Mary J. Lis, CT; Laurent O’Gene Lollis, FL; Vader M. Loomis, PA; Gordon ‘Cobbie’ Magness, SD; Beth E. Mamer, ID; Chuck E. Massengill, MO; Chris W. Murdock, MO; Dustin P. Oedekoven, SD; Kenneth E. Olson, IL; Jason B. Osterstock, TX; Lanny W. Pace, MS; Elizabeth J. Parker, DC; Boyd H. Parr, SC; Janet B. Payeur, IA; Kristine R. Petrini, MN; Jewell G. Plumley, WV; Michael R. Pruitt, OK; Suelee Robbe-Austerman, IA; Paul E. Rodgers, WV; Allen J. Roussel, Jr., TX; Patty B. Scharko, KY; Sarah B. S. Shapiro Hurley, WI; William P. Shulaw, OH; Marilyn M. Simunich, ID; Shri N. Singh, KY; Ben Smith, WA; Judith R. Stabel, IA; Cleve Tedford, TN; Robert M. S. Temple, OH; Charles O. Thoen, IA; Brad Thurston, IN; Jesse L. Vollmer, ND; James A. Watson, MS; Gary M. Weber, MD; Scott J. Wells, MN; Diana L. Whipple, IA; Robert H. Whitlock, PA; George O. Winegar, MI; Michael J. Wood, VT; Ching-Ching Wu, IN.

The Committee met on October 11, 2009 at the Town and Country Hotel, San Diego, Calif., from 12:30 to 5:30 p.m. There were 30 members and 15 guests present. Self introductions were made by all in attendance.

Status of 2008 Resolutions and Recommendations
RESOLUTION NUMBER 4: NATIONAL JOHNE’S DISEASE DEMONSTRATION HERD PROJECT

The National Johne’s Disease Demonstration Herd Project was initiated in 2003 as a long-term project (at least five years) with the objective of validating management tools needed for a science-based National Johne’s Disease Control Program.

Preliminary evidence indicates a reduction in prevalence and incidence of Johne’s disease in the demonstration herds to date, but
additional time is needed to complete the project.

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) continue to prioritize funding for the National Johne's Disease Demonstration Herd Project to complete the collection of eight years of data from cooperating herds.

RESPONSE: The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) appreciates the United States Animal Health Association’s interest in the National Johne’s Disease Demonstration Herd Project. Due to budget considerations, VS is setting priorities for all its programs, and some adjustments in program activities are necessary. Regarding the National Johne’s Disease Demonstration Herd Project, we will continue to collect data from herds that currently have less than eight years of data. Our goal is to continue testing through 2011 until all herds have eight years of data, reducing the budget by approximately $400,000 each year. However, this funding will depend on the budget set by Congress.

RESOLUTION NUMBER 5: STRATEGIC PLAN FOR JOHNE’S DISEASE

The current Johne’s Disease Strategic Plan was last updated by the National Johne’s Working Group (NJWG) in 2003 to guide the work and efforts of the NJWG and the United States Animal Health Association (USAHA) Committee on Johne’s Disease through 2008. A new five year plan is needed to incorporate significant changes that have occurred in understanding Johne’s disease, its management, availability and performance of diagnostic testing, state and federal funding and awareness of Johne’s disease among ruminant producers within the ruminant industries.

The United States Animal Health Association (USAHA) requests that United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) accept the updated Strategic Plan as approved during the 2008 Annual Meeting.

RESPONSE: The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (VS) appreciates the United States Animal Health Association’s (USAHA) interest in Johne’s disease. VS accepts the National Johne’s Strategic Plan approved by USAHA at the 2008 annual meeting. VS will develop an implementation plan based on the direction provided in the strategic plan. We encourage USAHA to reach out to industry stakeholders, as USDA is only one partner in the updated plan. The efforts of USAHA are needed to engage industry groups and producers to ensure the success of the National Johne’s Disease Control Program.

United States Johne’s disease Program Updates FY 2009
Michael Carter
National Johne’s Program Coordinator, USDA-APHIS-VS
In 1997, USAHA National Johne’s Working Group (NJWG) appointed
a committee to design an affordable and flexible program based on sound scientific knowledge. The result was the U.S. Voluntary Johne’s Disease Herd Status Program (VJDHSP). Instead of trying to certify herds free of Johne’s disease, the VJDHSP provides minimum requirements for a program to identify herds of low risk with *M. paratuberculosis* infection. These guidelines are used as a model for the Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) approved by USDA-APHIS in April of 2002. The latest revision to the program standards, yet to be published, include reducing the frequency of risk assessments to every three years, the use of milk enzyme linked immunosorbent assay (ELISA) and the guidelines to allow States to allow DHIA technicians or other competent personnel to collect samples for program herd classification. Other pending changes including the proposed herd classification structure were discussed by the program standards committee and have yet to be adopted.

For FY 2009 from States that have reported by September 4, 2009, 49 States had adopted to VBJDCP or had programs that were considered in compliance with these standards. In FY 2008, the reported activities includes 450,805 cattle tested by ELISA and 55,859 cattle tested by fecal culture or PCR, 5,675 enrolled herds (4,282 dairy and 1,393 beef) of which 891 are test negative herds (481 dairy and 410 beef). Herds enrolled as test negative herds are progressing through to level 4. There are 317 Johne’s program level 1 (159 dairy and 158 beef), 281 Johne’s program level 2 (150 dairy and 131 beef), 64 Johne’s program level 3 (28 dairy and 36 beef), and 229 Johne’s program level 4 herds (144 dairy and 85 beef). This represents a decrease in all categories.

In FY 2009, USDA-APHIS-VS received $6.8 million and made the National Johne’s Demonstration Project a priority. VS continued funding the data collection in an attempt to see that all herds enrolled in the project had at least seven years worth of data. In FY 2010, it appears that level funding will be received for the National Johne’s disease control program, however with the changing priorities within USDA-APHIS-VS, the decision was made to end the data collection portion of the National Johne’s Disease Demonstration Herd Project, support data analysis, and to shift the remaining funds to general State cooperative agreement. This shift is intended to support the shift from the federal funded national control program to more of a Public/Private partnership.

In the future, USDA-APHIS-VS is looking to bring the Johne’s disease control program into alignment with the VS 2015 vision. This brings about a shift in the focus by USDA-APHIS-VS maintaining the herd classification portion of the program while reducing the direct support provided to producers in favor of that effort being picked up by the State and Industry stakeholders.

**National Johne’s Working Group (NJWG) Report**

Jamie Jonker, Co-Chair NJWG

The full report is included at the end of this report.
JOHNE’S DISEASE

Current Status of the U.S. National Johne's Disease Demonstration Herd Project
Charles P. Fossler
USDA-APHIS-VS

The National Johne's Demonstration Herd Project (NJDDHP) in the United States was initiated to evaluate the long-term feasibility and effectiveness of management-related practices designed to control Johne's disease on dairy and beef cattle operations. The NJDDHP was started in 2003, but final herd enrollment numbers were not reached until 2005. The NJDDHP includes 62 dairy herds and 20 beef herds in 17 states. Current plans are to discontinue sampling of herds after the 2009 study year and concentrate on data analysis only in 2010. Results to date indicate that, for both beef and dairy herds, prevalence of *Mycobacterium avium* subspecies *paratuberculosis* (MAP) in the third, fourth, and fifth years of participation was significantly lower than prevalence during the first year of participation. An analysis using Poisson regression was undertaken to identify areas from the risk assessment most important with regard to MAP prevalence. Among the main areas from the risk assessment (which included calving area, preweaned heifers, postweaned heifers, bred heifers, cows and bulls, and additions/replacements), the calving and preweaned heifer areas appeared to be most important with regard to risk of cattle being MAP-positive. Specific factors within the calving and preweaned heifer areas were further assessed. Among these, high risk scores for multiple animal use, manure soiling of udders and legs, and presence of Johne's disease clinical or suspect animals in the calving area were associated with a greater risk for cattle to be MAP-positive. These results suggest that management efforts initiated since the beginning of the project have been effective in reducing MAP prevalence. Results also suggest that making sure udders and legs of cows in the calving area are clean, using individual animal calving areas (or allowing fewer animals in the calving area), and preventing Johne's disease clinical or suspect animals from entering the calving area should receive primary consideration with regard to control of Johne's disease on dairy operations.

National Veterinary Services Laboratory (NVSL) - Approved Laboratory Report
Beth Harris
NVSL, USDA-APHIS

Proficiency panels for Johne's disease organism detection (culture and direct PCR) were mailed to participants in February, 2009. A total of 64 laboratories, (55 USA laboratories, nine international; Canada, six; United Kingdom, one; Ireland, one; Sweden, one) participated in the 2009 Johne's disease fecal proficiency panel. A total of 52 laboratories participated using Direct PCR; 40 laboratories passed, two did not submit results, and 10 laboratories did not meet the criteria for passing. A total
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of 36 laboratories participated using HEY media; 31 laboratories passed, three laboratories did not pass and two laboratories did not submit results. Forty-three laboratories participated using liquid media systems. Two laboratories used Bactec 460 with both laboratories passing. Twenty-seven laboratories used ESP with 26 passing, and ten used MGIT 960 with six passing.

Fifty-two laboratories participated in the pooling proficiency panel. Twenty-six laboratories used direct PCR with 25 passing and one laboratory not submitting results. Six of six laboratories passed using Harold's Egg Yolk (HEY) solid media. Twenty laboratories used a liquid media system with all 20 labs passing. Of the laboratories using liquid culture for the pooling proficiency panel, four used the MGIT 960 with all passing, and 16 laboratories used the ESP system with all passing.

Test panels for the Johne’s ELISA serology proficiency test were distributed in July, 2009, with 73 U.S. laboratories and seven international laboratories participating (Canada, Chile, Netherlands, and Northern Ireland). Preliminary scoring of results submitted by October 9, 2009 using the z-score grading scheme, resulted in 84.5% percent of laboratories taking the Prionics ELISA panel received passing scores and 83.3 percent of laboratories taking the IDEXX ELISA panel passing. Final results and re-tests are scheduled to be released by October 31, 2009.

The second milk ELISA proficiency panel was offered and distributed in June 2008. A total of 9 laboratories participated in this panel, with 8 laboratories (97.4%) receiving a passing score. A total of 35 laboratories (100%) passed using the Prionics ELISA test kit, two laboratories (100%) passed using the Pourquier test kit, and 1/2 laboratories (50%) passed using another ELISA test methodology.

Johne’s Disease Integrated Program (JDIP) UPDATES
Ken Olson
JDIP Consultant

The Johne’s Disease Integrated Program (JDIP), a consortium including over 50 academic institutions, government institutions and organizations, provides a coordinated framework and crosscutting collaboration for the conduct of Johne’s related research and outreach. Utilizing these resources, JDIP seeks to shorten the timeline from discovery research to laboratory and field application of the work. Primary funding is through a USDA, Cooperative State Research Education and Extension Service (CSREES), National Research Initiative (NRI), Coordinated Agricultural Projects (CAP) grant, but these funds have been successfully leveraged to expand research efforts. JDIP facilitates Johne’s research through annual competitive grants. The system is working well. The Year 5 RFA resulted in 20 proposals requesting $1.4m in funding. Following peer review, 10 projects were funded with grants totaling $0.85m. Year 6 RFA proposals are due November 9, 2009. JDIP has two major new initiatives underway:
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• The first is a vaccine development project that seeks to identify one or more potential candidates for commercial vaccine development. To date 21 candidates have been received and four other groups have indicated that they will submit candidates. Others are also encouraged to submit candidates.
  o Phase I – the initial round of in vitro screening and data analysis for ~25-30 candidates is to be completed by March 2010
  o Phase II - (~10 best candidates to be evaluated in mice) will be completed by September 2010
  o Phase II – (3-5 best candidates to be evaluated in goats) will be completed by September 2011

• JDIP is also leading the development of a set of consensus-based standards for validating and reporting paratuberculosis test evaluation studies. This is patterned after the STARD (Standards for Reporting Diagnostic Accuracy) framework developed for test evaluation in human medicine. Anticipated benefits from this JDIP initiative include:
  o Help in avoiding the use of tests of poor utility that do not improve management decisions or reduce potential public health risks
  o Adoption and use of less expensive tests of comparable accuracy to current tests
  o Design and analysis guidelines for authors and reviewers of relevant grant proposals or applications for test licensure
  o More informed decisions about sample types to be included in repositories developed for use in test validation and comparison studies

Education and Outreach is another major focus for JDIP. Four efforts of the past year were highlighted.

• National Dairy Producer Survey – Approximately 16% of the commercial dairy farms in the country were surveyed to identify incentives for and barriers to participation in the Johne’s program. It was found that producers are concerned about and have basic knowledge of the disease. Addition education and program promotion/marketing efforts would be useful.

• An Annual Report on Johne’s Program Education and Outreach Impacts sought to identify and document program impacts not reflected in program statistics. Information was received from 37 states that include 91% of the dairy and 77% of the beef cow-calf operations. It was found that nearly 10,000 participants were reached through 210 meetings, 50,000 pieces of information were delivered and 2,155 Johne’s
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certified veterinarians are available to work with producers. Milk ELISA testing is growing significantly and is available to DHIA producers across the nation.

- The 2nd New Horizons in Johne’s Disease Control workshop was held in conjunction with the 10th ICP at the University of Minnesota. These workshops, targeted to producers and practitioners, focus on field application of Johne’s research and its value in addressing Johne’s at the farm. Regional workshops may be held in 2010.
- The 3rd Johne’s Interest Group session was held at the Joint Annual Meeting (JAM) of American Dairy Science Association (ADSA), and American Society of Animal Science (ASAS). These sessions provide a forum for discussion of the Johne’s program and related efforts as well as discussion of potential enhancements. JDIP anticipates holding its annual conference in conjunction with the 2010 JAM.

More details on JDIP and these efforts may be found on our website www.jdip.org.

Update on New IDEXX Johne’s Antibody ELISA Test Kit

Nevena Djuranovic
Idexx Laboratories

The new IDEXX Johne’s ELISA is pending USDA approval, with an estimated Approval date of October/November 2009. IDEXX will replace the USDA licensed HerdChek M.pt Ab ELISA with a new kit. The new IDEXX M.pt Ab Test kit has been available outside of United States for many years, uses proven Institut Pourquier technology and has gained international recognition for excellent performance.

The new IDEXX M.pt. ELISA kit has bovine milk, serum and plasma claims. It requires minimal retraining and no additional equipment for customer using the existing IDEXX HerdChek Ab ELISA. All the components, test protocol and result interpretation are very similar to HerdChek M.pt. ELISA as well.

Performance Characteristics vs Culture:
- Milk: Sens. 74.2%, Spec. 99.8%
- Serum: Sens. 51.4%, Spec. 99.3%
- Plasma: Sens. 54.9%, Spec. 100%

Performance vs. Competitor A ELISA
- IDEXX Milk: Sens. 52%, Spec. 98%
- Competitor A Milk: Sens. 44%, Spec. 99%
- IDEXX Serum: Sens. 68%, Spec. 99%
- Competitor A Serum: Sens. 67%, Spec. 99%

Additional benefits: results <2 hours, consistent lot to lot performance, reliable and steady supply from IDEXX.
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Risk Assessment Simulation and Producer Video
Jeannette McDonald
Johne’s Disease Integrated Program (JDIP)

A distance presentation was made of a risk assessment simulation program to be used as a teaching tool for veterinarians and veterinary students in performing on farm risk assessments. A producer version of the simulation is under development.

A preview of a motivational producer video designed to raise awareness about Johne’s disease was shown.

National Johne’s Education Initiative Update
Teres Lambert
National Institute of Animal Agriculture (NIAA)

A complete report is included at the end of this report.

Evaluation of Silirum®, a Bovine Johne’s Disease Vaccine, in a Calf Challenge Model
Terry Bowersock
Pfizer

A summary of the following study was presented.

*American Journal of Veterinary Research*
April 2009, Vol. 70, No. 4, Pages 493-497

**Effect of subcutaneous administration of a killed Mycobacterium avium subsp paratuberculosis vaccine on colonization of tissues following oral exposure to the organism in calves**
Raymond W. Sweeney, VMD; Robert H. Whitlock, DVM, PhD; Terry L. Bowersock, DVM, PhD; Diane L. Cleary, BS; Todd R. Meinert, PhD; Perry L. Habecker, DVM; Greg W. Pruitt, MEd
Department of Clinical Studies—New Bolton Center, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA 19348. (Sweeney, Whitlock); Pfizer Animal Health, 7000 Portage Rd, Kalamazoo, MI 49001. (Bowersock, Cleary, Meinert, Pruitt); Department of Pathobiology, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA 19348. (Habecker)

Address correspondence to Dr. Sweeney.

**Objective** - To evaluate the effect of vaccination of calves with a killed *Mycobacterium avium* subsp *paratuberculosis* (MAP) vaccine on colonization of tissues following oral MAP exposure.

**Animals** - 12 healthy Holstein calves.

**Procedures** - At 14 days after birth, calves received the MAP vaccine (1.0 mL, SC) or saline (0.9% NaCl) solution (1.0 mL, SC [control treatment]). Each calf received $1.2 \times 10^9$ CFUs of live MAP orally 21 and 22 days after vaccination. Prior to vaccination and
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at subsequent intervals, a blood sample was collected for ELISA detection of antibodies against MAP and for whole blood, antigen-specific, interferon (IFN)-γ–release assay. Nine weeks after MAP challenge, calves were euthanized and various tissue samples were collected for mycobacterial culture. Interferon-γ production in prescapular lymph node cells was measured following in vitro stimulation with MAP antigens.

Results - Calves were seronegative for anti-MAP antibodies at all times. Compared with the findings in control calves, antigen-specific IFN-γ production in circulating lymphocytes and prescapular lymph node cells from vaccinated calves was significantly higher. Culture of tissues from vaccinated calves yielded significantly fewer CFUs of MAP (2,417 CFUs/g), compared with tissues from control calves (15,709 CFUs/g). Furthermore, significantly fewer tissue samples from vaccinated calves yielded MAP in culture (21.8 tissues/calf), compared with findings in control calves (27.6 tissues/calf).

Conclusions and Clinical Relevance - Inoculation of calves with a killed MAP vaccine was associated with reduced colonization of intestinal tissues following experimental exposure to MAP. Use of the vaccine could potentially reduce transmission of MAP to calves in infected herds.

Johne’s Scientific Advisory Subcommittee Report
Suelee Robb-Austerman
This Subcommittee report is included at the end of this report.

Committee Business
Three action items and one resolution were taken under consideration, amended and passed as detailed below.

- **Action item 1**: The USAHA Johne’s Disease Committee tasks the NJWG to use beef and dairy producer focus groups to identify appropriate strategies to address Johne’s disease and develop a marketing plan based on the information received.
- **Action item 2**: The USAHA Johne’s Disease Committee will attempt to schedule the National Johne’s Working Group meeting on the same day as the Johne’s Committee meeting for future USAHA meetings.
- **Action item 3**: The USAHA Johne’s Committee requests approval from USAHA Executive Committee to spearhead the establishment, with representation from other relevant USAHA Committees, of a Working Group on Animal Health Risk Assessment for disease prevention and animal husbandry.
- **The Resolution** was titled Program Standard Revision with Updated Herd Classification System, and was forwarded to the Committee on Nominations and Resolutions.
CO-CHAIR SCOTT WELLS OPENED THE MEETING WITH ABOUT 60 PEOPLE IN ATTENDANCE.

REPORT FROM USAHA JOHNE’S COMMITTEE – COMMITTEE CHAIR ANDY SCHWARTZ PROVIDED COMMENTS ON THE PAST MEETING OF THE USAHA JOHNE’S COMMITTEE AND AN UPDATE ON USDA’S RESPONSE TO LAST YEAR’S RESOLUTIONS.

TREASURER’S REPORT – KEN OLSEN REVIEWED THE NJWG INCOME AND EXPENSES FROM THE PREVIOUS YEAR. ON SEPTEMBER 30, 2009 THE NJWG HAD APPROXIMATELY $25,000 IN AVAILABLE FUNDS.

NATIONAL JOHNE’S COORDINATOR’S ANNUAL REPORT – MIKE CARTER, USDA-APHIS-VS PROVIDED THE ANNUAL USDA JOHNE’S PROGRAM UPDATE. CONSISTENT WITH PREVIOUS YEARS AS USDA FUNDING HAS DECLINED, PARTICIPANT HERDS IN THE OFFICIAL PROGRAM HAS CONTINUED TO DECLINE. JOHNE’S TESTING HAS ALSO DECLINED WITH THE EXCEPTION OF MORE COST EFFECTIVE MEANS INCLUDING ENVIRONMENTAL POOLING AND MILK ELISA.

JOHNE’S FUNDING FOR FY2010 APPEARS TO BE FLAT FROM FY2009 AT $6.9 MILLION. WHILE USDA HAD INITIALLY AGREED WITH FUNDING DEMONSTRATION HERDS UNTIL 8 YEARS OF DATA COLLECTION, DEMONSTRATION HERD FUNDING WILL BE ENDING WITH THOSE FUNDS SHIFTED TO THE STATE COOPERATIVE AGREEMENTS. USDA WILL ALSO BE MOVING FROM INDIVIDUAL COOPERATIVE AGREEMENTS BY DISEASE TO A SINGLE VS COOPERATIVE AGREEMENT COVERING ALL DISEASES.

PRIVATE INDUSTRY PERSPECTIVES

DAIRY CATTLE INDUSTRY – CO-CHAIR JAMIE JONKER PROVIDED AN OVERVIEW OF JOHNE’S DISEASE INITIATIVES IN THE DAIRY INDUSTRY. HE NOTED THAT WHILE DAIRY HERD PARTICIPATION IN THE OFFICIAL PROGRAM IS AROUND 10%, SEVERAL RECENT SURVEYS SUGGEST THAT NEARLY TWO THIRDS OF DAIRY PRODUCERS ARE IMPLEMENTING A JOHNE’S CONTROL PROGRAM. A FEW INDIVIDUAL MILK COOPERATIVES AND PROPRIETARY PROCESSORS HAVE INDIVIDUAL JOHNE’S CONTROL EFFORTS UNDERWAY. MILK ELISA TESTING APPEARS TO PROVIDE AN ECONOMICAL AND CONVENIENT TESTING OPPORTUNITY FOR DAIRY PRODUCERS. FOR A SMALL SEGMENT OF THE DAIRY INDUSTRY, THE OFFICIAL HERD CLASSIFICATION PROGRAM IS IMPORTANT FOR MERCHANDISING OF GENETIC STOCK.

BEef CATTLE INDUSTRY – CO-CHAIR ELIZABETH PARKER PROVIDED AN OVERVIEW OF JOHNE’S DISEASE INITIATIVES IN THE BEEF INDUSTRY. THE STRONGEST OUTREACH FOR JOHNE’S DISEASE CONTROL APPEARS TO BE WITH SEED STOCK PRODUCERS. FOR MOST BEEF CATTLEMAN JOHNE’S DISEASE CONTROL IS CONDUCTED AS PART OF OVERALL HERD HEALTH ACTIVITIES.

Milk ELISA AND DAIRY HERD IMPROVEMENT ASSOCIATION (DHIA) – TODD BYREM PROVIDED AN OVERVIEW OF MILK ELISA TESTING THROUGH THE DHIA SYSTEM. DHIA NOW HAS 11 LABORATORIES IN THE U.S. AND TWO IN CANADA.
REPORT OF THE COMMITTEE

which run the Milk ELISA test. Additional DHIA associations offer testing conducted through these certified labs. This year, over 250,000 Milk ELISA tests will be conducted with a positive rate of about 6%. Most participating herds conduct testing prior to dry-off, although the test appears to be most sensitive in weeks 2-6 of lactation (prior to peak lactation).

DHIA record processing laboratories are examining opportunities for integrating Johne’s test results with producer management reporting software. This will provide greater opportunities for producers to utilize Johne’s test results for on-farm management decisions including calf management and culling. DHIA has also worked with USDA-AIPL to look at incorporating test results into genetic evaluations. Preliminary results indicate a genetic predisposition to Johne’s and reduced productivity.

Dairy Expo Meeting – Ken Olson reviewed the Johne’s meeting held in conjunction with the World Dairy Expo. The meeting focused on current activities on Johne’s disease being conducted across the dairy industry. Industry activities include producer level efforts from Tillamook County Creamery Association and Organic Valley cooperatives, DHIA activities related to Milk ELISA testing, and genetic evaluation activities from USDA-Animal Improvement Programs Laboratory (AIPL) and the American Jersey Cattle Association.

AI Industry – Charles Brown reported on perspectives from the AI industry. A.I. companies employee testing of animals (beginning about 12 months of age) prior to animals entering semen collection with positive animals removed. Testing continues throughout the productive life of bulls. A.I. companies provide Johne’s control and prevention information to producers who have a bull tested positive for Johne’s.

Draft Program Standards – Elisabeth Patton reviewed the draft program standards as two parts: immediate changes and herd classification system changes. Immediate changes include a new definition for an Authorized Collection Agent, Risk Assessment and Management Plan (RAMP) renewal duration, and the current herd classification changes in Appendix 1 and Appendix 2.

Herd Classification System – Scott Wells reviewed the scientific basis for the new proposed Herd Classification System which provides improved scientific accuracy for defining herd levels based upon true within herd prevalence. Elisabeth Patton then reviewed how these are implemented in the Draft Program Standards. The new proposed Herd Classification System would have 6 levels of quantified risk for Johne’s disease with increased flexibility on testing options to advance to the next level. This increased flexibility allows producers more options in determining how to spend their own dollars in the program. She also detailed how transition from the current system to the new system would occur.
**Recommendation:** The National Johne’s Working Group recommends that the USAHA Johne’s Committee endorse the Draft Program Standards with the new Herd Classification System.

**Small Group Discussion** – The session divided into four smaller groups for brainstorming on the future of the Voluntary Johne’s Disease Control Program and the NJWG. The groups reached similar conclusions about the need, in light of decreased Federal funding, for continued growth of the public-private partnership in Johne’s disease control. Herd Classification will remain important for select producers based upon their marketing needs for genetic stock. For most producers, Johne’s disease will remain part of general herd health management. The group noted that best management practices for Johne’s disease have positive implications on general animal health.

**Recommendation:** The USAHA Committee on Johne’s Disease tasks the NJWG to use beef and dairy producer focus groups to identify appropriate strategies to address Johne’s disease and develop a marketing plan based on the information received.

**Recommendation:** The National Johne’s Working Group recommends that the USAHA Committee on Johne’s Disease spearhead the establishment, with representation from other relevant USAHA Committees, a Working Group on Animal Health Risk Assessment for disease prevention and animal husbandry.
The Johne's Disease Scientific Advisory Subcommittee met to discuss the use and interpretation of the direct polymerase chain reaction (PCR) test for Johne's disease, primarily in context with the National Johne's disease program. Field data suggests that agreement between culture and direct PCR is high with moderate and heavy shedding animals, but not with low shedding animals. Preliminary data from 1 study suggests that direct PCR may identify less than 50% of low shedding animals, and can identify a large number of culture negative animals as positive particularly when there are heavy shedding animals in the herd at the time of sampling. While this does not affect the classification of herds within the current program structure, it is problematic for federal interstate movement rules and for States that have movement restrictions on animals classified as positive with an official Johne's disease test. Suggestions to address this problem included having a suspect range near the cut point, removing direct PCR from the list of official Johne's disease tests, or keep the uniform methods and rules (UMR) rules the same and consider the disagreement between the tests near the cut point an educational issue. The scientific advisory subcommittee will continue to meet and work for a scientific consensus on this issue remotely via the web and email. Interested parties are asked to contact Judy Stable, Judy.Stable@ars.usda.gov or Suelee Robbe-Austerman, Suelee.Robbe-Austerman@aphis.usda.gov.
NATIONAL JOHNE’S EDUCATION INITIATIVE REPORT

Teres Lambert
National Institute for Animal Agriculture

Through a National Disease Eradication Program Grant, the National Institute for Animal Agriculture (NIAA) oversees the National Johne’s Education Initiative and provides professional support to the Johne’s education efforts on a national scope. In line with this effort, NIAA submits an annual work plan that identifies communication strategies and tactics to help educate producers and veterinarians with the ultimate goal of helping to reduce the incidence of Johne’s disease in the United States. The approved work plan is then implemented.

This year’s budget for start-to-finish implementation of all National Johne’s Education Initiative (NJEI) tactics is $50,000.

Communication Tactic #1: National Johne’s Education Initiative Web Site

NIAA maintains and updates the National Johne’s Education Initiative web site and implement tactics to draw traffic to the web site and the information on it. A key tactic is that each news release and collateral piece includes the web site address.

Between April 1 and September 30, 2009, the NJEI web site received 126,846 total hits averaging 217.3 visitors per day. Further research shows that visitors checked out 3.25 different web pages per visit.

Communication Tactic #2: Collateral Pieces, Created 2008

Three brochures were developed in 2008, and these brochures continue to be disseminated upon request. The brochures include a risk assessment prevention and control piece targeting dairy producers, a risk assessment prevention and control piece targeting beef producers and a joint dairy and beef producer brochure about testing for Johne’s disease.

Between January 1 and October 4, 2009, the number of brochures requested and disseminated include:

- Risk assessment prevention and control brochures, beef: 1,272
- Risk assessment prevention and control brochures, dairy: 3,249
- Testing brochures, beef/dairy: 3,821

Funding was used to print 10,000 copies of each brochure, with a second printing funded when supplies were low. Current supplies include:

- Risk assessment prevention and control brochures, beef on hand: 250
- Risk assessment prevention and control brochures, dairy on hand: 1,800
REPORT OF THE COMMITTEE

Communication Tactic #2: Collateral Pieces, 2009

One brochure is scheduled to be created in 2009: a 16-page Q&A about Johne’s disease. The draft copy has been written and is with Dr. Carter for his input. The anticipated delivery date for this brochure is mid-November.

As with other collateral pieces developed, designated Johne’s coordinators (DJsCs) and extension specialists will be offered 100 free copies, with additional copies provided at print cost plus shipping.

Communication Tactic #3: News Releases

One news release has been written and disseminated to date to beef-specific and dairy-specific publications as well as general livestock magazines and newspapers and radio. This news release alerted producers and veterinarians to the 2nd New Horizons Workshop in Minneapolis in August.

An attention-getting letterhead using the blue and green NJEI color scheme was designed for news releases. The top element on the page includes the NJEI logo and web site address while the bottom element includes the logos of USDA and NIAA and addresses the NJEI partnership.

Communication Tactic #4: Feature Articles

NJEI started writing and disseminating feature articles that use the byline “T.S. Gatz” last year, and this tactic met with tremendous success. As such this tactic is in place again this year.

Unlike news releases which are perceived as being biased, feature articles are accepted at face value and information is viewed as unbiased since a feature article is written by a journalist rather than a company spokesperson or marketing/advertising agency.

Two feature articles have been written and disseminated this year to dairy publications:

One feature article highlighted Wisconsin dairy producers who lessened their incidence of Johne’s disease after implementing specific management strategies. The second article explained super shedders and the need to test for super shedders hopefully producers will eliminate super shedders from their herds.

Another feature article is set to be written and disseminated before the end of the year. This article will address the economics of Johne’s disease.

Communication Tactic #5: Dairy Johne’s Disease Newsletter

The newest communication tool implemented to further the reach of information about Johne’s disease, prevention and control practices and testing is a four-page dairy-specific Johne’s disease newsletter.

The dairy Johne’s disease newsletter debuted in July, with the most recent issue published in early October. A third issue will be created and disseminated in December.
JOHNE’S DISEASE

Due to limited state budgets and the desire to assist states with their communication efforts, the dairy newsletter has 50 editions per issue:

- One national edition
- 49 customized state editions—same content with change in contact information.

The national edition is disseminated to eight national dairy breed associations, the National Milk Producers Federation (for dissemination to its 31 member cooperatives) and the general press.

Customized state editions are emailed to:

- Respective DJC
- 450-plus State dairy extension specialists and state veterinarians
- 13 state dairy organizations such as Professional Dairy Producers of Wisconsin

Response to the newsletter has been overwhelmingly positive. Recipients report that the newsletter is being forwarded to dairy producers, sometimes printed and disseminated and/or articles are being cherry picked for further use.

The mailing list of the dairy Johne’s disease newsletter is quickly expanding as Dairy Herd Improvement Association (DHIA) staff has asked that they receive the newsletter for dissemination.

Communication Tactic #6: Beef Johne’s Disease Newsletter

The beef Johne’s disease newsletter is similar to the dairy Johne’s disease newsletter, but with all articles targeting beef producers. The beef Johne’s disease newsletter debuted in July, with the most recent issue set to go out in mid-October. A third issue will be created and disseminated in December.

This newsletter was initiated after learning from a National Animal Health Monitoring System’s study that more than 5 percent of beef producers say they are not familiar with Johne’s disease.

The national edition is disseminated to

- Three national beef organizations: National Cattlemen’s Beef Association, U.S. Cattlemen’s Association and R-CALF USA
- 15 national beef breed associations
- Several groups post the issue online

The 15 national breed associations have a total reach exceeding 75,000 seedstock producers and include:

- American Angus Association
- American Blonde d’Aquitaine Association
- American British White Park Association
- American Chianina Association
- American Gelbvieh Association
- American Hereford Association
- American International Charolais Association
- American Maine-Anjou Association
• American Salers Association
• American Simmental Association
• Braunvieh Association of America
• International Brangus Breeders Association
• North American South Devon Association
• Red Angus Association of America
• Santa Gertrudis Breeders International

To provide communication tools that meet national objectives while helping states that have limited budgets with their outreach efforts, customized state editions of each beef Johne’s disease newsletter are created and disseminated as well:

- 49 customized editions for individual state DJCs
- 44 customized editions include Beef Quality Assurance coordinator contact info in addition to the state-specific DJC contact info

**Communication Tactic #7: Interact with Media, Attend Producer Events**

NJEI staff person serves as the contact person for the media and directs the media to appropriate sources as needed.

Events attended to date in 2009 include: the National Cattlemen’s Beef Association, World Dairy Expo and the 2nd New Horizons Workshop. Attending allows NJEI to interact with producers, learn more so needs can be met and disseminate brochures.

**Projects Underway, Planned**

Three projects will be undertaken and finalized by the end of the year:

- Feature article on economics of Johne’s disease
- Feature article, beef-specific
- 16-page Q&A brochure
  - Anticipate November print date
  - Offer 100 free to each DJC
  - Offer 100 free to veterinarians, state dairy and beef extension specialists
  - Disseminate free upon request from producers
  - Additional copies available at print cost + shipping

**Acknowledgement**

NIAA acknowledges Dr. Michael Carter, USDA-APHIS-VS for his flexibility and assistance with project implementation and USDA for funding support.
The Committee met on October 14, 2009 at the Town and Country Hotel, San Diego, Calif., from 8:00 a.m. to 12:00 p.m. There were 44 members and 56 guests present. Chair Tony Forshey welcomed Committee members and guests to the meeting and provided opening remarks concerning Committee format changes to a forum.

He also reviewed the 2008 Resolution and USDA, Animal and Plant Health Inspection Service’s (APHIS) response with members.

Dr. John Clifford, Deputy Administrator, USDA-APHIS-Veterinary Services (VS), reported that USDA-APHIS filed funding input to the Secretary of Agriculture and awaits feedback. We have animal disease program continuation for scrapie, etc., and are confident we will get there. There was $5.3 million passed by Congress; a $9 million reduction.
REPORT OF THE COMMITTEE

Cooperative agreements go thru March 2010 and we have $5 million funds available, so there is confidence we can get through this FY10. We need to make sure that what we have today continues thru the current fiscal year.

John Picanso, USDA-APHIS-VS, reported the information technology roadmap was made available at this meeting in hard copy, and was reviewed during several committee meetings this week. Mobile information management is to be reviewed for the future. He has been collecting further comments regarding Veterinary Services Process Streamlining (VSPS), and received requests to integrate laboratory data for resulting to bring value and gain efficiency with the laboratory information management system, including barcode, etc.

A request for information (RFI) is being posted for Emergency Management Response System (EMRS) to evaluate commercial systems for case and investigation management. Plans are underway to modernize the animal health surveillance management (AHSM) system and generic database (GDB). APHIS plans to further evaluate systems management and information management offered by commercial companies. Some Fortune 15 companies have met with APHIS with interest in global systems applied to animal and food products.

The Committee reviewed the National Assembly resolution and later addressed the resolution in the business meeting session.

Several comments were made on the key agenda topic: “Development of a functional animal identification program for disease control using state based identification (ID) systems under APHIS-VS standards. What are states using now that is working?”

- Nancy Robinson - Members have done ID forever. We need to go back to a seamless system. There needs to be continuation of use of animal ID, as it dropped because of the end of the national brucellosis program. I think we should have continued. Location identifier is important, maintained in a state system, with focus on what is already in place.
- John Huntley - Suggested it is important to change wording in the resolution regarding official individual or group ID - to support bullet #1.
- Taylor Woods – We developed a system within the Missouri markets and put into a system with 400,000+ cattle recorded at markets. Wants the best ID system for cows going thru the chute and must have an ID.
- Keith Roehr – Suggests urging momentum to occur on ID in the new administration – and we should make clear our ideas on ID that could mitigate potential disease problems. He suggests significant steps can do meaningful things and thus would like to
LIVESTOCK IDENTIFICATION

see a resolution come out of this committee.

- Dustin Oedekoven – In SD we have a healthy auction market and keep data in a state database. If continued, it is well supported.
- John Clifford – If you have ideas or suggestions that would be helpful. We would like to hear from you.
- Dennis Hughes - Orange official calf hood vaccination (OCV) RFID tags are going over well and part of protocol and premium for calves. He suggests the word ‘shall’ rather than ‘will’ be held.
- Ernie Morales– without national premises ID participation it will not work.
- Robinson – Get most of premises via market commerce, I think over a few years a great number of premises will follow animal ID record recording.
- Paul McGraw – Secondary premises did not show up initially, but now all are able to map for each location.
- Patrick Webb – Pork quality assurance has site assessment program and we encourage all sites to have individual premises for each production sites so no premises for traceback are missed.
- Carl Heckendorf – In Colorado, people are universally in favor of writing down name and number if held by state official and storage. Suggests using RFID number and system as he searched health certificates via the GlobalVetLink system for a time frame of three years and had every certificate of veterinary inspection (CVI) within five minutes. Suggests a tie-in with ID number to keep track of all animals. Keeping it simple will yield more buy-in. Suggests a big NAIS-type system will meet strong resistance.
- Bob Hillman – Seven years ago, desire was to begin an ID program with breeding cattle……and we learned feeding cattle became breeding cattle in some cases and thus caused TB traceability problems. We need to consider to not allow feeding cattle to be converted to breeding.
- Huntley - Calf ranches and dairy operations are important to trace and thus livestock are identified at time of leaving farms.
- Heckendorf – Lessons learned are that people that use it will subscribe to it, but incremental stages of improvement are important.
- Mike Martin – Key role for federal system is to route data to the right laboratories for capacity management. Use Federal funds very conservatively and not overkill at the Federal level.
- Gary Wilson reviewed various forms of identify used within each state and stated there were 394 tags with 50 state databases.
- Patrick Webb reviewed the ID tags used by pork producers identifying premises.
- It was also suggested to consider leveraging success of brucellosis program and that traceability hinges on major trading
partner success.

Committee Business:

One resolution was presented and unanimously passed, titled “National Animal Identification System” and forwarded to the Committee on Nominations and Resolutions.
REPORT OF THE USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY NETWORK

Co-Chairs: Barbara E. Powers, CO; Richard E. Breitmeyer, CA
Vice Chairs: Terry F. McElwain, WA; David T. Marshall, NC

Bruce L. Akey, NY; Bill Barton, ID; Tammy R. Beckham, TX; James T. Case, CA; Tony A. Caver, SC; Patrick G. Halbur, IA; Sharon K. Hietala, CA; Bob R. Hillman, TX; Pamela J. Hullinger, CA; Jay Kammerzell, CO; Barbara M. Martin, IA; Thomas S. McKenna, WI; Lanny W. Pace, MS; Elizabeth J. Parker, DC; Robert H. Poppenga, CA; Harry Snelson, NC; Bruce N. Stewart-Brown, MD; George A. Teagarden, KS.

The Committee met on October 10, 2009 at the Town and Country Hotel, San Diego, Calif., from 12:00 to 3:00 p.m. There were 17 members and 13 guests present. The attendees introduced themselves.

USDA Vision for the National Animal Health Laboratory Network (NAHLN)

The first presentation was from Dr. Beth Lautner who presented the USDA vision for the National Animal Health Laboratory Network (NAHLN) and update on the NAHLN coordinating council formation. She reviewed the history of the NAHLN and defined the roles of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and USDA, National Institute for Food and Agriculture (NIFA) in the NAHLN. She announced that members of the newly formed coordinating council had been contacted and that a draft charter was available for them (which the coordinating council may review and edit). The first meeting is to be yet this year.

NAHLN Coordinating Council

The next discussion was how the current committee would interact with the NAHLN coordinating council. It was recognized that the AAVLD/USAHA joint committee could be a forum for larger AAVLD and USAHA input and a forum for industry input as well. It was further pointed out that the joint committee would be more flexible and able to write resolutions and letters to USDA as well as assist with legislative issues. The joint committee will continue for one year and be co chaired by Barb Powers and Dave Marshall and they will ensure that items from the committee are addressed to the coordinating council. Further discussion of how this committee could interact with or combine with the laboratory workforce committee ensued.

Committee Correspondence

A discussion of response to letters written to USDA by the Committee (and approved by the respective executive committees) was next addressed. These included issues related to blanket purchase
agreements, wildbird influenza surveillance and Toxicology. Dr. Lautner mentioned she has funding for influenza work targeted to H1N1 and swine influenza but could perhaps be addressed to swine health surveillance or influenza in other species. A discussion also ensued about the challenges the swine industry faces regarding the consequences of sample submission to the NAHLN if a positive H1N1 virus was detected.

**Toxicology in the NAHLN Workgroup**

The next issue was Toxicology. Steve Hooser gave an update on the progress of the Toxicology in the NAHLN workgroup. They have worked with FDA and AVMA to seek funding for the network. They are involved with the Food and Drug Administration (FDA) and PetNet and have had limited funding for one proficiency test. The data from the survey of laboratory capacity and equipment will be submitted for publication. It was decided that the Toxicology workgroup would draft a letter for funding a Toxicology network similar to the Food Emergency Response Network (FERN), or a part of the FERN, (using the white paper they have already written), this would be reviewed by the AAVLD/USAHA committee and signed by the respective organizations executive boards.

**AVMA Efforts for the NAHLN**

An update from Dr. Shelton from AVMA was given explaining the efforts AVMA have done for the NAHLN. They have a one page request for support for $30 million for the NAHLN and $12 million for Toxicology (previously approved by this committee). They have been working on addressing the funding shortfall by talking to legislative staffers. A discussion ensued on the best methods of funding the NAHLN, through the Food and Agriculture Defense Initiative or to “codify” the NAHLN. This will be further discussed.

A newly formed modeling workgroup and the draft charge was finalized. Dr. Hullinger will chair this workgroup. Other updates included the Federal Emergency Management Agency (FEMA) equipment list input, the progress of the IT subcommittee and ongoing work of the NAHLN. A discussion of Aquaculture was the final issue discussed.
REPORT OF THE COMMITTEE ON NOMINATIONS
AND RESOLUTIONS

Chair: Mr. James W. Leafstedt, SD

J Lee Alley, AL; Carter Black, GA; Philip E. Bradshaw, IL; Jones W. Bryan, SC; Clarence L. Campbell, FL; Stephen K. Crawford, NH; Leonard E. Eldridge, WA; Joe B. Finley, TX; Bob Frost, CA; Thomas J. Hagerty, MN; Bob R. Hillman, TX; Dennis A. Hughes, NE; Maxwell A. Lea, Jr., LA; Donald H. Lein, NY; Bret D. Marsh, IN; Michael R. Marshall, UT; Richard H. McCapes, CA; John R. Ragan, MD; Glenn B. Rea, OR; John C. Shook, PA; H. Wesley Towers, DE; Max A. Van Buskirk, PA; Richard D. Willer, HI; Larry L. Williams, NE; Ernest W. Zirkle, NJ.

2009 OFFICER NOMINATIONS

PRESIDENT......................Richard E. Breitmeyer, Sacramento, CA
PRESIDENT-ELECT....................Steven L. Halstead, Lansing, MI
FIRST VICE-PRESIDENT.............David T. Marshall, Raleigh, NC
SECOND VICE-PRESIDENT.......David L. Meeker, Alexandria, VA
THIRD VICE-PRESIDENT.............Stephen K. Crawford, Concord, NH
TREASURER.........................William L. Hartmann, St. Paul, MN

2009 DISTRICT DELEGATES

NORTHEAST..............................J. I. Enck, Jr., Pennsylvania;
                                      E. W. Zirkle, New Jersey
NORTH CENTRAL..........................Velmar Green, Michigan;
                                      Jay Hawley, Indiana
SOUTH.....................................Gene Lollis, Florida;
                                      A. Gregario Rosales, Alabama
WEST...............................Bill Sauble, New Mexico;
                               H. M. Richards, III, Hawaii
REPORT OF THE COMMITTEE

2009 RESOLUTIONS

RESOLUTION NUMBER: 1  APPROVED
SOURCE: COMMITTEE ON JOHNE’S DISEASE

SUBJECT MATTER: PROGRAM STANDARD
REVISION WITH UPDATED HERD
CLASSIFICATION SYSTEM

BACKGROUND INFORMATION:
The Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program was last revised in 2006. The Committee on Johne’s Disease Scientific Advisory Subcommittee has been tasked to propose an improved basis for the Herd Classification System to provide better scientific accuracy for defining herd levels based upon true within herd prevalence. The new proposed Herd Classification System would have 6 levels of quantified risk for Johne’s disease with increased flexibility on testing options to advance to the next level in the classification system. This increased flexibility allows producers more options in determining how to spend their own dollars in the program. The new proposed Herd Classification System would also allow transition from the current system to the new system to ensure continued producer participation.

RESOLUTION:
The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) adopt the draft Program Standards for the Voluntary Bovine Johne’s Disease Control Program including the new Herd Classification System. Additionally, USAHA requests USDA-APHIS-VS develop associated educational materials for the Johne’s Program to inform producers about the new program standards including changes and transition to the new Herd Classification System.

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RESOLUTION NUMBER: 2  APPROVED
SOURCE: COMMITTEE ON ANIMAL
EMERGENCY MANAGEMENT

SUBJECT MATTER: KNOWLEDGE AND CAPABILITY
GAPS RELATED TO MASS ANIMAL MORTALITY MANAGEMENT

BACKGROUND INFORMATION:
Recent natural disasters and animal disease events requiring disposal of mass animal mortality illustrate the need to be prepared for incident-dependent disposal challenges of large-scale poultry and livestock losses. Advantages and disadvantages of existing carcass disposal technologies
and environmental health consequences of burial have not been adequately studied, thus the long term impacts of burial remain unknown. Better information on the impact of leachate and gasses produced by burial or composting methods and the impact of end-products of emerging disposal methods is in demand.

Other disposal issues, such as safe and legal disposal of animals possibly affected by prion diseases, reduced capacity of the rendering industry, and the additional disposal restrictions imposed on animal industries as a result of the 2008 Food and Drug Administration (FDA) Bovine Spongiform Encephalopathy (BSE) Ban rule entitled “Substances Prohibited from Use in Animal Food or Feed” require further evaluation of current and emerging disposal methods. Recent livestock industry and American Veterinary Medical Association (AVMA) memos and policy statements also support research to develop appropriate animal disposal mechanisms subsequent to the FDA rule and for disaster response.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) and Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) work with and encourage the United States Environmental Protection Agency (EPA), United States Department of Health and Human Services (DHHS), United States Department of Homeland Security (DHS), and appropriate research entities to support:

- Expanded research to assess short and long-term impacts on animal, public and environmental health of existing and emerging carcass disposal methods and the development of environmentally-friendly best management practices.
- Animal agriculture emergency management funding streams to enable state and local agriculture or animal health agencies to address gaps in capacity to rapidly handle carcass surges in case of mass animal casualties, such as expanding landfill areas, establishing composting sites, and expanding rendering capacity. Equipment and systems for carcass disposal should be added to the Homeland Security Approved Equipment List to enable states to more readily respond to emergency animal carcass disposal needs.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 3 APPROVED
SOURCE: COMMITTEE ON AQUACULTURE

SUBJECT MATTER: FEDERAL FUNDING FOR A NATIONAL AQUATIC ANIMAL PATHOGEN TESTING NETWORK

BACKGROUND INFORMATION:
In order to protect the health of wild and cultured fish and shellfish, provide quality inspections in support of interstate and international trade, and meet challenges associated with implementation of the National Aquatic Animal Health Plan (NAAHP), the National Aquatic Animal Pathogen Testing Network (NAAPTN) is needed. The participating laboratories would all use standardized protocols for the detection of pathogens important in interstate and international trade and to the natural aquatic resources of the nation, or included in the NAAHP. These protocols would specify a standard approach to pathogen detection, calibration and operation of all relevant equipment, and the collection, handling, transport, storage, and preparation of samples for testing. Rather than attempt to establish a NAAPTN in a single step, the program should begin with a trial period to demonstrate proof of concept. This effort would use viral hemorrhagic septicemia (VHS) testing as the model for an aquatic disease diagnostic laboratory network. The goals of the trial period would be to:

a) establish a collaborative structure to develop standardized protocols
b) gain experience in the establishment of training programs
c) develop methods to ensure laboratory compliance
d) develop standardized reference materials for lab use
e) develop proficiency testing samples for labs
f) develop mechanisms for collecting lab results
g) determine test accuracy and sensitivity among laboratories
h) determine the need for formal centralized training of laboratory personnel
i) establish a mechanism to validate future pathogen screening methodology

The United States Animal Health Association (USAHA) / American Association of Veterinary Laboratory Diagnosticians (AAVLD) Committee on Aquaculture in consultation with the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), United States Department of the Interior (USDI), Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries has been working to develop a plan that outlines the structure and implementation of this laboratory network.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health...
Inspection Service (APHIS), Veterinary Services (VS) in partnership with the United States Department of the Interior (USDI) Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration (NOAA) Fisheries to provide funding, facilitate, and participate in a pilot National Aquatic Animal Pathogen Testing Network.

RESOLUTION NUMBER: 4  APPROVED
SOURCE: COMMITTEE ON AQUACULTURE
SUBJECT MATTER: IMPLEMENTATION OF THE NATIONAL AQUATIC ANIMAL HEALTH PLAN

BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), the United States Department of the Interior (USDOI) Fish and Wildlife Service (FWS) and the National Oceanographic and Atmospheric Administration (NOAA) Fisheries have outlined a proposal for a National Aquatic Animal Health Plan (NAAHP) for the United States. The overall objective of the NAAHP is to assist federal and state agencies and aquaculture industries, combat aquatic animal diseases, meet harmonized interstate and international standard and requirements, and assist the growth of United States aquaculture and protect natural (wild) resources.

Key elements of the NAAHP include: identifying diseases of regulatory concern; developing and validating appropriate laboratory diagnostic assays within a National Aquatic Diagnostic Laboratory Network; and, prevention, control and eradication measures for these diseases. An important component of the NAAHP is the National Advisory Committee for Aquatic Animal Health to provide the opportunity for input from all stakeholders, including representatives from wildlife, agriculture and animal health agencies, the aquaculture industry, veterinary and other fish health experts, and the federal partners.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the Secretary of Agriculture to establish a Federal Advisory Committee for Aquatic Animal Health as described in the National Aquatic Animal Health Plan (NAAHP).

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RESOLUTION NUMBER: 5, 7, 17, 24, 29, 37, 44, and 45 Combined
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON, AND CAMELIDS
COMMITTEE ON IMPORT-EXPORT
COMMITTEE ON INTERNATIONAL STANDARDS
COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
COMMITTEE ON INFECTIOUS DISEASES OF HORSES
COMMITTEE ON SHEEP AND GOATS
COMMITTEE ON BLUETONGUE AND RELATED ORBIVIRUSES

SUBJECT MATTER: FAILURE OF IMPORTING COUNTRIES TO FOLLOW WORLD ORGANIZATION FOR ANIMAL HEALTH GUIDELINES FOR IMPORTATIONS OF ANIMALS

BACKGROUND INFORMATION:
United States (U.S.) livestock exporters are facing an escalation of animal health requirements by importing countries that make it difficult or impossible to export U.S. genetic material. Many countries are using animal health protocols as bargaining chips in trade negotiations to obtain more favorable treatment for other trading items that have nothing to do with animal health. Many countries are now requiring tests for imported animals for diseases that they have in their own countries and for which they have no control programs. This is contrary to the spirit and recommendations of the World Organization for Animal Health (OIE).

The OIE Terrestrial Animal Health Code, Chapter 5.1 and article 5.1.2 outlines the responsibilities of the importing country.

Steps should be taken to ensure that importing countries which are members of OIE follow the recommendations of the Animal Health Code.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to initiate all trade negotiations on import and export protocols with reference to compliance with World Organization for Animal Health (OIE) guidelines and Sanitary and Phytosanitary (SPS) rules.

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RESOLUTION NUMBER: 6 and 18 Combined APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON, AND CAMELIDS
COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: INVESTIGATION OF RISK POSED BY EMERGING PESTIVIRUSES

BACKGROUND INFORMATION:
It is well established that infection of livestock with pestiviruses causes significant losses to producers. The primary concerns are reproductive failure, persistently infected animals and the induction of immune suppression in infected animals, possibly leading to more severe disease. Several atypical pestiviruses, for example, hobi and pronghorn pestiviruses, have recently been isolated. Some of these viruses cause reproductive and immunological disease in domestic livestock. Further, it is unknown whether currently available diagnostic tests can detect and differentiate these viruses, and if currently available vaccines are protective. The risk and impact of infection of domestic animals with these atypical pestiviruses is largely undetermined. Research is needed to determine the presence, prevalence, and risk posed to domestic livestock by these emerging pestiviruses. This requires the design and validation of tests to be used in surveillance and differentiation of pestiviruses, as well as development of vaccines that will effectively protect livestock.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) to initiate research to determine the risk and impact of emerging pestiviruses, especially those that may be difficult to differentiate from bovine viral diarrhea virus, on domestic livestock. Additionally, the USDA-ARS is urged to sustain research to determine the effectiveness of current vaccines and diagnostic assays in protecting domestic livestock industries from the detrimental effect of these viruses.

RESOLUTION NUMBER: 7 Combined with 5
SOURCE: COMMITTEE ON IMPORT – EXPORT
SUBJECT MATTER: FAILURE OF IMPORTING COUNTRIES TO FOLLOW WORLD ORGANIZATION FOR ANIMAL HEALTH (OIE) GUIDELINES FOR IMPORTATION OF ANIMALS

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 8 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: CONTAGIOUS EQUINE METRITIS (CEM)

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), initiated a review of the United States’ contagious equine metritis (CEM) import activities. The CEM Program Review Team was comprised of members representing VS’ National Veterinary Services Laboratory (NVSL), National Center for Import and Export (NCIE), National Center for Animal Programs (NCAHP), Center for Veterinary Biologics (CVB), policy program and development staff, area offices, state veterinarians and university personnel.

The 2009 United States CEM incident involving 48 states and 991 exposed equids initiated “The First Conference of Experts on CEM” at the United States Animal Health Association (USAHA) meeting in San Diego on October 9, 2009. The conference purpose and intent was to review recent developments concerning the national incident of CEM, discuss CEM protocols, review ongoing *Taylorella equigenitalis* research, and to discuss possible further CEM research and regulatory actions at the state and federal level. Concerns were addressed on the lack of consistent CEM testing and treatment protocols at both a state and federal level.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to immediately implement the recommendations of the 2007 Contagious Equine Metritis Working Group in VS Memorandum.

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RESOLUTION NUMBER: 9 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: SUPPORT FOR SECTION 1433 FORMULA FUNDS FOR ANIMAL HEALTH AND RESEARCH

BACKGROUND INFORMATION:

Section 1433 Formula Funds (P.L. 95-113) have been in existence since 1977 and provide an extremely valuable source of funds for fundamental research on diseases of food producing animals. These
funds are important funds for the Colleges of Veterinary Medicine and the Veterinary Science departments in the United States. In addition, some of the states with veterinary colleges have in the past provided some monies for faculty wishing to conduct food animal related research on local and emerging diseases; however these funds have been essentially eliminated in many of the states. As a result, college faculties are shifting to National Institutes of Health (NIH) research which will not support research on agricultural animals or on food safety at the farm level. Section 1433 Formula Funds have also supported training graduate students in most colleges and veterinary science departments. There are no other funds available at this time to provide this much needed support.

For a number of years the President’s budget had not requested any money for Section 1433 Formula Funds, but Congress has provided approximately $5 million annually. Recently that amount has dipped to slightly under $3 million.

**RESOLUTION:**

The United States Animal Health Association (USAHA) requests that the President include the authorized level of $10 million for Section 1433 Formula Funds (P.L. 95-113) in his Annual Budget request. USAHA also requests the House of Representatives and Senate Agriculture Appropriations Committees fund Section 1433 Formula Funds (P.L. 95-113) at the authorized level of $10 million per year.

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**RESOLUTION NUMBER: 10 APPROVED**

**SOURCE:** COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE

**SUBJECT MATTER:** SUPPORT FOR REGIONAL CENTERS OF EXCELLENCE IN FOOD SYSTEMS VETERINARY MEDICINE

**BACKGROUND INFORMATION:**

The 2008 Farm Bill created a new regional Centers of Excellence Program in food systems veterinary medicine. Centers of Excellence (Centers) would serve to train more veterinarians to address the needs of contemporary livestock and poultry enterprises in the United States. The Centers would also serve as research units, addressing such areas as production diseases (enterococcal mastitis and lameness in dairy cattle; porcine reproductive and respiratory syndrome (PRRS) in swine; lameness due to bone and joint disease in poultry, etc.), animal welfare issues, and environmental contamination. The Centers would have faculty supported by the United States Department of Agriculture (USDA), Agriculture and Food Research Initiative (AFRI) or National Institute of Food and Agriculture (NIFA) that would be integrated with faculty from colleges of
REPORT OF THE COMMITTEE

veterinary medicine to train students either regionally or nationally about the needs of contemporary livestock and poultry production units in rural America.

Collaborations with staff veterinarians from USDA, Food Safety and Inspection Service (FSIS), Animal and Plant Health Inspection Service (APHIS) and United States Department of Health and Human Services (USDHHS), Food and Drug Administration’s (FDA), Center for Veterinary Medicine (CVM) would provide approximately 20 training exercise days per year to veterinary students rotating through the Centers. As many as 10 to 15 students would be at the Centers at any one time for rotations lasting four to 12 weeks for in-depth training during their fourth year of veterinary college. Up to 60 veterinary students would be trained at each Center in any one year. Post-graduate training for residents and graduate students would also be offered.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the President include funding for the Regional Centers of Excellence in food systems veterinary medicine in the Annual Budget and that the United States Department of Agriculture (USDA) develop regulations and implementation plans for the Centers.

USAHA requests that the House of Representatives and Senate Agriculture Appropriations Committees fund the Centers at $15 million per year.

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RESOLUTION NUMBER: 11  APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE
SUBJECT MATTER: SUPPORT FOR FOOD ANIMAL RESIDUE AVOIDANCE DATABANK

BACKGROUND INFORMATION:

The Food Animal Residue Avoidance Databank (FARAD), in existence since 1982, develops and maintains a unique food safety databank that provides information to veterinarians, livestock producers, and state and federal regulatory and extension specialists on avoiding both animal drug residues and environmental contaminants in meat, milk and eggs. FARAD’s databank provides information regarding the time-course of drug and chemical depletion in blood and tissues of animals following the routine use of drugs in animal agriculture, for the extra-label use of drugs in animal agriculture, and during food contamination emergencies which might arise from exposure to environmental toxins, particularly pesticides, either accidentally or intentionally introduced into the food supply. Additionally, FARAD provides rapid response assistance through both its
telephone hotline and web access for inquiries concerning residue issues that affect food animal health and food product contamination. FARAD provides assistance in trade matters by maintaining databanks of foreign drug approvals and it trains veterinary students and veterinary medical residents in the principles of residue avoidance.

Congress funded FARAD at $1 million for fiscal year 2010.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the President to request and the United States Congress to fund the Food Animal Residue Avoidance Databank (FARAD) at $2.5 million annually.

RESOLUTION NUMBER: 12  APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE
SUBJECT MATTER: INCREASED FUNDING FOR EXPANDED RESEARCH FOR THE DEPARTMENT OF HOMELAND SECURITY NATIONAL CENTER FOR FOREIGN ANIMAL AND ZOONOTIC DISEASE DEFENSE

BACKGROUND INFORMATION:

The National Center for Foreign Animal and Zoonotic Disease Defense (FAZD Center) is a Department of Homeland Security national academic center of excellence involving a coalition of seventeen academic institutions. The FAZD Center cooperates with the Department of Energy’s national laboratories and other federal institutions to address the priority needs of the United States (U.S.) related to natural or intentional introduction of exotic animal diseases into this country. The FAZD Center is currently developing vaccines and diagnostics for foot and mouth disease, avian influenza and Rift Valley fever and is moving toward future validation and licensing of these products. It has developed the capacity to address a substantially broader agenda. The FAZD Center is developing analytic tools that inform decision makers assessing the consequences of alternative policy and regulatory decisions to protect, intervene, and recover from outbreaks of exotic disease, including a focus on methods to enhance continuity of business during and after outbreaks of these diseases. The FAZD Center provides education and outreach programs for 100 graduate students and hundreds of private sector operators and government officials on these diseases at both regional and national levels.

In the five years of its existence, the FAZD Center has brought together an integrated team of scientists and educators that uses an
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integrated approach to produce knowledge, analytic tools and specific products contributing to the solution of the most pressing problems related to the prevention, intervention, and recovery from the introduction of exotic animal diseases in the U.S. The ability to exploit the previous investment and current capacity of the FAZD Center team is threatened by a projection of serious erosion of funding in future years.

Funding for the FAZD Center has been reduced from an earlier $6 million per year to $4.2 million for FY2009. The indicative budget for the FAZD Center from FY2010 through FY2014 is $4 million per year. This level of core funding for the FAZD Center is insufficient to maintain the integrity and momentum of the multi-institutional team that has been established.

RESOLUTION:

The United States Animal Health Association (USAHA) urges Congress to appropriate funds to restore support for the National Center for Foreign Animal and Zoonotic Disease Defense (FAZD Center) to $6 million per year for FY2010 – FY2014. USAHA requests the United States Department of Homeland Security (USDHS), Science and Technology (S&T) Directorate maintain the integrity and momentum of the FAZD Center to meet the pressing needs for protection against intentional or accidental introduction of exotic animal disease into the United States.

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RESOLUTION NUMBER:  13 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE
SUBJECT MATTER: REVIEW OF COMPENSATION FOR RESEARCH AND DIAGNOSTIC VETERINARIANS

BACKGROUND INFORMATION:
Veterinarians are employed in the United States Departments of Agriculture, Commerce, Defense, Homeland Security, Health and Human Services, Interior, Justice, Veterans Affairs and in the Environmental Protection Agency, National Aeronautics and Space Administration, Smithsonian, and the United States Agency for International Development. Veterinarians with advanced scientific training and expertise, including advanced degrees and board certification credentials, are critically needed for the prevention, control and eradication of animal diseases, as the first line responders for many human health issues and as a workforce for ensuring a safe global food supply. The research and diagnostic testing they conduct ensures animal diseases are rapidly identified and vaccines developed. In order to attract and retain these scientists additional compensation is required.
RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Departments of Agriculture, Commerce, Defense, Homeland Security, Health and Human Services, Interior, Justice, Veterans Affairs, and the Environmental Protection Agency, National Aeronautics and Space Administration, Smithsonian, and the United States Agency for International Development to adjust salaries to achieve parity with other health professional salaries in order to appropriately compensate, recruit and retain veterinarians, including those with advanced degrees or board certification, in high priority research fields, diagnostic fields, and disease surveillance, prevention and control.

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RESOLUTION NUMBER:  14 APPROVED
SOURCE:  COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE
SUBJECT MATTER:  VETERINARY MEDICINE LOAN REPAYMENT PROGRAM

BACKGROUND INFORMATION:

The Veterinary Medicine Loan Repayment Program (VMLRP) was established by Congress in 2003 by the National Veterinary Medical Service Act (NVMSA) and is a student loan repayment program for veterinarians who practice in underserved areas. This loan repayment program is to be administered by the National Institute for Food and Agriculture (NIFA), an agency within the United States Department of Agriculture (USDA). The Secretary of Agriculture can determine veterinary shortage areas in rural practice, urban practice, federal and state government agencies, and discipline areas. Recently highlighted awareness of bioterrorism and foreign animal disease threats to public health and food safety has heightened the urgency for a fully-funded and implemented program. The VMLRP also creates a reserve corps of veterinarians available for mobilization in the event of an animal disease emergency or disaster.

USDA published interim final regulations to govern the program in the July 9, 2009 Federal Register. Veterinarians participating in the program will be required to practice in designated areas of veterinarian shortages which will be published in the Federal Register.

Adequate funding for VMLRP is $20 million annually. Congress awarded the program modest appropriations in fiscal years 2006 ($495,000), 2007 ($495,000), 2008 ($868,875) and 2009 ($2,950,000). The President recommended $3 million for fiscal year 2010. Congress appropriated $4.8M for the VMLRP in the fiscal year 2010 Agriculture Appropriations Bill.
RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Congress fund the Veterinary Medicine Loan Repayment Program (VMLRP) (PL 108-161) at $20 million for fiscal year 2011.

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RESOLUTION NUMBER: 15 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: VETERINARY PUBLIC HEALTH WORKFORCE AND EDUCATION ACT

BACKGROUND INFORMATION:
There are critical shortages of veterinarians working in public health and rural practice disciplines such as bioterrorism and emergency preparedness, environmental health, food safety and security, food production systems, regulatory veterinary medicine, diagnostic laboratory medicine and biomedical research. There are only 28 veterinary medical colleges in the United States, and they do not have sufficient capacity to meet all of these needs.

All of these colleges are operating at maximum student capacity due to space limitations for teaching, diagnostics, and research. Laboratories, teaching hospitals, veterinary research facilities, and animal diagnostic areas are built specifically for use with animals ranging from laboratory animals, livestock species, and wildlife.

HR 2999, The Veterinary Public Health Workforce and Education Act addresses these critical needs by providing:
- A competitive grant program for academic veterinary institutions for
  - New construction and/or new equipment
  - Expansion of post-Doctor of Veterinary Medicine (DVM) training opportunities
  - New faculty salaries
  - Curriculum development
  - Scholarships
- Programs to support faculty recruitment and retention
- A rotating fellowship program run by the United States Department of Health and Human Services (USDHHS)
- A Division of Veterinary Medicine and Public Health at the Health Resources and Services Administration

RESOLUTION:
The United States Animal Health Association (USAHA) supports the Veterinary Public Health Workforce and Education Act and urges the United States Congress to pass this legislation.

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NOMINATIONS AND RESOLUTIONS

RESOLUTION NUMBER: 16 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC
LABORATORY AND VETERINARY
WORKFORCE DEVELOPMENT
SUBJECT MATTER: VETERINARY SERVICES
INVESTMENT ACT

BACKGROUND INFORMATION:

The Veterinary Services Investment Act (VSIA) was introduced in the House of Representatives on July 31, 2009 and is expected to be introduced in the Senate at the end of September 2009. The VSIA will help ensure a stable and safe food supply for citizens in the U.S.

The American Veterinary Medical Association (AVMA) reports that 60 percent of the veterinary school graduates in 2009 entered private practice of which only five percent opted to practice large-animal medicine. The Government Accountability Office (GAO) has predicted a veterinarian shortage in the coming years. This shortage already exists in parts of rural America and shows signs of worsening unless current trends are reversed.

This legislation will establish a new competitive grant program to relieve veterinary shortage situations and support veterinary services. It will help address the challenges faced by America’s farmers and rural communities which rely heavily on large animal veterinarians. Grants awarded under the program may be used for a variety of purposes including:

- Promoting recruitment, placement, and retention of veterinarians, veterinary technicians, students of veterinary medicine and students of veterinary technology.
- Assisting veterinarians with establishing or expanding practices for the purpose of equipping veterinary offices, sharing in the overhead costs of such practices, or to the establishment of mobile veterinary facilities where at least a portion of such facilities will address education or extension needs.
- Providing financial assistance for veterinary students, veterinary interns and externs, fellows and residents, and veterinary technician students to attend training programs in food safety or food animal medicine to cover expenses other than tuition.
- Establishing or expanding accredited veterinary education programs, veterinary residency and fellowship programs or veterinary internship programs or veterinary internship and externship programs in coordination with accredited colleges of veterinary medicine.
- Programs for tele-veterinary medicine where such practices shall at least in part contribute to veterinary extension, education, or research.
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- Assisting the office or position of a state veterinarian or animal health official to coordinate veterinary services and food protection issues.
- Assessments of veterinarian shortage situations and preparation of applications for designation as a shortage situation.
- Continuing education and extension, including distance-based education, for veterinarians, veterinary technicians, and other health professionals needed to strengthen veterinary programs and enhance food safety.
- Recruiting and retaining faculty at accredited colleges of veterinary medicine.
- Programs, in coordination with universities or local educational agencies, to encourage students in secondary schools to pursue a career in veterinary medical or science professions.

VSIA will be administered by the National Institute for Food and Agriculture (NIFA), an agency within the United States Department of Agriculture (USDA). The Secretary of Agriculture shall award a preference to applications that document coordination between or with the state, national allied or regional veterinary organizations, or specialty boards recognized by AVMA; the applicable accredited veterinary education institution, accredited department of veterinary science, or department of comparative medicine; or the applicable state veterinarian or animal health official (or its equivalent); and will use the grant funds to help meet veterinary workforce or food protection needs.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Congress pass the Veterinary Services Investment Act (VSIA). This action will help to meet this nation's demand for large-animal veterinarians and rural America's need for services provided by veterinarians.

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RESOLUTION NUMBER: 17 Combined with 5
SOURCE: COMMITTEE ON INTERNATIONAL STANDARDS
SUBJECT MATTER: FAILURE OF IMPORTING COUNTRIES TO FOLLOW WORLD ORGANIZATION FOR ANIMAL HEALTH (OIE) GUIDELINES FOR THE IMPORTATION OF ANIMALS AND ANIMAL PRODUCTS.

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BACKGROUND INFORMATION:

Disease has had a significant impact on many bighorn sheep populations. Although evidence indicates that contact with domestic sheep appears to increase the likelihood of epizootics in bighorn sheep, the overall contribution of domestic sheep to bighorn health problems is not clear. At the 2007 United States Animal Health Association (USAHA) meeting in Reno, Nevada, Resolution 15 (combined with 64) was approved. In response to the resolution, the Committees on Wildlife Diseases and Committee on Sheep and Goats established a working group comprised of representatives of state and federal animal health agencies, wildlife and public land managements, the American Sheep Industry and Foundation for North American Wild Sheep (now the Wild Sheep Foundation). The working group has developed recommended practices for raising domestic sheep and goats on public lands where contact between domestic sheep and bighorn sheep may occur and has delivered the report to both committees. The resolution proper however urges the United States Secretary of Agriculture and the United States Secretary of the Interior to seek resources through the President’s budget to fund research to better elucidate the epidemiology and pathogenesis of bighorn/domestic sheep disease interactions. To date no additional research funds have been made available.

The Chairs of the Committee on Wildlife Diseases and Committee on Sheep and Goats now will charge the current Working Group on Domestic and Wild Sheep Disease Interactions, or assemble a new working group of similar composition, to develop and prioritize recommendations for research that would best answer questions regarding epidemiology and pathogenesis of bighorn/domestic sheep disease interactions and bighorn mortality prevention.
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RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA) and the United States Department of the Interior's (USDOI) research agencies seek resources including cooperative efforts with non-governmental organizations to fund research to better elucidate the epidemiology, pathogenesis and prevention of disease in bighorn sheep associated with bighorn-domestic sheep and goat interactions. Cooperative proposals should be solicited from state and federal agencies, universities and other research organizations. The USAHA also requests that funding organizations consult the prospective working group report on research prioritization to assist in determining the highest and most promising priorities.

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RESOLUTION NUMBER: 20 and 26 Combined APPROVED AS AMENDED

SOURCE: COMMITTEE ON WILDLIFE DISEASES

COMMITTEE ON FOREIGN AND EMERGING DISEASES

SUBJECT MATTER: ENHANCE DEVELOPMENT OF RISK ASSESSMENT MODELS BY DETERMINATION OF UNITED STATES WILDLIFE SUSCEPTIBILITY TO RIFT VALLEY FEVER VIRUS

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) identifies Rift Valley Fever (RVF) as the third most important foreign animal disease threat to United States (U.S.) livestock. RVF is an insect-transmitted viral (arboviral), zoonotic disease that is endemic and epidemic in Sub-Saharan Africa. The recent outbreaks and spread of RVF from Africa to the Arabian Peninsula have raised concerns of the potential introduction of this arbovirus into the U.S. In addition, the potential for RVF virus being used as a bioterrorism agent is widely recognized. RVF virus infection of cattle, sheep, and goats can result in very high abortion rates and 70-100 percent newborn mortality. The number of hospitalized human cases is usually less than 1 percent, but in the Saudi Arabia epidemic the mortality rate was 13.9 percent demonstrating the potential severity of an RVF outbreak. Vision loss from retinitis occurs in approximately 10 percent of human patients either during acute febrile illness, or up to four weeks after. The spread of West Nile Virus to the Western hemisphere illustrates the natural ability of arboviruses to establish themselves in new ecosystems. Wildlife species are important
components of the epidemiology of many arboviral diseases. There is no
information of the U.S. wildlife susceptibility to infection, clinical disease, or
potential as reservoirs for RVF virus.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that
the United States Department of Agriculture (USDA), Agriculture Research
Service (ARS), Animal and Plant Health Inspection Service (APHIS),
Veterinary Services (VS), the Department of Homeland Security (DHS),
Science and Technology (S&T) Directorate, and the U.S. Department of
the Interior’s (USDOI) research agencies, working with universities and
other agencies, establish, expand and/or coordinate research programs to:

Determine the potential of United States (U.S.) wildlife to become
affected by Rift Valley Fever (RVF) virus
Determine the potential role of U.S. wildlife as reservoir hosts for RVF

RESOLUTION NUMBER: 21 APPROVED
SOURCE: COMMITTEE ON PARASITIC
DISEASES
SUBJECT MATTER: CONTINUED UNITED STATES
DEPARTMENT OF AGRICULTURE
SUPPORT FOR SCREWWORM
ERADICATION ACTIVITIES

BACKGROUND INFORMATION:
The screwworm eradication program is a monument to the success
of science, the government and the private sector cooperating for the
benefit of mankind. Such cooperation has resulted in the eradication of
screwworm in the United States (U.S.) (1966), Mexico (1984) and Central
America (2006). The Commissions for the Eradication and Prevention
of Screwworm (COPEG in Panama and COMEXA in Mexico) was
created between the U.S., Panama and Mexico as part of the United
States Department of Agriculture (USDA) Regional Plan for screwworm
eradication in Central America. The COPEG and COMEXA eradication
efforts should be supported in a capacity sufficient enough to permit the
screwworm program to completely eradicate the screwworm in Jamaica,
Cuba and any other infested location in the region to further protect the
U.S. borders. The continued existence of the screwworm in remote areas
presents a constant threat to the U.S.

RESOLUTION:
The United States Animal Health Association (USAHA) urges
the United States House of Representatives and Senate Agriculture
Appropriation Committees to provide appropriate funding to the United
States Department of Agriculture (USDA), Animal and Plant Health
Inspection Service (APHIS), Veterinary Services (VS) to better protect the
homeland by fully supporting screwworm eradication activities in Central
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America, Cuba, and the Caribbean Islands to assure the total eradication efforts are ultimately successful in the region.

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RESOLUTION NUMBER:  22  APPROVED
SOURCE:  COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER:  NATIONAL BOVINE TUBERCULOSIS ERADICATION PROGRAM

BACKGROUND INFORMATION:

The current National Bovine Tuberculosis (TB) Eradication Program has had tremendous success in eliminating bovine TB from the United States. However, now that every state has previously achieved “free” status, and available federal funding continues to decline, it is time to update the program to more effectively address risks of reintroduction and to provide flexibility to States. New program standards are needed to maximize disease prevention, while minimizing unnecessary impacts on business.

The United States Animal Health Association (USAHA) recognizes the need to make significant changes in the National TB Eradication Program and generally supports the concepts and priorities outlined by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) in the July, 2009 document, A New Approach for Managing Bovine TB: VS’ Proposed Action Plan.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to expedite review of comments on this VS Proposed Action Plan and immediately propose new rules which include: measurable program performance standards; program flexibility to address variables within states and regions; mitigation requirements that address the risk of tuberculosis (TB) transmission from imported cattle, wildlife reservoirs and other potential sources; and implement effective and timely program oversight in cooperation with state and industry partners and consider the establishment of a state-industry oversight board.

USAHA urges USDA-APHIS-VS to carefully review the report and discussion items from the USAHA sponsored meeting in Denver, July 20-21, 2009, The Future of the National Tuberculosis Program, and incorporate this input, especially on items where consensus was reached, into the revised TB program rules.

USAHA urges USDA-APHIS-VS to prioritize completion of this rule and to expedite the rule-making process with the goal for completion within two years.

USAHA also supports the concept of a Federal Order, but only as a
short-term interim step during this rule making process, in order to allow USDA-APHIS-VS the flexibility to suspend downgrading states’ “free” status and to suspend interstate movement requirements for Modified Accredited Advanced states. USAHA urges USDA-APHIS-VS to develop this Federal Order in cooperation with State Animal Health Officials.

RESOLUTION NUMBER: 23  APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: EXPEDITED APPROVAL OF NEW BOVINE TUBERCULOSIS ANTIBODY TESTS BY THE CENTER FOR VETERINARY BIOLOGICS

BACKGROUND INFORMATION:
Infection with Mycobacterium bovis (M. bovis) continues to plague the United States cattle industry with a significant number of tuberculosis (TB) infected herds detected in five states in 2009. The caudal fold tuberculin (CFT) test is the primary screening test used in the bovine TB program. A major disadvantage of this test is that it requires cattle to be handled twice, once for the injection and a second time to “read” the test. Further, the person injecting and reading the test must also be adequately trained and sufficiently experienced to “read” the test accurately. Experience is critical; determining a “response” may be subjective, especially if the response to the injection is small.

Currently, Bovigam® is one official supplemental test used in cattle herds with the approval of the State Animal Health Official and Area Veterinarian In Charge (AVIC). This test may be used under direction of the Designated TB Epidemiologist and with concurrence of the Regional TB Epidemiologist. However, this test requires specialized sample shipping and processing and should only be conducted on blood samples collected between three and 30 days after injection for the CFT test.

The lack of funding for herd depopulation has the potential to increase test and remove routines for herds under TB quarantine. Also, regional or risk-based herd approaches would create additional opportunities for targeted testing scenarios using new diagnostic tools. The United States Animal Health Association (USAHA) has recognized in recent years through discussion and resolution that many companies are generating promising data on antibody-based TB diagnostics that would assist with the potential new realities of managing bovine TB.

Serum sample-based antibody tests represent viable alternatives to current TB test methods and many such tests have demonstrated promising results. Antibody detection tests offer the following advantages over current methods:

An antibody test can be performed in any diagnostic laboratory, and given the
REPORT OF THE COMMITTEE

Approximate 2-3 hour test protocols; reliable and more consistent results can be provided same or next day
Testing serum samples requires no additional manipulation such as sensitization with PPD, timing or shipping constraints
Serum samples currently being collected for other diagnostic or surveillance purposes (Johnne’s, brucellosis, bovine viral diarrhea virus (BVDV), etc.) would be sufficient for use in a TB antibody test
Collecting serum samples for laboratory-based testing eliminates the need to make two visits to each animal in order to read skin test responses
This method allows convenient repeat testing as there is no 30 or 60-day gamma interferon skin test window
Typical antibody test formats provide objective, numerical results, removing subjectivity and variability associated with reading the skin test
While the pathway to a Center for Veterinary Biologics (CVB) diagnostic kit license is well-defined, CVB continues to experience resource challenges that contribute to the delay in approving new diagnostic tools urgently needed by the cattle industry.
RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Center for Veterinary Biologics (CVB) to work with bovine tuberculosis program staff to prioritize and expedite the review of new Mycobacterium bovis antibody tests submitted to CVB for approval.

RESOLUTION NUMBER: 24 Combined with 5
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF SWINE
SUBJECT MATTER: FAILURE OF IMPORTING COUNTRIES TO FOLLOW WORLD ORGANIZATION FOR ANIMAL HEALTH (OIE) GUIDELINES FOR IMPORTATION OF ANIMALS

RESOLUTION NUMBER: 25 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: MARKET SWINE SURVEILLANCE PROGRAM
BACKGROUND INFORMATION:
The United States Animal Health Association (USAHA) approved Resolution 45 during the 2007 Annual Meeting in Reno, Nevada calling for United States Department of Agriculture (USDA), Animal and Plant
Health Inspection Service (APHIS), Veterinary Services (VS) to continue funding in support of market swine surveillance sampling. The Resolution outlined in detail the importance of market swine surveillance to the swine industry as an efficient and cost-effective means of sample collection to support on-going disease control efforts and as an integral part of any comprehensive swine surveillance program. The Resolution requested USDA-APHIS-VS maintain funding for market swine surveillance in Fiscal Year (FY) 08 and in FY 09 and increase funding in future years to enhance and integrate the program into a comprehensive swine surveillance system.

USDA-APHIS-VS responded to the Resolution and expressed agreement with the industry regarding the importance of maintaining market swine surveillance as “an important surveillance sampling stream that needs to be included in a comprehensive swine surveillance program.” The response identified market swine surveillance as important “because of the ability to identify and test large populations on a daily basis” and recognized the program’s cost effectiveness and efficiency “compared to time-consuming and costly down-the-road or first-point collection testing regimens.” Furthermore, the agency indicated its desire to include market swine surveillance as a component in the developing comprehensive swine surveillance program.

While USDA-APHIS-VS communications would indicate the agency’s recognition of the value of market swine surveillance and its desire to continue funding for the program, the swine industry is concerned that future funding may be in question. Loss of this funding could result in a cessation of sample collection and loss of resources and personnel. Discontinuation of this program would jeopardize on-going disease surveillance efforts and future disease elimination and eradication projects. This decision also negates the considerable efforts the industry has undertaken to improve this surveillance stream through premises identification and expanded surveillance objectives beyond pseudorabies and swine brucellosis. The industry strongly supports continued efforts to develop and implement a comprehensive swine surveillance system which would incorporate market swine sampling as one of the critically important surveillance streams.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to maintain funding for market swine disease surveillance and encourages the integration of market swine surveillance as an important sampling stream in a comprehensive swine surveillance program.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 26  Combined with 20
SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER: ENHANCE DEVELOPMENT OF RISK ASSESSMENT MODELS BY DETERMINATION OF UNITED STATES WILDLIFE SUSCEPTIBILITY TO RIFT VALLEY FEVER VIRUS

RESOLUTION NUMBER: 27  APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: PROPOSAL TO MAINTAIN AND ENHANCE POULTRY TUMOR VIRUS AND GENETIC DISEASE RESISTANCE RESEARCH PROGRAMS

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA), Agriculture Research Service (ARS) programs are critically important for the future of animal agriculture. The Avian Diseases and Oncology Laboratory’s (ADOL) research programs and services are vital for the future well-being of the United States (U.S.) and global poultry industry. The need for continuous research related to poultry tumor virus and genetic resistance to disease is and will continue to be at the forefront for enabling the U.S. poultry industry to provide a safe, economic and wholesome protein source for consumers in this country and abroad. Poultry and allied industry stakeholders across the U.S. are very concerned about maintaining and enhancing ADOL's research programs and service capabilities. Although Congress restored the funding in the Fiscal Year (FY) 2009 Omnibus Appropriations Bill, it is not known whether budgets subsequent to FY 2010 will include these USDA-ARS-ADOL programs.

RESOLUTION:

The United States Animal Health Association (USAHA) urges that the United States Department of Agriculture (USDA), Agriculture Research Services (ARS) continue to place a high priority on the Avian Diseases and Oncology Laboratory’s (ADOL) tumor virus and genetic resistance to disease programs. Further, the USAHA urges the House of Representatives and Senate Agriculture Appropriation Committees to provide funding to ensure that the USDA-ARS-ADOL poultry research capabilities are preserved and enhanced to maintain their ability to continue research in these important areas. In particular, the USAHA requests the addition of $1 million in annual appropriations to USDA-ARS
to 1) add a DVM/Ph.D. pathologist to address research in Marek’s disease and 2) add additional funding to support the integrated research needed to identify and investigate the genes directly involved in resistance to Marek’s disease, all subgroups of Avian Leukosis Viruses and general disease resistance.

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RESOLUTION NUMBER: 28 APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: COOPERATIVE AGREEMENT FUNDING FOR NOTIFIABLE AVIAN INFLUENZA SURVEILLANCE

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA) has provided funds for states to establish notifiable avian influenza surveillance in multiple avian compartments. State animal health organizations have been successful in implementing surveillance programs for their resident avian populations, some of which had previously lacked organized disease surveillance.

The success of the surveillance partnership effort is evidenced by the elimination of H7N2 avian influenza from the northeast live bird market system. Additionally, recent introductions of H7N9 avian influenza into commercial poultry flocks in four states have been successfully managed to reduce the impact on the marketability of United States (U.S.) poultry due to early detection and rapid response by states whose capabilities have been strengthened by federal notifiable avian influenza cooperative agreement surveillance funding.

The risks to the U.S. poultry industry remain as prevalent and challenging as when the surveillance programs were first initiated. The ongoing potential for virus introduction by wild birds into a growing backyard mixed species flocks along with spread of the urban chicken phenomena, increases in alternative housing for smaller commercial poultry enterprises and confirmed notifiable avian influenza reports from fourteen other countries continues to pose an eminent threat to the U.S. commercial poultry industry. This ongoing threat is best addressed through federally supported surveillance for notifiable avian influenza.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to maintain adequate funding and risk based allocation to states to fully support the national notifiable avian influenza domestic poultry program. Further, the USAHA urges Congress to continue to appropriate these monies to USDA-APHIS-VS for the notifiable avian influenza program.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER:  29  Combined with 5
SOURCE:  COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND other AVIAN SPECIES
SUBJECT MATTER:  FAILURE OF IMPORTING COUNTRIES TO FOLLOW WORLD ORGANIZATION FOR ANIMAL HEALTH (OIE) GUIDELINES FOR IMPORTATIONS OF ANIMALS

RESOLUTION NUMBER:  30  APPROVED
SOURCE:  COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER:  CONTAINMENT OF VERY VIRULENT INFECTIOUS BURSAL DISEASE VIRUS IN CALIFORNIA

BACKGROUND INFORMATION:
A very virulent strain of infectious bursal disease virus (vvIBDV) was identified in the Netherlands in the late 1980’s. In short order this virus spread throughout Europe, Asia and Latin America. This disease results in mortality, severe damage to the immune system and resulting secondary infections and severe performance shortfalls in both table egg and meat type chickens. Mitigation strategies, including increased biosecurity and vaccination, are expensive and only partially effective. The United States (U.S.) has been spared this disease but an incursion has been identified in a presently confined area of California. While the World Organization for Animal Health (OIE) does not distinguish among strains of infectious bursal disease virus (IBDV) and IBDV is not a program disease, it is critical that this presently small focus of infection be contained and eliminated from U.S. soil before it has the opportunity to spread further.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to apply all necessary resources to assist the State of California in eliminating very virulent infectious bursal disease virus (vvIBDV) from California. Further, the USAHA urges USDA-APHIS-VS to support the validation and distribution of a real-time reverse transcriptase polymerase chain reaction (RT-PCR) for the detection and differentiation of vvIBDV for use in a national surveillance program.

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BACKGROUND INFORMATION:

The recently appointed Undersecretary for Research, Education, and Economics of the United States Department of Agriculture (USDA), Rajiv Shah, told the United States of House of Representatives Agriculture subcommittee at a congressional hearing, that as “Chief Scientist” that “the next six months will be of great organizational evolution” as he reviews research conducted by USDA scientists as well as grants given to external research bodies. Shah said that he sees the chance “to bring about transformative change in the way we do science at USDA.” He said he will focus resources around priority areas, seeking breakthroughs in food safety, food security, climate change, biofuels and human nutrition; he feels this change will generate real benefits for the people.

The Undersecretary failed to mention the importance of a critical component of USDA, Agricultural Research Service's (ARS) historical focus: the ongoing animal disease research performed by USDA scientists, often in collaboration with scientists at universities or the private sector under the umbrella of the agency’s ARS. This work has proven essential to maintain the health and well-being of the nations’ animal industries through the development and implementation of methods to diagnose, control, eliminate and eradicate emerging, regulatory, foreign, exotic and zoonotic diseases. These efforts must be maintained to protect our national animal and human health, enhance food safety, minimize pathogen load and sustain the safe, affordable food supply we produce for national and global consumption.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the Undersecretary for Research, Education, and Economics of the United States Department of Agriculture (USDA) recognize the importance of the efforts and accomplishments of the Agricultural Research Service (ARS) regarding animal disease and animal health research and acknowledge by providing a robust budget and administrative support to fund ARS sponsored research for animal disease which benefits human and animal health, food and environmental safety, and abundant, affordable food for our nation and global partners.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 32  APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: CONSORTIUM FOR THE ADVANCEMENT OF BRUCELLOSIS SCIENCE

BACKGROUND INFORMATION:
After over six decades of eradication efforts and expenditure of several billion dollars, brucellosis (*Brucella abortus*) has nearly been eliminated from this nation's cattle herds. The last remaining reservoir for *Brucella abortus* in the United States is in the wild bison and elk in the Greater Yellowstone Area (GYA). In the last few years, the disease has spilled over from those affected wildlife to cattle populations in the states surrounding the GYA, thus threatening the ultimate success of the National Brucellosis Eradication Program. Current vaccine and diagnostic technologies to eliminate this disease in free ranging elk and bison are inadequate. To address this issue, a Special Committee of the United States Animal Health Association (USAHA) was formed. In August 2005, this Committee held a working symposium of scientists to identify the research needs for new and improved brucellosis vaccines, vaccine delivery systems, and diagnostic tests for use in elk and bison. The summary of the results of that working symposium were published in a document entitled the USAHA Laramie Agenda. The total cost of the needed research identified in the Laramie Agenda is substantial. However, funds for their research were not readily available.

As a follow-up to the USAHA Laramie Agenda, funds were provided by the legislature of the state of Wyoming to develop a framework for brucellosis vaccine and diagnostic test development. As a result, the Consortium for The Advancement of Brucellosis Science (CABS) was initiated, assembling brucellosis researchers and scientists from across the nation. The purpose of this Consortium is to evaluate the current status of brucellosis research with a focus on immunology, vaccines, and diagnostic tests; to identify gaps in research; and to develop a road map for advancing brucellosis science. As part of this effort, two subgroups will be formed; a scientific team (which has already been formed) and a stakeholder’s group. The purpose of the stakeholders group will be to provide feedback to the scientific team, and to work to obtain funding for the research priorities identified. Endorsement of CABS by USAHA and its stakeholders will be a key to success.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) endorse formation of the Consortium for The Advancement of Brucellosis Science (CABS) and participate in a meeting with CABS included on the agenda.
RESOLUTION NUMBER: 33  APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: STANDARDIZATION OF BRUCELLA ABORTUS TESTING FOR ELK

BACKGROUND INFORMATION:
During the last 10 years, the Greater Yellowstone Area (GYA) states, Idaho, Montana, and Wyoming, have sustained Brucella abortus (B. abortus) infections in livestock with the most likely cause being a transmission from brucellosis infected elk. The GYA states have embarked on risk mitigation and surveillance programs in cattle to ensure that new cases are rare, and will be detected rapidly should they occur. The wildlife agencies in the three GYA states are likewise conducting aggressive wildlife surveillance to better understand the rate of infection and the distribution of brucellosis exposed wild ungulates.

The states of Idaho, Montana, and Wyoming use varying protocols for defining brucellosis exposed elk which creates difficulty in comparing surveillance results between states. As the National Brucellosis Eradication Program evolves from a state-by-state to a regional concept, uniformity in elk testing protocols and case definitions of a brucellosis exposed elk is increasingly important. Standardization of testing protocols for the purpose of classifying elk as brucellosis-exposed is important to monitor the rate of disease of wild ungulate populations across the three states of Idaho, Montana, and Wyoming and to facilitate risk-based decisions on livestock management and surveillance.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to work with the Department of Interior, and the wildlife agencies of Idaho, Montana, and Wyoming, to develop a standardized brucellosis testing protocol and serological case definition for a brucellosis exposed wild elk. Furthermore, USAHA urges the USDA-APHIS and Agricultural Research Service (ARS) to commit laboratory capacity, and personnel to this effort.

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NOMINATIONS AND RESOLUTIONS
for the 2010 USAHA Government Relations meeting in Washington DC, in order to identify long-term support to CABS, including but not limited to financial, political, and regulatory support.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER:  34  APPROVED
SOURCE:             COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER:     SWINE BRUCELLOSIS IN CATTLE

BACKGROUND INFORMATION:
Swine brucellosis (Brucella suis) is an infectious disease of swine that can also affect humans and cattle. Swine brucellosis is considered endemic in the United States (U.S.) feral swine population. Swine brucellosis infection in cattle causes economic losses to the beef and dairy industries and in cattle can interfere with the interpretation of serologic (blood) tests used to diagnose Brucella abortus (cattle brucellosis) in the U.S. cattle population.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Agricultural Research Service (ARS), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) take actions to increase research on cattle infected with Brucella suis, to include but not limited to transmissibility studies, development and implementation by the National Veterinary Services Laboratory (NVSL) of differentiating serologic tests, development of effective vaccines for cattle, and development of better control mechanisms for the disease.

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RESOLUTION NUMBER:  35  APPROVED
SOURCE:             COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER:     SUPPORT OF THE UNITED STATES DEPARTMENT OF AGRICULTURE BRUCELLOSIS CONCEPT PAPER PUBLISHED OCTOBER 5, 2009 IN THE FEDERAL REGISTER

BACKGROUND INFORMATION:
Following a highly successful Brucella abortus (B. abortus) eradication program, the nation’s livestock are free of brucellosis. Wild ungulates in the Greater Yellowstone Area (GYA) represent the last focus of infection of B. abortus in the United States, and these wild ungulates are able to transmit B. abortus to other wild ungulates and livestock through infected products of parturition. However, current federal brucellosis rules do not recognize the continuing and variable risk from a wildlife vector. Depopulation of affected herds does not eliminate the risk of re-infection, and the Brucellosis Class Status system based on state boundaries needs additional review.
RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to proceed with revising brucellosis rules consistent with the published concept paper, and continue to solicit input from USAHA prior to, during, and following the rule writing process. Further, USAHA urges USDA-APHIS-VS to proceed with an interim rule that, includes but is not limited to, removal of the mandatory downgrade of state brucellosis status with two *Brucella abortus* (*B. abortus*) affected herds detected within a two year period, and the elimination of the requirement for mandatory depopulation of affected herds.

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RESOLUTION NUMBER: 36 APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: REVIEW OF SELECT AGENT STATUS FOR *BRUCELLA ABORTUS*

BACKGROUND INFORMATION:
**Introduction:** With the reclassification of the state of Montana from brucellosis Class Free to Class A in 2008, the Greater Yellowstone Area (GYA) states of Idaho, Montana and Wyoming have sustained livestock brucellosis infections from a brucellosis infected wildlife reservoir that resulted in loss of status during the last 10 years. These reclassifications have cost the nation millions of dollars in additional testing costs, loss of trade and decreased market value. Further research in vaccine development and other aspects of *Brucella abortus* (*B. abortus*) control is needed.

**Benefits of additional research:** Greater understanding of vaccine technology, transmission, immune system response including diagnosis of animals in the “dormant” state of *B. abortus* infection are critical to:
- Accomplish the goal of the brucellosis eradication program;
- Implement regionalization of brucellosis disease management;
  - Collect and archive samples for studies on Differentiating Infected from Vaccinated Animals (DIVA) diagnostics;
Further, increased understanding of *B. abortus* will assist management of *Brucella suis* and *B. abortus* in feral swine.

**Current Limitations:** Although further efforts in vaccine research and other aspects of *B. abortus* control are needed, current regulations and restrictions have nearly abolished these efforts. Guidelines from the Center for Veterinary Biologics for challenge studies necessitate 20 challenged animals, and 10 control animals, however, there are no facilities in the nation that can accommodate research on *B. abortus* in a covered research facility as is required by the Select Agent rule.
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Building new facilities is costly, dependent on congressional appropriations, and not able to meet current research needs in a timely manner. Alternatively, the Outdoor Facilities Requirements developed by the United States Department of Agriculture (USDA), in principle, allows research on \textit{B. abortus} to be conducted outside, however, the logistical and economic burdens make the implementation of the requirements impractical.

\textbf{Summary:} It is essential that \textit{B. abortus} research be enhanced to better protect captive and free-ranging bovids and cervids, as well as to accomplish the USDA goal of eradicating \textit{B. abortus} from the United States.

Delisting \textit{B. abortus} from the select agent list is supported by characteristics of the organism which include: 1) little potential for aerosol transmission; 2) disease is treatable with readily available antibiotics; 3) the agent can easily be acquired from infected wildlife populations regardless of Select Agent status; 4) availability of highly sensitive and specific diagnostic tests for humans and livestock. These characteristics have allowed thousands of infected ungulates to roam the landscape in the GYA, with no public health consequences, but dramatic ramifications following rare transmissions to livestock, and 5) based on existing need relative to the minimal potential for public health and national security risk.

\textbf{RESOLUTION:}

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and the United States Department of Health and Human Services (USDHHS), Centers for Disease Control and Prevention (CDC) to support additional research on \textit{Brucella abortus} (\textit{B. abortus}) by removing \textit{B. abortus} from the Select Agent List.

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\textbf{RESOLUTION NUMBER:} 37  \textbf{Combined with 5}

\textbf{SOURCE:} COMMITTEE ON INFECTIOUS DISEASES OF HORSES

\textbf{SUBJECT MATTER:} FAILURE OF IMPORTING COUNTRIES TO FOLLOW WORLD ORGANIZATION FOR ANIMAL HEALTH (OIE) GUIDELINES FOR THE IMPORTATION OF ANIMALS AND ANIMAL PRODUCTS.

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RESOLUTION NUMER: 38  APPROVED AS AMENDED
SOURCE: COMMITTEE ON ANIMAL WELFARE

SUBJECT MATTER: SUPPORT FOR THE DEVELOPMENT OF THE CENTER FOR ANIMAL WELFARE BY THE UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, ANIMAL CARE

BACKGROUND INFORMATION:
Animal welfare is recognized as a complex issue by governments, national and international bodies, academic institutions, and individuals throughout the world. Public awareness and increased emphasis on animal welfare has given the United States Department of Agriculture's (USDA), Animal and Plant Health Inspection Service (APHIS) additional responsibilities. Those responsibilities have been delegated to the Animal Care (AC) unit, the unit within USDA-APHIS responsible for enforcing the Animal Welfare Act (AWA) and regulations and the Horse Protection Act (HPA) and regulations. To respond to the additional responsibilities, the AC unit was authorized to establish a Center for Animal Welfare to provide the critical leadership necessary to effectively respond to animal welfare issues. The focus of the newly established unit will support the current mission of AC including the AWA and HPA, while developing a national resource for the collaboration on international animal welfare issues and providing scientific and technical expertise.

RESOLUTION:
The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to provide leadership, serve as a national resource for policy development and analysis, develop training, science, and technology on animal welfare topics, and be recognized as a collaborating center for the World Organization of Animal Health (OIE) and other international entities. USDA-APHIS, Animal Care (AC) should continue to enhance the well-being of animals covered by the Animal Welfare Act (AWA) and the Horse Protection Act (HPA).

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER:  39   APPROVED
SOURCE:   COMMITTEE ON ANIMAL WELFARE

SUBJECT MATTER:   SUPPORT FOR THE AMERICAN VETERINARY MEDICAL ASSOCIATION RESPONSE TO THE FINAL REPORT OF THE PEW COMMISSION ON INDUSTRIAL FARM ANIMAL PRODUCTION

BACKGROUND INFORMATION:

The Pew Commission on Industrial Farm Animal Production (PCIFAP) published a report on April 29, 2008, Putting Meat on the Table: Industrial Farm Animal Production in America, on the impacts of animal agriculture in the United States. In June 2008, the Northeast United States Animal Health Association (NEUSAHA) passed a resolution calling for the United States Animal Health Association (USAHA) to request that PCIFAP include the technical reports it had commissioned but not received at the time of publication and that PCIFAP re-evaluate its findings based on said reports. Said resolution was not approved by the membership at the 2008 USAHA annual meeting.

According to the PCIFAP website, http://www.ncifap.org/about/, the group 'was formed to conduct a comprehensive, fact-based and balanced examination of key aspects of the farm animal industry.' In a letter to the editor of the Journal of the American Veterinary Medical Association published on October 15, 2008, Robert P. Martin, Executive Director of PCIFAP states, “The Pew Commission on Industrial Farm Animal Production (PCIFAP) was a two-year study funded by a grant from the Pew Charitable Trusts to the Johns Hopkins Bloomberg School of Public Health to recommend solutions to the problems created by concentrated animal feeding operations in the areas of public health, the environment, animal welfare, and rural communities.” Mr. Martin's comment appears contradictory to the notion that the group was convened to ‘conduct a comprehensive, fact-based, and balanced examination’ of the situation when he infers that there was a predetermined agenda to ‘recommend solutions to the problems’.

In the past year, the American Veterinary Medical Association (AVMA) has done a thorough and excellent job at reviewing each of PCIFAP’s recommendations in its Response to the Final Report of the Pew Commission on Industrial Farm Animal Production released in August 2009; http://www.avma.org/advocacy/PEWresponse/.

RESOLUTION:

The United States Animal Health Association (USAHA) supports the findings of the American Veterinary Medical Association’s (AVMA) Response to the Final Report of the Pew Commission on Industrial Farm Animal Production released in August 2009.

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RESOLUTION NUMBER:  40  APPROVED
SOURCE:  COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER:  NATIONAL ANIMAL IDENTIFICATION SYSTEM

BACKGROUND INFORMATION:
Animal disease events threaten the economic viability of the animal industries of the United States and the ability of the animal industries to produce a secure source of food, fiber and other important animal products for our nation. The lack of reliable livestock traceability inhibits state animal health officials from efficiently and effectively managing and responding to animal disease events. The primary goal of an animal traceability system is the ability to respond quickly and efficiently to disease outbreaks by tracing individual livestock movements rapidly and accurately, which can only be accommodated by assigning a unique identification number to all livestock premises. The cost of implementing an animal identification system is a concern to many livestock owners, and there is additional concern that an identification system may cause a loss of their ability to keep pace with the speed of commerce in the marketplace. There is also a concern about the security of data held in the system.

RESOLUTION:
The United States Animal Health Association (USAHA) strongly encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to incorporate the following vital components in an animal identification system.

- Require all livestock producers who transport livestock interstate or participate in disease control and eradication programs within the Title 9 CFR to have a livestock location identifier.

- Allow maintenance of state databases and develop standards whereby the state data systems will be compatible in order to facilitate rapid and effective epidemiological efforts in livestock traceability. This data may be held at the state level unless and until there is a need for the information to be shared in the event of a disease investigation.

- Continue to recognize and encourage the use of official permanent individual or group animal identification for official traceability systems.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 41 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: BRUCELLA OVIS RESEARCH

BACKGROUND INFORMATION:

Brucella ovis (B. ovis) has continued to be a source of infertility and thereby of economic significance to the United States sheep industry. Currently available diagnostic methods have not been adequate to accurately determine the disease status of rams. Questions regarding cross-reactivity with other organisms, residual colostral antibody interference, and disparate results between laboratories complicate interpretation of the true disease status.

Additionally questions remain about the role of the ewe in the perpetuation of the disease within a flock. Many times flocks have been found to be infected following years of negative ram tests and with no ewe additions. The role of the female in B. ovis transmission has not been thoroughly studied.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Agricultural Research Service (ARS), Animal Disease Research Unit (ADRU) and Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratory (NVSL) work together to develop better diagnostic tests. Also USAHA requests USDA-ARS and other institutions to do research on the pathogenesis and transmissibility of Brucella ovis in both rams and ewes.

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RESOLUTION NUMBER: 42 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: NATIONAL ANIMAL HEALTH MONITORING SYSTEM SHEEP STUDY

BACKGROUND INFORMATION:

The United States (U.S.) sheep industry has been the subject of only two studies by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Animal Health Monitoring System (NAHMS) in the past. In 1996, a mail survey conducted in cooperation with the National Agriculture Statistics Service (NASS) was completed. The survey results were very helpful to the sheep industry and allied industries, plus served a needs assessment role for the more complete study in 2001 which included on-
farm sample collection and diagnostic surveys. The 2001 study results have been widely used by industry and government alike as a national benchmark of U.S. sheep industry health, disease and management issues. A timeline and draft study plan for another NAHMS sheep study to be conducted in 2011 has been established.

RESOLUTION:
The United States Animal Health Association (USAHA) urges that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Animal Health Monitoring System (NAHMS) proceed with a sheep study in 2011, that is both regional and national in scope and priority disease issue targeted.

USAHA also recommends that NAHMS work with industry and the National Agriculture Statistics Service (NASS) as well as state animal health officials on study design and implementation.

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RESOLUTION NUMBER: 43 Combined with 19
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: RESEARCH AND MANAGEMENT OF BIGHORN SHEEP/DOMESTIC SHEEP DISEASE

*****

RESOLUTION NUMBER: 44 Combined with 5
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: FAILURE OF IMPORTING COUNTRIES TO FOLLOW WORLD ORGANIZATION FOR ANIMAL HEALTH (OIE) GUIDELINES FOR IMPORTATIONS OF ANIMALS

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RESOLUTION NUMBER: 45 Combined with 5
SOURCE: COMMITTEE ON BLUETONGUE AND RELATED ORBIVIRUSES
SUBJECT MATTER: FAILURE OF IMPORTING COUNTRIES TO FOLLOW WORLD ORGANIZATION FOR ANIMAL HEALTH (OIE) GUIDELINES FOR IMPORTATIONS OF ANIMALS
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 46 APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: STRATEGIC INITIATIVES AGAINST WILDLIFE RABIES

BACKGROUND INFORMATION:
The use of a licensed oral rabies vaccine, RABORAL V-RG® (Merial) has been effective in controlling rabies in certain wildlife rabies reservoir species. Strategic application of RABORAL V-RG eliminated domestic dog/coyote (DDC) rabies variant from the United States (U.S.). However endemicity of this variant in Mexico has necessitated ongoing enhanced surveillance and maintenance of a barrier of vaccinated coyotes along the Texas/Mexico border to prevent reincursion of DDC rabies variant in the U.S. This vaccine has been effective in the eastern United States to control raccoon rabies variant and gray fox rabies variant in southwest Texas. The Ontario Ministry of Natural Resources also continues control programs with the ultimate goal of elimination of artic fox rabies in western Ontario and raccoon rabies variant in Quebec along the Vermont border utilizing a new human adenovirus recombinant deoxyribonucleic acid (DNA) oral rabies vaccine, ONRAB® (Artemis) and a new bait with great success. This vaccine shows good effectiveness in fox, raccoon and skunk. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) and the United States Department of Health and Human Services (USDHHS), Center for Disease Control and Prevention (CDC) and Thomas Jefferson University continue captive wildlife studies on a new canine adenovirus (DNA) rabies glycoprotein vaccine with good success and expect field trials to be conducted in 2010. This cooperative and collaborative work continues through the partners of the North American Rabies Management Plan (NARMP) which include the United States, Canada, Mexico, Navajo Nation, state and local government agencies, private industry and academia who continue to study and plan the management, control and elimination of terrestrial rabies in North America. Current large scale projects to mitigate the adverse impact of raccoon rabies on the U.S. eastern seaboard, gray fox rabies in Texas, and domestic dog/coyote rabies on the Texas Mexico border. Current studies include the preliminary research in the control of the new bat rabies variant in skunks and gray fox in the Flagstaff, Arizona region; skunk variant rabies in the western United States; feral dog studies in the Navajo (Tribal) Nation. Data from barrier projects and rabies control associated studies inform strategic planning to assure efficient and effective utilization of resources. Appropriate funding for these projects and studies is paramount if the control and elimination of these terrestrial rabies variants in North America is to be realized.

RESOLUTION:
The United States Animal Health Association (USAHA) encourages
the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) and the United States Department of Human and Health Services (USDHHS), Center for Disease Control and Prevention (CDC)/National Center for Zoonotic and Vector Borne Enteric Diseases to request funding and resources and that Congress appropriate funding to cooperate and collaborate with their partners in the North American Rabies Management Plan (NARMP) team to study and compare the effectiveness of these three vaccines and baits in field trials to enhance the effectiveness of control and elimination of rabies in these coordinated regional wildlife rabies control and vaccination programs.

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REPORT OF THE COMMITTEE ON PARASITIC DISEASES

Chair: Joseph L. Corn, GA
Vice Chair: J. Mathews Pound, TX

Bob H. Bokma, MD; Corrie C. Brown, GA; Matt H. Cochran, TX; Anita J. Edmondson, CA; Dee B. Ellis, TX; Chester A. Gipson, MD; Larry L. Hawkins, MO; Bob R. Hillman, TX; Thomas J. Holt, FL; Pamela Luisa Ibarra, DF; Ralph C. Knowles, FL; Charlotte A. Krugler, SC; Linda L. Logan, TX; Kim Lohmeyer, TX; Terry F. McElwain, WA; Daniel G. Mead, GA; Andrea Mikolon, CA; Ernie A. Morales, TX; Don L. Notter, KY; James E. Novy, TX; Alejandro Perera, MEX; Dale E. Preston, TX; Shawn P. Schafer, ND; Jack L. Schlater, IA; Charly Seale, TX; Robert C. Stout, KY; Lee Ann Thomas, MD; Paul O. Ugstad, NC; Sherrilyn H. Wainwright, CO; Kenneth Waldrup, TX; James A. Watson, MS; David W. Winters, TX.

The Committee met on October 13, 2009 at the Town and Country Hotel, San Diego, Calif., from 8:00 a.m. to 12:00 p.m. There were 11 members and 17 guests present.

Exotic Ecotoparasites in Florida
Joseph Corn and James Mertins

Dr. Joseph Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia, Athens, Georgia; and Dr. James Mertins, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL), Ames, Iowa, gave a report on exotic ectoparasites collected from wildlife in Florida during recent surveys for exotic livestock arthropods in the Southeastern United States. Surveys are being conducted via capture and examination of free-ranging wildlife in cooperation with the USDA-APHIS-VS. Examples of recent findings included ticks, mites and lice not previously reported in the United States. Additional examples were new host records of ticks, lice and mites collected from established species of exotic reptiles. It is clear that a diversity of exotic ectoparasites are becoming established in Florida, and that new host-parasite relationships are developing among exotic and native ectoparasites, and exotic and native wildlife.

Amblyomma triste in White-tailed Deer in West Texas
Ken Waldrup, Pete Teel and James Mertins

Dr. Ken Waldrup, Texas Department of State Health Services, El Paso, Texas; Dr. Pete Teel, Department of Entomology, Texas A&M University, College Station, Texas; and Dr. James Mertins, USDA-APHIS-VS-NVSL, Ames, Iowa, gave a report on the collection of Amblyomma triste from white-tailed deer in West Texas. In July 2008, two native
female white-tailed deer were collected by gunshot with permission from the Texas Parks and Wildlife Department from a ranch on the north side of the Davis Mountains in Jeff Davis County, Texas. As part of the necropsy of these animals, adult ticks were collected and stored in 70% isopropyl alcohol. Some of these ticks were initially identified as *Amblyomma maculatum*, the Gulf Coast tick. Specimens were submitted to the NVSL via the Texas tick identification system. Because the Trans-Pecos region of Texas is not part of the recognized geographical range of the Gulf Coast tick, additional specimens were submitted to Texas A&M University. Subsequently these ticks were identified by both the NVSL and Texas A&M as *Amblyomma triste*, a Neotropical tick species similar to *A. maculatum*.

**Importation of Reptiles and Exotic Ticks into the United States**

Francisco Collazo-Mattei  
USDA-APHIS-VS

Dr. Collazo-Mattei gave a report on the importation of reptiles and exotic ticks into the United States. The importation of reptiles into the United States through the port of Miami currently is estimated at between 20,000 and 50,000 animals per week for a total of more than two million reptiles per year. Some of these reptiles, coming from Africa, Asia, and South America, are infested with ticks exotic to the United States. Some of the exotic *Amblyomma* tick species are capable of harboring heartwater disease, a serious livestock disease of Africa with a high mortality rate, and heartwater and other diseases may be introduced into the United States via these exotic ticks. The United States Department of the Interior has banned the importation of certain reptile species that are considered endangered or invasive and the USDA in 2004 prohibited certain reptile species from being imported into the United States when found to carry *Amblyomma* species ticks. In 2009, the United States Fish and Wildlife Services (USFWS) and the USDA found 30 tick-infested reptile importations out of 4,491 import inspections. The introduction of exotic ticks and the possibility of foreign animal disease entry through imported reptiles raise significant concerns. For this reason, Florida currently maintains very strict requirements for livestock moving from the U.S. Virgin Islands due to the presence of *Amblyomma* and *Boophilus* ticks. Currently, cattle are required to be isolated in tick-free areas for at least 21 days, be treated at least three times with an approved acaricide before departure, and re-inspected and re-treated upon arrival in Florida. The impact of such a regimen on cattle moving interstate here on the mainland would wreak havoc on our livestock industries. Work is now being done with the USFWS and USDA, APHIS, VS to target inspections on shippers who in the past have imported reptiles infested with ticks and on shipments from countries known to have animals infected with heartwater disease. The USDA-APHIS-VS-NVSL has provided training on tick inspections to one USDA inspector in Miami and funding for an additional tick inspector is being requested.
Cattle fever tick, *Rhipicephalus (=Boophilus) microplus* and *R. annulatus*, outbreaks within the free areas and the permanent quarantine buffer zone of South Texas have increased dramatically since 2004. During fiscal year (FY) 2009, there were 145 newly-recorded fever tick-infested premises in South Texas, which was the second highest total number of infested premises recorded during a single fiscal year since 1973. One of the most important factors responsible for this increase involves the free-ranging movement of fever tick-infested native white-tailed deer and various exotic ungulate species. At the same time, these deer are capable of maintaining fever tick populations on livestock-vacated pastures. Other important factors include the presence of established fever tick populations on the Mexican side of the Rio Grande, the presence of ticks on stray and smuggled Mexican livestock, and the lack of long-lasting treatments for ticks on livestock and deer. Fortunately, funding for the Program is projected to increase to $13.1 million for FY 2010, an increase of over $4 million from FY 2009. The increased funding, including emergency funding from FY 2009, will help the Program begin initiating new and/or enhanced eradication strategies, such as constructing deer-proof fencing along the permanent quarantine line, treating white-tailed deer on the Boca Chica Preserve, provide personnel to inspect livestock for the voluntary livestock movement notification and inspection, and support the development and implementation of currently unavailable anti-tick vaccines and long-lasting treatments, such as Gavac and injectable microspheres containing ivermectin, for fever tick control on livestock. Continuing into FY 2010, APHIS and the Texas Animal Health Commission will continue the systematic treatment of fever tick-infested livestock and deer in both the free and permanent quarantine areas of South Texas. In addition, APHIS will finalize the environmental assessments required for the new initiatives, and increase collaborations with the local, state, and national livestock industries, and increase communication with Mexican state and federal government officials to improve cooperation between the eradication programs of both countries.

**Control of Ticks on Wildlife**

J. Mathews Pound

USDA-Agricultural Research Service (ARS), Knipling-Bushland U.S. Livestock Insects Research Laboratory, Kerrville, Texas

From 1907, when the fever tick eradication campaign began, until 1933, the eradication methods of dipping cattle in an acaricide and “pasture vacation” were enormously successful in eradicating southern cattle ticks, *Rhipicephalus (Boophilus) microplus*, but in 1933 failures began to occur in Florida. The consensus was that populations of white-tailed deer infested with these ticks were acting as alternative hosts in
maintaining and dispersing tick populations. Only after thousands of deer in several counties were depopulated was eradication achieved in Florida. In Texas, the pasture vacation approach to tick eradication is becoming less efficacious, and increasing numbers of failures are thought to be related to increased populations of white-tailed deer and perhaps other wild ungulate species. Significant evidence confirms that white-tailed deer support the dispersal and maintenance of southern cattle ticks and cattle ticks, *Rhipicephalus (Boophilus) annulatus*, within the Permanent Quarantine or Buffer Zone in South Texas along the Rio Grande from Del Rio to Brownsville, Texas, as well as in the so-called Free Area north and east of the Buffer Zone. As of September 2009, in addition to the Permanent Quarantine Zone of approximately 2,233 km², three Temporary Preventative or Blanket Quarantines totaling an additional 3,619 km² were established. Currently, only one systemic and 2 topical acaricidal treatment methods are available to control ticks feeding on white-tailed deer: 1) systemic treatment through dispersal of ivermectin-medicated corn and 2) two topical treatment devices, the ‘4-Poster’ Deer Treatment Bait Stations and the ‘2-Poster’ Deer Treatment Feeder Adapters. Data summaries were derived from historical records, circumstantial evidence from review of recent infestations, and results of cattle fever ticks observed feeding on white-tailed deer that were live-captured and examined specifically for ticks, and these data form the basis of conformational support for the role of white-tailed deer in the epidemiology of cattle fever ticks in South Texas.

**Screwworm Eradication in the Americas**

Cynthia Duerr
USDA-APHIS, International Services (IS), Comisión Panamá - Estados Unidos Para La Erradicación y Prevención Del Gusano Barrenador Del Ganado (COPEG)

Screwworm remains endemic in various Caribbean countries and much of South America. The aim of the APHIS Screwworm Program is to protect U.S. agriculture by preventing reintroduction of screwworm disease into the United States. APHIS currently participates in two bilateral commissions with two program sites: Mexican-American Commission for the Eradication of Screwworm (COMEXA) and U.S.-Panamanian Commission for the Eradication and Prevention of Screwworms (COPEG). The COMEXA site in Chiapas, Mexico has a current production capacity of 250 million flies per week and produced flies that eradicated the disease throughout Central America. Current plans are to maintain this plant, as the program continues to move from disease eradication to disease exclusion, as an alternate production site while future eradication programs in remaining positive countries are considered. In Panama, the program produces sterile flies, disperses over the barrier zone, conducts field surveillance and works with ARS on various research topics. Although the Pacora facility was inaugurated in 2006, it wasn't until
this spring that dispersal of Panamanian flies began. Current production is at the level of 40 million flies per week, with current capacity of 60 million. This is more than adequate for maintenance of the barrier, but not adequate for elimination of outbreaks, especially should concurrent outbreaks occur. In the future the capacity may be increased to 100-160 million. Some differences between Pacora and Tuxtla include the diet materials used and irradiation methods. After earlier efforts to use X-ray, in 2009 a Cobalt 60 unit was brought on line and is now being used. The Darien Region of Panama, at the end of the Interamerican Highway, was selected as a permanent barrier to prevent screwworm reintroduction into Central and North America. Just last year, the USDA officially recognized Panama as free of screwworm, 14 years after the creation of COPEG and 10 years after eradication began. Approximately 38 million flies are dispersed over this area weekly in 8 flights. In recent years the Dispersal Center has developed new methods for hatching pupae that have improved the yield from as low as 65-75% to a consistent average of over 85%. The biggest change has been the modification of Worley and Tween towers used in fruit fly production for screwworm pupae. Not only is yield higher, other quality measures such as flight agility and longevity appear to be improved. Additional advantages of these tower systems are the decreased energy costs, decreased labor and improved conditions for those rearing the flies compared with traditional chamber maturation. From 2004 to 2009 Panama has had isolated positive screwworm cases in the barrier zone. Field operations continue to conduct surveillance, monitor animal movement, and provide education and outreach. At the start of the rainy season in May of 2009, the first case of screwworm outside of the barrier zone since 2003 was detected in Colón province. It was almost immediately evident that this was not an isolated case. In subsequent weeks, 16 additional positive cases were diagnosed - all within a 10km radius of the first. The majority of cases were bovine, only two of which were infested navels. A piggery near the center of the outbreak had four positive cases, with the remainder being found in dogs and one person. Field surveillance and aerial dispersal began immediately. For the first time in Panamá, ground dispersal was also used. Animal movement control points were set up on all main roads exiting the area. The last positive case was detected on June 2. It is unclear what caused the outbreak. While it is convenient to consider a wildlife reservoir, this is inconsistent with known biology. Movement of infected animals is possible, but no, we have not discovered any other focus of infected animals. The possibility that an infected animal transited the canal is possible; but again, remote. We are awaiting DNA testing of the positive larvae. We hope that this will provide information as to the type of fly strain at the least. Preliminary analysis is that the direct costs of the outbreak were $1.5 million. Significant certainly, but small in comparison with $1.8 billion in beef exports from Panama to Mexico alone last year, and small in comparison with the potential consequences to Panama,
Central America, Mexico and the United States should re-infestation occur. One positive result of the outbreak is the identification of various areas for improvement. These include maintaining a higher level of alert, decreasing sample turnaround time, getting check points established and other logistical issues. At the same time, a great deal of cooperation, flexibility, dedication and teamwork were demonstrated. We are now in the process of implementing various improvements to our program including revising emergency protocols, improving sample handling and reporting systems, updating our GIS capability, and generally improving communications and preparedness.

Tropical Bont Tick in the Caribbean and CaribVet Working Group Update
Thierry Lefrancois
Centre International de Recherche en Agriculture pour le Développement (CIRAD), Guadeloupe, French West Indies

Dr. Lefrancois provided an update on the tropical bont tick in the Caribbean Region and a summary of the output of a CaribVet Working Group on the tropical bont tick. The tropical bont tick (TBT) is a historical burden for cattle and small ruminant production in the Caribbean islands, transmitting heartwater disease, and inducing dermatophilosis, anaemia and infections. Treatments have been ongoing in most islands of the smaller Antilles for long periods of time under a multi-partners/multi-countries project known as Caribbean Amblyomma Programme (CAP), attempting to control/eradicate TBT. The CAP was the first multi-country approach of an animal health problem in the Caribbean and it promoted the creation of a regional animal health network named CaribVet in which veterinary services of the Caribbean and regional/international organizations work together to improve and harmonize the surveillance and control of animal diseases. The CAP ended in 2008 and was followed by a project of national veterinary epidemiologists/paraepidemiologists (VEP) funded by USDA-APHIS under the strategy of CaribVet. A CaribVet working group on tick and tick borne disease met in Fort Collins, Colorado, October 1-2, 2009 in accordance with a resolution from the 2008 meeting of the USAHA. It gathered veterinary services from 12 Caribbean countries or territories including those from the previous CAP (Antigua, Barbados, Dominica, Nevis, St. Lucia, St. Maarten, St. Kitts, St. Vincent), French islands (Guadeloupe and Martinique) and USA territories (Florida and St Croix), plus experts on tick and tick borne diseases from CIRAD and the USDA Centers for Epidemiology and Animal Health (CEAH), Fort Collins, USA and previous CAP. Presentations were given by CIRAD Guadeloupe, USDA-APHIS-VS-CEAH, on the following: research needs for heartwater and TBT, surveillance planning and previous heartwater/CAP risk assessment, analysis of CAP data, spatial analysis and vector-borne diseases, habitat suitability models for three host ticks, mathematical framework for potential tick presence. The
group reviewed the current surveillance and control programs in the different Caribbean countries and in the USA, in particular reviewed the changes associated with the end of the CAP. A questionnaire sent before the meeting to all the countries helped to assess the current situation regarding animal population (evolution, main breeds, density, exchange between countries), surveillance system (protocol, type of surveillance, level of surveillance), level of control, limiting factors for TBT surveillance and control. The group worked on the use of risk factor analysis, spatial analysis and modelling of tick population dynamic for improvement of surveillance and treatment. The group developed recommendations for surveillance and control protocols including both regional recommendations and specific recommendations according to the current level of TBT prevalence. The group also worked on data to be collected by the countries for analysis purpose (spatial analysis, modelling).

Tick Eradication in South Texas
Dee Ellis
Texas Animal Health Commission (TAHC)

Dr. Ellis, provided an update on the ongoing tick eradication activities along the Rio Grande Border in South Texas by USDA and TAHC. A summary of the information provided is as follows:

**Cattle Fever Ticks**
- 145 NEW infestations identified for Federal Fiscal year 2009 as of September 15, 2009
- 157 premises under previously existing quarantines (fever tick-infested premises are quarantined a minimum of nine months)
- 94 premises EXPOSED to fever ticks
- 498 premises are adjacent (also called “check premises”) to quarantined premises
- 739 premises are currently quarantined due to fever ticks, a record number since the 1970’s

When fever tick infestation is detected, cattle that were moved from the ranch in the past year must be traced, inspected and treated. Fortunately, tick-infested cattle have not been found outside of South Texas, but exposed cattle have been moved across Texas and to sites in some other states in the last year, which requires that they be traced and examined. For that reason the fever tick issue is a national concern, not just a Texas problem. Re-establishment of the tick into acceptable habitat across the U.S. would create significant economic hardship to the cattle industry. Some South Texas ranchers have reported the loss of clients, due to the tracing requirements, and increasingly, buyers are demanding that South Texas cattle be inspected and treated prior to movement from the area.

The livestock industry is committed to helping the TAHC and USDA in
PARASITIC DISEASES

Texas acquire the $14.2 million budget needed to fully fund the fever tick program, which would also potentially include the inspection and treatment of cattle moved through the seven South Texas livestock markets, or transported directly from non-quarantined premises in the area. This inspection and treatment is the only way to ensure cattle are fever tick-free when they leave the area, as long as ticks continue to pose an on-going threat.

The TAHC, in its 2010 state budget, has received funding for five temporary fever tick inspectors to complement the USDA’s Tick Force. The USDA has provided cooperative agreement funding for five more temporary fever tick positions in the Carrizo Springs area. This agreement will allow the agencies to sustain the number of personnel needed in this area to complete the fever tick eradication effort.

The TAHC and USDA staff recently participated in producer meetings and in a cross-border strategic planning session with animal health officials from New Mexico, California and Tamaulipas, Nueva Leon, and Coahuila Mexico, to continue to explore possible collaborations for control and surveillance. TAHC with USDA-APHIS-VS, Natural Resources Conservation Service (NRCS), and ARS continue to also closely collaborate on inter-agency program activities. Resource and funding challenges however, continue to hamper effective control strategies. Wildlife issues are also an ongoing consideration in South Texas, from both a surveillance and delivery/treatment aspect. Finally, a request to perform a controlled study on the Cuban vaccine GAVAC in the established quarantine zone has been made by TAHC, pending Department approval.

Committee Business:

One Resolution on support of the screwworm eradication program was forwarded to the Committee on Nominations and Resolutions.
The Committee met on October 16, 2009 at the Town and Country Hotel, San Diego, Calif., from 8:00 a.m. to 11:30 a.m. There were 11 members and 8 guests present. It was reported that the Food Animal Residue Avoidance Databank (FARAD), a subject of last year’s resolution had received $1 million in funding for continued operation.

Issues Impacting the Use of Antimicrobial Drugs in Food-producing Animals
William Flynn
Senior Advisor for Science Policy, Center for Veterinary Medicine, Food and Drug Administration

Dr. Flynn updated the committee on the issues surrounding the extra-label use of cephalosporins in food animals. The agency received many comments. The comments fell into two major areas, one questioning the agency’s legal basis for the rule and the others challenging the need for such a broad based rule. Some presented science that had not been visible to the agency prior to the rule-making. The agency will issue a new rule. The second topic in this presentation presented the agency’s current thinking on judicious use of medically important antibiotics. Public concerns are driving the agency to look at ways to assure judicious use and providing veterinary oversight is viewed as key to this process. The agency recognizes the industry need to have antimicrobials available for therapeutic uses including treatment, control and prevention. In feed and water administered antimicrobials are the most common targets of legislative action. The Veterinary Feed Directive (VFD) is being used as a model for providing veterinary oversight and could be subject to alteration based on stakeholder input to make it less cumbersome.

Discussion ensued with the key points being made that some producers may be disenfranchised by lack of veterinary expertise and support for their species in their location. Also, risk tolerance was discussed with the point being made that zero, the risk suggested by legislation is not achievable, and the agency has not looked at a defined tolerance definition. It was also pointed out that this issue is more about public opinion than science. There was also discussion about an
increase in ceftiofur residues in dairy cattle, likely due to extra-label use by producers. The concern is that even if veterinarians provide correct direction, the application by producers might result in residue violations.

**Web-based Veterinary Prescription System**  
Kevin Maher  
GlobalVetLink, LC  
A second presentation was made by Kevin Maher, Global VetLink (GVL), to demonstrate the capability of a web based veterinary prescription system. GVL just celebrated the 50th state for Coggins testing and certificates of inspection for livestock movement. The Food and Drug Administration just approved the use of e-signatures for veterinary prescription and VFDs, so GVL is introducing a web based veterinary prescription system. Eventually the plan is to link diagnostics with product use and outcomes.

**Testing and Implementation of KIS™ (Kidney Inhibition Swab) Test**  
Terry Dutko  
USDA-FSIS  
A third presentation was made by Terry Dutko, Chemistry Branch Chief, Office of Public Health Science, Food Safety Inspection Service, USDA, Midwestern Laboratory explaining the testing and implementation of KIS™ (Kidney Inhibition Swab) test, replacing the FAST screening test for antibiotic residues in cattle presented for slaughter. The KIS technology as a rule provided improved results (increased sensitivity) when compared to the FAST test. It has been implemented in 100 beef plants to date and the plan is to introduce it to the remaining beef plants before moving to swine processing plants.

**Committee Business:**  
There was no Committee business brought forth.
The Committee on Program met on Saturday, October 10, 2009 at the Town and Country Hotel, San Diego, Calif. from 6:00 pm to 8:00 p.m. There were 30 members and guests present.

Richard Breitmeyer called the meeting to order, and reviewed the use of Robert’s Rules of Order, quorums and the voting procedures for Committees.

Jim Leafstedt discussed the process for resolutions, including the importance of getting resolutions in a timely manner, and general guidelines for the language used. Steve Halstead reminded chairs to use supportive language when directing action.

David Marshall discussed the Committee on Government Relations meeting, inviting chairs to participate in submitting key issues and attending the meeting in Washington, D.C.

Ben Richey reminded chairs to use the templates and flash drives for their reports, with them due within 24 hours of the close of their meeting. Richey stressed the importance of the business section of the report, which is subject to review and approval by the Board of Directors. Survey forms and sign-in sheets are also to be returned as soon as possible, and staff will make necessary adjustments. Richey added that if security issues arise, chairs should contact staff to handle.

Breitmeyer introduced as part of the Strategic Operational Plan his intentions to appoint a Committee Chair task force to review the chair manual. The Executive Committee will also be reviewing staff support for
chairs in an effort to expand services.

The following chairs were recognized for their services, and presented a plaque as they retire at the close of the 2009 meeting.

- Committee on Diagnostic Laboratory and Veterinary Workforce Development, Bob Frost and Bennie Osburn
- Committee on Animal Emergency Management, Keith Roehr
- Committee on Pharmaceuticals, James Bradford

Questions were taken by the Chair, and the meeting was adjourned.
REPORT OF THE COMMITTEE ON
PUBLIC HEALTH AND RABIES

Chair: Nancy A. Frank, MI
Vice Chair: Sandra K. Norman, IN

Helen M. Acland, PA; Scott C. Bender, AZ; Sue K. Billings, KY; Shane A. Brookshire, GA; Charles S. Brown, NC; William H. Clay, DC; Joseph L. Corn, GA; Donald S. Davis, TX; Ignacio T. dela Cruz, MEX; Thomas J. DeLiberto, CO; Leslie A. Dierauf, WI; Michael R. Dunbar, CO; Brigid N. Elchos, MS; James M. Foppoli, HI; Keith N. Haffer, SD; Cathleen A. Hanlon, NY; Richard E. Hill, IA; Christine N. Hoang, IL; Donald E. Hoenig, ME; Kristin G. Holt, GA; John P. Honstead, CO; Sherman W. Jack, MS; Patrice N. Klein, MD; Spangler Klopp, DE; Donald H. Lein, NY; Martha A. Littlefield, LA; Margie M. Lyness, GA; Robert G. McLean, CO; David L. Meeker, VA; Lee M. Myers, GA; Marguerite Pappaioanou, DC; Kristine R. Petrini, MN; Deidre A. Qual, ND; Anette Rink, NV; Leon H. Russell, Jr., TX; John P. Sanders, WV; Tom J. Sidwa, TX; Robert H. Singer, CA; Dennis Slate, NH; Paul L. Sundberg, IA; Seth R. Swafford, CO; Liz K. Wagstrom, IA; Margaret A. Wild, CO; Dennis J. Wilson, CA.

The Committee met on October 14, 2009 at the Town and Country Hotel, San Diego, Calif., from 8:00 a.m. to 12:00 p.m. There were 12 members and 12 guests present. Chair Dr. Nancy Frank opened the meeting at 8:05 a.m. in the California Room of the Town and County Hotel. She gave a summary of the mission of the committee and welcomed the presenters and committee members. Dr. Frank asked members and guests to sign the attendance rosters and pick up an agenda. There is a resolution to consider and the Committee needs a quorum to consider those, so she urged members to stay or return for those deliberations.

There were no time specific papers presented at 2009-San Diego meeting of this Committee.

CDC Rabies Updates
Dr. Kris Robertson
Epidemiologic Intelligence Officer
Center for Disease Control and Prevention (CDC)

Dr. Robertson filled in for Brett Peterson in giving a rabies summary from CDC. Two cases of human cases were reported in 2008. One from California was a recent immigrant and had a history of a fox bite prior to arrival. In Missouri, there was a case of a person who played with wildlife had an ill bat that he observed. He thought the bat was alright and released it. That person came down with rabies six weeks later.

In 2008 there were 6,841 cases of rabies in animals, 97% in wildlife and 3% in domestic animals. Raccoons, bats, skunks are the top wildlife
species diagnosed with rabies. Skunks have the highest positivity rate of 26% and this is not dropping. About 2,300 raccoons were reported positive in 2008 with 14% positivity clustered in Eastern seaboard states. Percent positivity is decreasing in raccoons. Bats were present in 47 states with the highest numbers in Texas, California, Illinois and New York with about 6% positivity. There were an increased number of bats with the percent positivity dropping slightly. Skunks are a spill over species that are involved in many strains with highest positivity holding at 26%. Foxes decreased in percent positivity also.

Cats increased in percent positivity and case count. They are still the most commonly diagnosed domestic species. Dogs have had decreased number of cases, but maintain 0.3 percent positivity. Variants for dogs are those that are enzootic for the area where they live. Canine strain rabies continues to be absent in the U.S. Texas saw an increase in fox strain rabies in coyotes in northern Texas which lead to increased baiting outside the barrier to cover this area. There was a decline in the number of cases in Canada. Mexico had an increase in vampire bats and human cases associated with exposure to those bats.

Dr. Robertson went over some future changes in rabies management that have occurred in the last year. Changes in rabies reporting to CDC includes the need for more urgent reporting partially due to the Iraqi dog imported with rabies. CDC is using electronic reporting through Public Health Laboratory Information System (PHLIS) in some states and using PHINNIS as back up to this system. They hope to utilize an electronic system in all states. The RabID system will accumulate data but is down right now. It will be web based and is planning on being launched next year. This will hopefully help with reporting and statistical surveillance. In 2009, there were some changes to the Advisory Committee on Immunization Practices guidelines for rabies vaccination. In June, this committee voted to reduce the number of vaccines for post exposure treatment from five doses to four doses. This was in light of vaccine shortage and the research that showed four doses regiment gave adequate immunity. This will not be official until the Mortality and Morbidity Weekly Report (MMWR) is published, but many states have already started using this protocol.

The United States administers about 200,000 doses of Rabies vaccine annually between pre and post exposure vaccine, mostly as post exposure. Most (80%) are paid by private insurance, about 30% require reporting. CDC is looking at national reporting of post-exposure prophylaxis (PEP) by using national surveillance existing tools. Some states are reluctant to report and the CDC would like to collect this data if possible. They are working on how they can obtain this data in states where it is non mandatory to report.

Large scale exposure to a rabid bat at a school in Wyoming produced much public attention. A bat was taken to school as show and tell item and was found to be rabid. Only one person was evaluated to need PEP, but 100 people pursued PEP because of risk advice from physicians. There is a need for communication with private health care providers
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to understand the use and overuse of PEP so they can advise patients appropriately in post exposure situations. Also noted, dogs being returned to shelter because of the economy may result in possibly less vaccination and more rabies diagnosed in canines. An incident with rabies was identified in Bali. Post exposure vaccine treatment that only requires one injection is being studied and could change treatment dynamics. Arizona surge in skunk rabies has been highlighted in national publications. Media has made the outbreak seem much more sensational that in reality.

CDC honored the loss of Dr. George Baer by having a symposium on progress in rabies control on World Rabies Day in Atlanta. Dr. Baer was on the forefront of rabies research and worked on the oral rabies vaccine. He was the head of the CDC Rabies division and vital in the advances in rabies control.

United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Wildlife Services (WS) Rabies Update

Dr. Dennis Slate
APHIS-WS Rabies Management Plan

Dr. Slate, head of the Rabies Management program for Wildlife Services, updated the Committee on the program, surveillance and control. He also said the WS would be honoring Dr. George Baer with a program in the near future regarding oral rabies vaccine.

A paradigm shift in the rabies program includes enhance surveillance so they can make better decisions about rabies baiting distribution. The baiting plan for 2009 includes spreading 6 million baits from Texas in January to New York later in the year. There is a downward trend in putting baits on the ground. Revenues in government are down and caused them to be more efficient in spreading baits. Ohio decreased its investment and WS attempted to cover that shortfall. We are still canine rabies free, but still have translocation and movement of infected dogs from Mexico. There is spillover of the gray fox rabies into the coyote and may expand baiting into New Mexico. Surveillance is difficult in open country and predator trapping is important in this process. Raccoon baiting along the east coast is important to holding the westward movement of this strain. Wildlife Services has been handbaiting at an increased density outside the Ohio zone where the breaks in rabies cases has occurred. This can be difficult because of the area being highly urbanized. Skunks have been found positive with raccoon strain rabies outside the zone. They are attempting to get the number to zero. The number of juveniles coming in to the population makes vaccination and control difficult. The program is looking at GenCon to control population through immunocontraception.

Contingency actions include increased baiting along the Canadian border, baiting in Vermont and other areas in upstate New York to deal with control of raccoon and skunk rabies. Spillover of big brown bat
rabies into skunk and foxes in Arizona is an additional challenge. They developed an oral rabies vaccine (ORV) zones and dropped baits to prevent spread outside the area and establishment of a new variant. The North American Rabies Management plan is a good example of the One Health concept and can be used a prototype for other programs. Dennis outlined the Plan and future projects with Mexico and Canada which includes population control on many levels. He also identified accomplishments along with challenges for the program. Raccoon populations make control and surveillance a challenge. Fox and coyotes have much higher seroconversion rate and makes raccoon immunity not quite as good. Other species such as mongoose do not respond to ORV. Spillover into skunk continues to be a problem in many areas and spillover in all species continues to identify new outbreaks of rabies in other areas of the country. One goal is to eliminate terrestrial rabies in the future over the long term including eliminating variants in various regions. Review of the rabies program will occur in the near future with the new administration. This is one of the first program reviews for this administration. State surveys along with looking at new tools will help in evaluating the future form of the rabies program. Questions followed talking about various issues involving wildlife rabies and control challenges.

One Health Initiative Overview and the Wildlife Perspective
Dr. Margaret Wild
Biological Resource Management Division, National Park Service

One Health is the collaborative effort of multiple disciplines—working locally, nationally, and globally—to address critical challenges and attain optimal health for people, domestic animals, wildlife, and our environment. One Health is not a new idea, but an idea whose time has come, particularly given the emergence and resurgence of zoonotic diseases in recent decades. The American Veterinary Medical Association (AVMA) has taken a leadership role in bringing together partners in a current One Health Initiative. As recommended through the One Health Initiative Task Force and subsequently the One Health Joint Steering Committee, a One Health Commission was incorporated in June 2009. The Commission has established a mission, purposes, and is taking steps to move toward implementation of the One Health concept (see www.onehealthcommission.com). Wildlife health is an important component of One Health. Wildlife populations can be negatively impacted by disease directly by mortality or decreased fitness, or indirectly through collateral impacts of management actions (e.g., culling); however, the most critical impact may be if wildlife are increasingly viewed as pests or disease reservoirs, then tolerance of wildlife and the value society places on wildlife conservation may be at risk. Application of a One Health approach provides the opportunity to avoid such a scenario, if the health of all species remains the goal. Some applications of One Health in
wildlife management are occurring. Rabies management is an excellent example of a program focusing on protection of all species. The Wildlife Conservation Society’s One World-One Health program is a model for collaborative efforts. The National Park Service (NPS) has implemented a One Health approach to management through collaboration of their Office of Public Health and Wildlife Health Program. The NPS initiative has five focus areas including: unified disease surveillance, interdisciplinary response through a Disease Outbreak Investigation Team (DOIT), combined research agenda, consensus guidance, and support of national One Health efforts. Efforts such as these can demonstrate the value of application of the concept of One Health.

A fifteen minute break followed the last presentation and then presentations followed.

Margaret Wild acknowledged all the speakers and borrowed material for her presentation.

NVS Preparedness for a Zoonotic Disease
Dr. Lee M. Myers
USDA-APHIS-VS

Dr. Lee Myers, State Federal Liaison for the National Veterinary Stockpile (NVS) within the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), reported on NVS preparedness for a zoonotic disease. Dr. Myers also discussed the One Health initiatives of VS as part of the agency’s vision for 2015.

Of the 17 disease threats considered by APHIS to be the most damaging, the following nine are zoonotic: 1.) Highly pathogenic avian influenza, 2.) Rift Valley fever (RVF), 3.) Nipah, 4.) Hendra, 5.) Bovine spongiform encephalopathy (BSE), 6.) Japanese encephalitis (JE), 7.) Venezuelan equine encephalomyelitis (VEE), 8.) Eastern equine encephalomyelitis (EEE), and 9.) Coxiella burnetti.

Four of the zoonotic diseases are transmitted by mosquito vectors that can acquire infection transovarially or by consuming blood from infected birds, pigs, or other animals. Rift Valley fever in the Phlebovirus genus is transmitted primarily by Aedes spp. or aerosol/direct contact with infective tissues or blood. Japanese encephalitis in the Alphavirus group is transmitted by birds or other infected animals to humans primarily by Culex spp. Venezuelan equine encephalomyelitis, also in the Alphavirus group, is transmitted by Aedes, Anopheles, Culex, Deinocerities, Mansonia, and Psorophora spp. Transmission by exposure to aerosolized infectious material has been demonstrated in laboratory accidents. Eastern equine encephalomyelitis in the Flavivirus group is transmitted primarily by Aedes spp.

General preventive measures for mosquito-borne arboviruses include vector control and animal vaccination. Vector control measures include destroying mosquito larvae and eliminating breeding areas; Wearing of
long sleeved shirts and trousers; Using approved mosquito repellents; Avoiding mosquito exposure during hours of biting, especially at dusk and dawn; And, killing adult mosquitoes by applying insecticides in known habitats. Animals in endemic areas should be immunized with approved vaccines.

When facing arboviral epidemics, general control measures include educating the general public on the mode of spread and mosquito control measures. High risk individuals should use appropriate personal protective equipment when handling infectious materials. Mosquito surveillance to determine vector density, location of breeding habitats, and the most useful control measures is a critical component of a vector control program. Large-scale vaccination of animals should be considered in epidemics.

Nipah and Hendra viruses are both in the Paramyxoviridae family. Nipah virus is a biosafety level 4 (BSL-4) agent because of high mortality rates (40-75%) in human infections. Transmission is by aerosol or direct contact with excretions or secretions. It is important to ensure all workers in a Nipah virus eradication program are fully trained in personal protection and that only experienced field personnel should handle pteropid bats. Hendra virus is not highly contagious, according to field observations and experimental studies. Horses is the only domestic animal species that is naturally infected. The route of infection to humans is unknown with only four human cases recorded. Flying foxes in Australia is the known reservoir. Horses infected with Hendra virus should be handled carefully.

Coxiella burnetti, known as Q fever, is a rickettsial organism transmitted commonly by airborne dissemination of dust from premises contaminated with placental tissues, birth fluids and excreta of infected animals. Contaminated airborne particles have been known to be carried downwind for over one half mile. Transmission by direct contact with infected animals and contaminated materials, or raw milk of infected animals.

The NVS is the national repository of critical veterinary equipment, supplies, vaccines, and services to combat the disease in animals, but to protect the health of responders. Some of the deployable personal protection countermeasures in the NVS are protective suits (standard, moderate, and high protection), aprons, gloves, boot covers, goggles, powered air-purifying respirators, filtering respirators (N95), biohazard bags, chemical tape, shears, etc. The connotation of standard personal protective equipment (PPE) includes routine disposable coveralls (e.g. Tyvek®), apron, gloves, boot covers, goggles, respiratory protection (N95), and the like. The NVS holds water-resistant disposable coveralls for moderate protection and waterproof disposable coveralls and powered air-purifying respirators for high protection.

Considerations for potential personal protections against zoonoses were reviewed remaining cognizant of the routes of transmission and zoonotic potential of each disease causing agent. High protection PPE
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gear and vector protection should be considered to prevent exposure to Rift Valley fever and Venezuelan equine encephalomyelitis when performing high risk activities. High risk activities requiring the highest level of protection in this context means direct contact with infected animals, or their tissues, excretions, or secretions, or exposure to infected and competent vectors. High protection PPE gear should be considered for highly pathogenic avian influenza (H5, H7), Nipah virus, and *Coxiella burnetti* high risk activities. Standard PPE gear and vector protection should be considered for Japanese equine encephalomyelitis and Eastern equine encephalomyelitis, and standard PPE gear should be considered for Hendra virus and bovine spongiform encephalopathy.

The NVS holds poultry foam equipment for massive depopulation which reduces human exposure to zoonotic pathogens when compared with historical depopulation equipment and methods. Commercial services through NVS contracts can provide vector control measures and responders skilled in all levels of PPE. The NVS also holds antivirals, both Tamiflu® and Relenza® for agriculture responders checked into incident command and identified as needing medication. The USDA will prescribe and dispense antivirals if needed to Federal government employees and States/Tribes/U.S. Territories are responsible for prescribing and dispensing to their personnel.

The NVS program encourages logistics preparedness for zoonoses and has recently initiated exercises for arboviral diseases. The NVS program co-sponsored a tabletop exercise with the State of Arizona and the Navajo Nation in August of 2009 based on a Rift Valley fever scenario. In FY 2010, the NVS program will partner with the Southern Agriculture and Animal Disaster Response Alliance member states to develop State NVS plans, and will conduct an operations based Rift Valley fever logistics exercise concurrently with the States of Alabama, Louisiana, and Mississippi in the spring of 2010. Reference materials for this presentation included *Foreign Animal Diseases* 2008; the Rift Valley Fever Factsheet from the Center for Food Security and Public Health, Iowa State University, May 2007; the Rift Valley Fever Factsheet, World Health Organization, September 2007; and the *Control of Communicable Diseases Manual*, 1995.

Dr. Myers also briefed the Committee on the VS 2015 vision of one health. The One Health working group (OHWG) was the first of the five VS 2015 working groups formed in June 2009. Veterinary Services employees on the OHWG are Lynn Creekmore, Western Region; Tom Gomez, National Center for Animal Health Emergency Management (NCAHEM); Beth Harris, National Veterinary Services Laboratory; Steve Just, Minnesota Area Office; Patrice Klein, National Animal Health Programs; Katherine Marshall, Center for Animal Health; Mike McDole, New Mexico Area Office; Lee Myers, NCAHEM; Sheryl Shaw, Minnesota Area Office; Jay Srinivas, Center for Veterinary Biologics; Jill Wallace, National Center of Import and Export; Randy Wilson, Oregon Area Office.
The OHWG brainstormed on the following issues:

- Facilitate more assertive role of VS in One Health (OH)
- Determine when VS should engage in OH issues; and when to lead vs. assist
- Encourage enhanced interactions with other agencies, departments, and organizations in OH arena
- Develop central coordinating entity within VS for zoonotic disease-related issues (ex. 2009 novel H1N1 influenza)
- Coordinate with USDA OH initiatives

The OHWG developed two pilot projects to move forward, the One Health Investigation Team (One-HIT) project and the personnel exchange/detail project. The intent of a One-HIT is to:

- Develop VS team of subject matter experts who could mobilize to rapidly assess an undiagnosed or uncharacterized OH event at the request of local or state officials
- Deploy, investigate, take necessary actions (e.g., rapid assessment), interface with OH partners, make recommendations regarding the scope and implications of the One Health incident
- Use case studies and role play to better define VS' interactions and policies, October 2009
- Identify potential team positions, roles, triggers for mobilization, and responsibilities for various scenarios
- Conduct tabletop exercise with OH partners to clarify how team will integrate with OH events
- Respond to an actual event by summer 2010
- One-HIT project recently approved and supported by VS Management Team as part of the VS 205 initiative

The intent of the personnel exchange/detail project is to:

- Provide short-term experiential learning opportunities for all VS employees (GS 7-14) through details and externships with OH partners throughout FY 2010
- Focus on activities that promote interdisciplinary approaches involving the health of animals or humans or well-being of ecosystems
- Foster collaboration and linkages across disciplines; gain leadership experiences; and enhance professional skills
- Short-term personnel exchanges and detail assignments recently approved and supported by the VS Management Team as part of the VS 2015 initiative and VS employee individual development plan

Foundational issues VS should address in order to create a culture of One Health

- Clarify VS authorities and roles
- Catalog employee skills
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- Identify training needs
- Facilitate paradigm shift from historical roles
- Develop short term workarounds and long term solutions
- Invite representative of National Assembly of State Animal Health Officials and National Association of State Public Health Veterinarians to join OHWG

- Consider input from USAHA meeting
- Continue to solicit ideas and suggestions from stakeholders

NVS Tabletop Exercise – Rift Valley Fever
Dr. Scott Bender
Tribal Veterinarian, Navajo Nation Veterinary Program

Dr. Bender covered the recent tabletop drill of the NVS in Arizona with a RVF incident. There are 564 sovereign nations, tribes and villages. USDA is not allowed in these sovereign areas along with military and other federal agencies. Program started with Dr. Bender and another veterinarian to be liaison with USDA, but still employed by the Tribe. The Tribe had a disease outbreak likely Western equine encephalitis and realized they needed resources. They have worked with Arizona and USDA to obtain additional training for veterinarians along with an MOU with the state to obtain public health resources. Navajo nation has developed plans for emergency response to foreign animal disease and other emergencies. Incident command training was also included in preparation activities. It was discovered that the nation had very little PPE and needed a stockpile plan. Dr. Bender observed stockpile exercise in Kentucky and realized what needed to be done in his area. Dr. Upshaw developed the tabletop exercise for Rift Valley fever to exercise the NVS plan. The exercise took place August 5, 2009 involved Arizona, USDA and Navajo nation and took place in the Navajo Nation capital. This fit with the New Mexico exercise for foreign animal disease involving Rift Valley Fever. Navajo nation developed incident command system for the exercise and all learned about each others’ roles in a disease emergency outbreak. Public health learned the importance of veterinary input to the process. Conclusions include that counties have no idea what the Navajo Nations are doing, so additional planning needs to proceed with these entities. Tribal agencies learned that they need to be involved in more planning for animal disease emergencies. Public health realized that that they would need to work with the nation on vector trapping and control. Recommendations include improving communications, identifying resources and feasibility of reciprocal sharing. There was great value in bringing all parties to the table and opening the eyes of non animal responders to the needs in the area of disease response along with interagency conversations.
H1N1 from the Swine Industry Perspective
Dr. Jen Greiner
National Pork Producers Council

Dr. Greiner covered that the swine industry and the loss of $4.5 billion in the last 24 months. Dr. Greiner spoke about communications and the response of the swine groups to the H1N1 outbreak. Meeting with USDA and state veterinarians along with public health and elected officials was initiated to try and minimize the impact on an already impacted industry. China shut the door to swine imports and a North American Management Plan was developed and signed off on by Dr. Clifford. Messaging that “Pork is Safe” was delivered to the public to show that eating pork was safe. Industry plan has been developed along with a core crisis team continues to meet to address any disease situations.

Four objectives were:
1. Pork is safe to eat and media is carrying messages to the public
2. Protect the U.S. swine herds by keeping sick humans out of the barns and minimizing exposure
3. Monitor and react to media-use proper name, not swine influenza
4. Address allegations by activists and defend modern swine production practices to animal welfare groups.

Pork consumption did not drop in the U.S. but it did in other countries. Finding H1N1 in a swine herd does not mean you cannot eat that meat. Messaging was very important in the Hispanic community. Ads were displayed in several media outlets and many interviews were given in the first weeks after the outbreak. Social media was included in the communication plan. You tube videos were posted along with messaging on Twitter. Farmers have worked to educate people on Twitter that H1N1 has stolen the farm and educated the public about the swine farm.

Round two, we are struggling with H1N1 being called the other name. Large media outlets have tested and the public appears to like swine flu better than H1N1. Continue to do webinar for all audiences to dispel the myths and send out messages. FactAboutPork.com is a website for information.

Surveillance has gone on for years for influenza and the current environment makes it difficult for farmers for submit to testing since the market for these pigs is uncertain. Continuing to work with USDA and other agencies will be important in the future of the swine industry in this climate.

Committee Business
A quorum is being sought to consider a resolution and recommendation. There were not 10 committee members available for consideration at the time of the deliberations. More Committee members arrived and a quorum was obtained. A resolution presented by Don Lein was presented that addressed continued funding for wildlife rabies management programs in North America. After discussion and language
amendments the resolution was passed and forwarded to the Committee on Nominations and Resolutions.

A recommendation was presented by Scott Bender to push forward a previous resolution regarding the GenCom program that the Committee considered last year. The Committee made no effort to remove it from the table and will look for action at next year’s meeting.

A resolution presented in 2007 to the Committee on Transmissible Diseases of Poultry and Other Avian Species regarding vaccination, treatment and PPE for livestock workers as a priority was brought to the attention of the Committee by a guest. The Committee voted to recommend that this resolution be given to officials that can address priority vaccination for this population.

Chair Frank brought up that a subcommittee that could focus on One Health initiatives through this Committee and bring USAHA to the table in this program. The subcommittee could help with bringing public health to the meeting. Subcommittee includes Don Lein, Lee Myers, Margaret Wild and other members were appointed.
The Committee met on October 11, 2009 at the Town and Country Hotel, San Diego, Calif., from 12:30 p.m. until 5:30 p.m. There were 28 members and guests present. Members were encouraged to sign-in. Dr. Paula Fedorka Cray was the meeting moderator since Dr. McDonough was out of the country and unavailable to conduct the meeting. Dr. Cray gave a brief overview of the Committee and its mission statement, encouraged attendees to review the minutes of the 2008 Annual Meeting, and then welcomed the speakers to the forum.

**CDC Update on Salmonella in the United States**

Casey Barton Behravesh
Centers for Disease Control and Prevention

Lt. Commander Casey Barton Behravesh DVM, DrPH, DACVP, Outbreak Response Team, Outbreak Response and Prevention Branch (proposed), Division of Foodborne, Bacterial and Mycotic Diseases, U.S. Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, gave an overview of Salmonella in the United States, updated surveillance activities of the Public Health Laboratory Information System (PHLIS), FoodNet, and the National Antimicrobial Resistance Monitoring System (NARMS), and finally covered the Salmonella outbreaks for the past year.

There are greater than 2,500 Salmonella serotypes and each year in the United States, Salmonella infections cause an estimated 1.4 million illnesses, 168,000 physician office visits, 15,000 hospitalizations, and 400 deaths. She described the National Salmonella Surveillance System (from
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PHLIS) which was established in 1990 to collect data directly from state public health laboratories. The laboratories report isolation of a reportable pathogen, the species and/or serotype, and limited epidemiologic information. She provided the top *Salmonella* serotypes in the United States for 2008 (see the Appendix) in which *Salmonella* Typhimurium and S. Enteritidis remained the top two serotypes. Annual summaries of human *Salmonella* isolations may be found at http://www.cdc.gov/ncidod/DBMD/phlisdata/salmonella.htm and http://www.cdc.gov/ncidod/DBMD/phlisdata/salmonella_surveillance.htm but cover only the time period through 2006.

FoodNet, established in 1996, is the principal foodborne disease component of CDC's Emerging Infections Program. FoodNet is a collaboration of CDC, USDA, FDA, and 10 participating state health departments. It covers about 15% of the United States population or around 45 million people through the active surveillance at greater than 650 clinical laboratories. Enhanced surveillance of foodborne infections as measured in FoodNet sites estimates that the rate of *Salmonella* has changed the least compared to the 1996 to 1998 baseline period versus other common foodborne bacterial infections. The rate each year is compared with the baseline developed in 1996-1998. Compared with 1996-1998 period there was a 4% decrease (CI: 11% decrease to 4% increase) in *Salmonella* in 2008 and compared with the previous three years there was a 6% increase (CI: 0% to 12% increase), but neither was a significant change. The bottom line is that there is a lack of progress toward decreasing *Salmonella*.

The Healthy People 2010 objective is 6.80 cases of *Salmonella*/100,000 persons; however, the level for 2008 was 16.20 cases/100,000 (http://www.cdc.gov/nchs/healthy_people.htm). It was determined that 7.5% of all *Salmonella* cases were related to outbreaks in 2008, in contrast to 4.55% in 2005, 7.15% in 2006, and 6.09% in 2007. The top 10 serotypes from humans in 2008 accounted for 73% of infections (see appendix). She then reported the percent change in the incidence of infection with selected *Salmonella* serotype infections in 2008 compared with the previous three years (2005-2007), i.e., S. Enteritidis and S. Saintpaul both increased while S. Heidelberg decreased in 2008.

**National Antimicrobial Resistance Monitoring program or (NARMS)**

Dr. Barton Behravesh then gave an overview of the National Antimicrobial Resistance Monitoring program or (NARMS) that monitors changes in antimicrobial drug susceptibilities of selected enteric bacterial organisms in humans, animals, and retail meats to a panel of antimicrobial drugs important in human and animal medicine. The NARMS program consists of three areas or arms: Animal Arm, Human Arm, and the Retail Arm. NARMS results for *Salmonella* are available since 1996. NARMS started in 14 sites in 1996 and expanded nationwide in 2003. She then discussed trends in multidrug-resistant *Salmonella*, resistance to clinically
important drugs, Fluoroquinolones, Nalidixic acid, Ciprofloxacin, 3rd
generation cephalosporins, and to Ceftriaxone. A couple of changes
occurred in the 2007 NARMS analysis, i.e., there was the switch from
non-Typhi (excluding Typhi) to nontyphoidal (excluding Typhi, Paratyphi
A, B, and C) Salmonella; they also used resistance to >=3 drug classes
as one of the major categories for multidrug resistance (MDR). With the
switch to nontyphoidal Salmonella, resistance to nalidixic acid in more
recent years was lower than when they were looking at non-Typhi, so
the increase in nalidixic acid resistance from 1996 to 2007 was slightly
less. This is explained by the exclusion of Paratyphi A, which has very
high resistance to nalidixic acid. Ceftiofur resistance was less affected
by the switch to nontyphoidal Salmonella in the analysis. NARMS is now
counting resistance to clinical and laboratory standards institute (CLSI)
classes of drugs rather than to antimicrobial agents because this better
quantifies resistance. Resistance to a class is defined as resistance to one
or more drugs in the class. For some of the classes, they have more than
one drug representing the class, so they are not counting several drugs
in one class. The percentage of nontyphoidal Salmonella resistant to
nalidixic acid, by year, 1996-2007 showed that although Fluoroquinolone
(e.g., ciprofloxacin) resistance was not yet widespread, there was an
increase in quinolone (e.g., nalidixic acid) resistance along with decreased
susceptibility to ciprofloxacin has been ongoing since 1996. The
percentage of nontyphoidal Salmonella resistant to ceftiofur has gradually
increased over the time period as has the percentage of strains with
decreased susceptibility to ceftriaxone. Resistance to extended-spectrum
cephalosporins appears to be mediated by similar mechanisms found in a
variety of Salmonella serotypes horizontally transmissible by plasmids.

**CDC’s OutbreakNet Team**

Dr. Barton Behravesh presented an overview of CDC’s OutbreakNet
Team. This team supports a national network of epidemiologists and other
public health officials who investigate outbreaks of foodborne, waterborne,
and other enteric illnesses in the United States. It is a collaboration
between CDC and U.S. State and local health departments, U.S.
Department of Agriculture (USDA), U.S. Food and Drug Administration
(FDA), and works in close partnership with PulseNet, the national
molecular subtyping network for foodborne disease surveillance. This
surveillance helps ensure rapid, coordinated detection and response
to multi-state enteric disease outbreaks and promotes comprehensive
outbreak surveillance. The OutbreakNet Team activities regarding
salmonellosis include outbreak investigations, consulting on local and
multistate outbreak investigations (greater than 200 outbreaks and ~10
Epi-Aids a year), coordinating multistate outbreak investigations, outbreak
surveillance, maintaining a database of reported foodborne outbreaks,
and analyzing outbreak data for trends. What can outbreaks tell us
about control of salmonellosis? Outbreaks are one of our best sources
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of information on foods that cause foodborne illness. Individual outbreak investigations can provide insight into the mechanism of contamination, potential control measures to prevent future illnesses. Outbreaks constitute a relatively small proportion of all illnesses each year, largely representative of foods causing salmonellosis (1.4 million illnesses estimated/35,000 reported/3,500 outbreak-related per year).

National Outbreak Reporting System (NORS)

Next she discussed the National Outbreak Reporting System (NORS), which is an electronic reporting system for foodborne and waterborne disease outbreaks, enteric 'person-to-person'-transmitted disease outbreaks (e.g., norovirus outbreaks), that just recently included animal contact associated enteric disease outbreaks. This is a web-based system that will provide one online location for reporting these types of outbreaks. The enhancement to NORS in terms of well-defined data fields, as well as the inclusion of additional fields for laboratory data, environmental data, and additional options for factors that contributed to the outbreak means that future analyses of outbreak data will be able to provide more information about risk factors associated with these types of outbreaks. Additionally, it will allow for continued reporting of animal contact associated outbreaks including those associated with animals in public settings and sending out a request such as this one will not be necessary in the future. There is a guidance document describing how to use the NORS system to report outbreaks, and training was available online in early 2009.

Then information was reported on the Average Weekly Number of Clusters that the CDC Outbreak Response Team followed by month and pathogen, from February 2008 to August 2009. Dr. Barton Behravesh discussed the applications of outbreak investigations and their role in the control of salmonellosis. Outbreaks are one of our best sources of information on foods that cause foodborne illness, i.e., individual outbreak investigations can provide insight into the mechanism of contamination, control measures to prevent future illnesses, and also identify gaps in our food safety system. Though outbreaks represent a relatively small proportion of all illnesses each year, they are largely representative of foods causing salmonellosis, e.g., there are around 1.4 million estimated foodborne illnesses each year of which 40,000 are reported; around 3,500 illnesses are outbreak-related.

Information was provided on the number of salmonellosis outbreaks and outbreak-related illnesses reported to CDC, 2006 to 2009. Twenty outbreaks were highlighted and in 12 out of 20 outbreaks a new food vehicle was uncovered. During 1998 to 2005, eggs, poultry, and produce led in numbers of salmonellosis outbreaks when analyzing the data by food commodity category of single implicated food. Salmonellosis outbreaks due to poultry were discussed, i.e., these are typically small, are home, restaurant or event-based. Cross-contamination by poultry
**SALMONELLA**

is likely underrepresented in outbreak surveillance, e.g., these may be large outbreaks: >100 cases S. Typhimurium in Arkansas associated with restaurant sushi contaminated in the kitchen. They can be widespread, and are detected by pulsed field gel electrophoresis (PFGE), e.g., S. Typhimurium due to microwaveable chicken, 1998 and 2005, and S. I 4,5,12:i:- due to poultry containing frozen pot pies, 2007.

The outbreak of *Salmonella* Montevideo infections associated with restaurant chain A—Arizona, May - October 2008 was presented: the entire outbreak's epicurve focusing on those *Salmonella* Montevideo infections matching the outbreak strain, occurring after May 1, 2008 was presented; the dates of illness onset ranged from May 10th through September 2, 2008. There were 58 case patients in Arizona. Of these 58 noncohort cases in Arizona matching the outbreak strain, three were lost to follow up. Of the remaining 55, 59% were female with a median age of 36.5 years. Additionally, 96% of case patients were residents of Maricopa County, with the remaining 4% residents of neighboring Pinal County, but who dined frequently in Maricopa County; 40% of cases reported bloody stools and 35% were hospitalized and there were no deaths. Initial patient interviews showed a predilection for eating at Restaurant Chain A. In total, 67% ate at Restaurant Chain A in the seven days before illness onset, with 46% eating at Location A, 28% eating at Location B, and 15% eating at Location C. Three percent or one person each, ate at Locations D, E, and F, while 3% ate at Restaurant Chain A, but was unable to identify the location. Ten percent were frequent diners of Restaurant Chain A, but they were unsure if they consumed a meal there within 7 days of illness onset. Of the individuals who had eaten at one of the restaurants where clustering was noted, in total 63%, or 35 confirmed case patients, ate at Location A, B or C in the 7 days before illness onset. Case patients were asked what items they consumed at restaurant Chain A and 43% reported eating grilled chicken, 17% ate pinto beans, 17% ate Spanish rice, and 17% ate an item called an ultimate chicken bowl, which contains grilled chicken. These were the items with the highest frequencies and were not that informative on this menu level analysis. However, as restaurant Chain A is a Mexican-style restaurant, many items on the menu contain the same ingredients. Therefore, we did an ingredient level evaluation. On this analysis, 83% reported eating any type of chicken and 69% reported eating cilantro at Restaurant Chain A. The last part of the investigation that was discussed was the environmental investigation that was conducted; this investigation and the epidemiologic investigations occurred concurrently. However, before I get into the environmental investigation, I'd like to give you an idea of how chicken is prepared in the store. Restaurant Chain A serves three different cuts of chicken: whole chicken, saddle hind chicken, which is where the two legs of the chicken remain connected, and chicken breast. All types of chicken are marinated in the restaurants. Marinade is made from a prepackaged concentrate, water, and ice. However, while fresh marinade is made for both whole
chicken and saddle hind chicken, marinade, used previously on whole chicken or saddle hind, is used to marinate the chicken breast.

Over 150 food and environmental samples were taken during the investigation. These samples were collected from multiple Chain A locations, including affected, unaffected, and those locations of unclear status. Samples were taken multiple times over the course of two months, and samples were cultured, serotyped and subtyped by the Arizona Dept. of Health Services (ADHS) and CDC. Food and Environmental samples yielding the outbreak strain were collected from Location A and Location B. A timeline showed when samples were collected. Samples were collected from other locations, including Location C. However, none of these yielded the outbreak strain. A sample collected on August 5 from Location A of processed cilantro yielded the outbreak strain. Two different samples of processed cilantro collected on August 13, yielded the outbreak strain from Location B. This cilantro was not from a sealed bag, but rather was chopped by kitchen staff. A sample collected on August 19 of freshly marinated saddle hind chicken yielded the outbreak strain from Location B. A sample collected on August 27 of marinated chicken breast yielded the outbreak strain; please remember, this marinade was not fresh, and had been used prior on either whole or saddle hind chicken. Finally, on September 8, a swab of the cutting board used exclusively for cooked chicken was collected and subsequently yielded the outbreak strain from Location B. As a reminder, there is no cutting of uncooked chicken and therefore could not have been the result of a mix up of raw and cooked chicken cutting boards by the kitchen staff.

Salmonella Montevideo matching the outbreak strain was not the only Salmonella isolated from the restaurants. As would be suspected, different samples of chicken collected on different days from different locations yielded Salmonella Kentucky, S. Heidelberg, S. Typhimurium, and S. Uganda. This is not an unexpected finding. Additionally, the area around the cooked chicken cutting board was tested. Three separate samples yielded Salmonella Seftenberg. There was no increase in illnesses due to these other Salmonellas.

Conclusions about the outbreak revealed that the source of outbreak was likely chicken, i.e., contaminated chicken was delivered to many stores multiple times, poor restaurant hygiene resulted in cross-contamination of cilantro, undercooked chicken contaminated cutting board. Patrons of the restaurants became ill from contaminated cilantro, undercooked chicken, and contaminated cooked chicken. Thus most cases associated with the 3 locations likely were due to unsafe food handling practices. Additionally, undercooked chicken was removed from the grill before completion of the cooking process, cut on the cutting board, and contaminated the board. This then served to contaminate cooked chicken cut on this board.

Produce outbreaks are on the rise. Dr. Barton-Behravesh reported that the proportion of all foodborne outbreaks associated with produce has been increasing over the last 30 years, i.e., from < 1% to 6% of all
outbreaks, and from < 1% to 12% of outbreak associated cases. Some produce items associated with recurrent outbreaks of salmonellosis have been almonds, melons, sprouts, tomatoes.

**Outbreak of *Salmonella* Serotype Saintpaul Infections Associated with Eating Alfalfa Sprouts --- United States, 2009.**

On February 24, 2009, the Nebraska Department of Health and Human Services identified six isolates of *Salmonella* serotype Saintpaul with collection dates from February 7--14. *Salmonella* Saintpaul is not a commonly detected serotype; during 2008, only three *Salmonella* Saintpaul isolates were identified in Nebraska. This report summarizes the preliminary results of the investigation of this outbreak, which has identified 228 cases in 13 states and implicated the source as alfalfa sprouts produced at multiple facilities using seeds that likely originated from a common grower. On April 26, the Food and Drug Administration (FDA) and CDC recommended that consumers not eat raw alfalfa sprouts, including sprout blends containing alfalfa sprouts, until further notice. On May 1, FDA alerted sprout growers and retailers that a seed supplier was withdrawing voluntarily from the market all lots of alfalfa seeds with a specific three-digit prefix.

[http://www.cdc.gov/mmwr/preview/mmwrhtml/mm58e0507a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm58e0507a1.htm) (see full text following this report)

**Multistate Outbreaks of Human *Salmonella* Infections Associated with Small Turtles – United States, 2007–2009.**

Dr. Barton-Behravesh spoke next of the ongoing issues of small turtle salmonellosis. Salmonellae are normal gut flora for most or all reptiles. Humans become infected when they come into contact with fecal matter from a colonized reptile, and multiple studies have shown that direct contact is not necessary to acquire *Salmonella* infection. Compared to other reptiles, turtles are considered especially risky for young children. This is because turtles are more likely than other reptiles to be given to young children due to their slowness, gentle nature and their perceived ease of care. In contrast to other reptiles, turtles are frequently kept in a terrarium with a reservoir of water, which can amplify *Salmonella* bacteria, and which may serve as a source of infection among young children who handle the turtle or come in contact with its habitat. To prevent turtle-associated *Salmonella* infections, especially in young children, in 1975 the Food and Drug Administration enacted a federal law that prohibited the sale of turtles under four inches in shell length. This federal ban has been estimated to prevent 100,000 turtle-associated *Salmonella* infections in children each year. Despite the ban, sales of small turtles still occur in the United States.

From September of 2006 until April of 2007 three multistate *Salmonella* outbreaks involving 20 people occurred due to *Salmonella* Pomona. There were also two large, multistate outbreaks with >100
illnesses each of *Salmonella* Java (2007-2008) and in 2008 of *S. Typhimurium* in which the index case had contact with a turtle and there was secondary exposure in daycares resulting in seven ill children (with no turtle contact).

Of the *Salmonella Typhimurium* Infections during March 2008 – November 4, 2008, 135 cases were reported from 25 states and the District of Columbia. Cases were predominantly reported from the eastern half of the United States. The state reporting the most cases was Pennsylvania, with 25 cases. The median age of patients in this outbreak was 8 years, with a range from <1 year to 94 years and 51% of the patients were female. Among patients interviewed with a supplemental questionnaire, 38% of patients reported exposure to some kind of reptile. 33% reported exposure to turtles, and 11% reported exposure to other kinds of reptiles, such as snakes and lizards. Some patients reported contact with both turtles and other types of reptiles. Only 32% of the respondents reported knowing about the risk of *Salmonella* infection associated with exposure to reptiles prior to their illness. As mentioned previously, 16% of the patients were thought to have secondary infection. Of these patients, 75% attended daycare and were associated with three different daycare center clusters, all of which were in Pennsylvania. Daycare A had eight cases, daycare B had two cases, and daycare C had two cases. Most of these cases appear to have resulted from person-to-person transmission within the daycare from an index case with exposure to a turtle outside of the daycare. The index case was a different child in each of the three daycares. Person-to-person transmission within these daycare centers (i.e., secondary transmission) was suggested by several factors: no reptiles were located in the daycare centers; each index case in the three centers reported exposure to a turtle outside of the daycare; none of the subsequent cases reported exposure to turtles or exposure to an ill contact outside of the daycare during the two weeks preceding illness; and lastly the PFGE patterns of isolates from subsequent patients in each daycare matched that of the index case in the daycare. [Two daycares had the 416 pattern and one daycare had the 0006 pattern.] Only exposure to turtles was statistically significant and 49% of cases versus 20% of controls reported exposure to turtles, yielding a matched odds ratio of 16.5 with a 95% confidence interval from 2.4-723.2. Of the eighteen patients reporting exposure to turtles, 94% were exposed to turtles with shell lengths <4 inches. Of the 11 patients who knew what kind of turtle they were exposed to, 55% reported exposure to red-eared sliders, and 69% of the turtles came from street vendors or flea markets. These venues are an important source of illegal turtle sales. The results of the environmental investigation revealed that six water samples obtained from turtles owned by cases were cultured and that 3 were positive. In each case, the pulse-field gel electrophoresis (PFGE) pattern of the positive sample matched that of the corresponding human case. Both PFGE patterns in the outbreak strain were represented in the positive samples.
From 1975, when the federal ban was enacted, to 2006, no large turtle-associated *Salmonella* outbreaks were reported in the U.S. Now, however, this is the third multistate *Salmonella* outbreak in the last three years that has been associated with exposure to turtles. Reasons for this increase may include improved detection of multistate outbreaks through PulseNet, and increased pet turtle ownership in the United States. Public knowledge of the risk of *Salmonella* infection with exposure to turtles and other reptiles is low, ranging from 21% to 32% in the last two outbreaks. A high proportion of patients in these outbreaks are young children, who also may be at greater risk for serious morbidity.

Many of the small turtles associated with these outbreaks continue to be sold illegally, especially through street vendors and flea markets. The transient and easily re-locatable nature of these sources makes enforcement of the federal ban difficult.

Current recommendations to prevent turtle and other reptile-associated *Salmonella* infections have been made by CDC, FDA, and other public health partners. Turtles should not be kept as pets and should be removed from households containing elderly or immunocompromised persons or children aged < 5 years, due to their increased susceptibility to infection. For similar reasons, turtles should not be kept in daycare centers. If pet turtles or other reptiles are kept in a household, owners should follow good hygiene and food safety practices. These include keeping turtles away from high risk individuals and from food preparation areas. Household members should wash their hands after any contact with turtles or the turtle habitats, and should routinely disinfect all surfaces coming into contact with them. Based on recent outbreaks, the CDC also has the following recommendations: more should be done to evaluate and improve education efforts to prevent turtle-associated *Salmonella* infection, such as more effective methods of reaching the target audience; physicians, especially pediatricians, should incorporate education about reptile-associated salmonellosis into routine health visits; state and local jurisdictions should consider enacting regulations against the sales of small turtles, such as those that led to the recent convictions in Illinois and Florida, to augment the current federal ban.

**Nuts Over Salmonella: Multistate Outbreak of Salmonella Typhimurium Infections Associated with Peanut Butter and Peanut Butter-Containing Products — United States, 2008–2009.**

Dr. Barton-Behravesh next provided an update on the peanut butter associated outbreaks from the past year. First an overview of outbreak investigation was given. Past practices of outbreak investigations versus present methods were compared, e.g., in the past food distribution was mostly localized; local outbreaks having large numbers of ill people occurred; they were identified by affected group, and improper food handling in a single restaurant or event was usually the cause, plus control measures were locally applied; in contrast, now food products are
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more widely distributed; many affected communities are involved with few cases; PulseNet detects and connects dispersed cases; communication, coordination are critical; usually industrial contamination of foods has occurred, and large-scale control measures need to be implemented. Dr. Barton-Behravesh also explained in detail how the outbreak was investigated, including the generation of hypotheses that were tested.

Some of the research questions that developed included how long Salmonella can survive in peanut butter and peanut-containing products? What temperatures are required to kill Salmonella in different peanut butter-containing products? What is the best way to determine if peanuts have been sufficiently heated to kill Salmonella during the roasting process? Other questions raised by the investigation were how we can decrease the time to get subtyping results? Decrease time to identify hypothesis, especially in ingredient-driven outbreaks? Conduct large multistate case-control studies without relying on hundreds of volunteers? and Communicate health risks effectively in outbreaks involving many food products?

On November 25, 2008, an epidemiologic assessment began of a growing cluster of Salmonella serotype Typhimurium isolates that shared the same pulsed-field gel electrophoresis (PFGE) pattern in PulseNet. As of January 28, 2009, 529 persons from 43 states and one person from Canada had been reported infected with the outbreak strain. This report is an interim summary of results from ongoing epidemiologic studies and recall and control activities by CDC, the Food and Drug Administration (FDA), and state and local public health agencies. Confirmed, reported onset of illness dates have ranged from September 1, 2008, to January 6, 2009. A total of 116 patients were reported hospitalized, and the infection might have contributed to eight deaths. Sequential case-control studies have indicated significant associations between illness and consumption of any peanut butter (matched odds ratio [mOR] = 2.53), and specific brands of prepackaged peanut butter crackers (mOR = 12.25), but no association with national brand jarred peanut butter sold in grocery stores. Epidemiologic and laboratory findings indicate that peanut butter and peanut paste produced at one plant are the source of the outbreak. These products also are ingredients in many foods produced and distributed by other companies. This outbreak highlights the complexities of “ingredient-driven” outbreaks and the importance of rapid outbreak detection and investigation. Consumers are advised to discard and not eat products that have been recalled.

In conclusion, a large multistate Salmonella Typhimurium outbreak caused by contaminated institutional peanut butter and peanut paste used in food products resulted in one of the largest food recalls ever in the United States. This was a complex, “ingredient-driven” outbreak. When the outbreak was first detected, the source was not immediately apparent since products were distributed through multiple channels and consumed in various settings. But the rapid investigation of small, local clusters,
and tracebacks, such as the Minnesota investigation, provided critical clues to solving this large and dispersed multistate outbreak. In addition, collaboration and information sharing among local, state and federal partners facilitated rapid public health actions. Even after a source was identified, on-going interviews of new patients were crucial to detect other contaminated products. For example, continued case-patient interviews by the Colorado Department of Health led to the discovery of contaminated in-store ground peanut butter, and the traceback revealed contamination at the PCA Texas facility. However, such investigations are intense, and can rapidly drain resources. Therefore, enhancing capacity at the state, local, and federal levels could make outbreak detection and investigations even faster. This may include enhancing Salmonella serotyping and molecular subtyping laboratory capacities. Finally, illnesses could continue to occur if recalled peanut-butter containing products are consumed. Since products have long shelf lives up to one year, they may still be in households, so consumers should check for recalled products and discard them. Finally, this outbreak also highlighted important policy considerations for prevention of future outbreaks. For food processing companies, policies should be considered for general food safety practices, quality control and product testing to verify that these food safety practices are being carried out, and policies detailing follow-up actions to be taken when product sampling identifies a food safety problem. Food safety regulators should consider policies detailing the frequency and depth of recommended food company inspections, and requiring specific good manufacturing practices for food companies. During this high profile outbreak there were many media stories in the national press. As apparent in the headlines, this outbreak was instrumental in refocusing national attention on food safety. 

(http://www.cdc.gov/mmwr/preview/mmwrhtml/mm58e0129a1.htm) (see MMWR paper in the following this report).

NAHMS Studies Update: Salmonella
Dr. David A. Dargatz
USDA-APHIS-VS

Dr. Dargatz presented the USDA-APHIS-VS Centers for Epidemiology and Animal Health (CEAH) update for this year. Recent National Animal Health Monitoring and Surveillance (NAHMS) studies involved (1.) the Beef 2007-08 Study encompassing 24 states during October 2007–August 2008 and provided descriptive information on prevalence of Salmonella isolates from beef cows; and (2.) the Dairy 2007 Study from 17 states during January 2007–August 2007; the Dairy Study sought to compare bulk milk samples and environmental samples for Salmonella using PCR; it provided a comparison of Salmonella data from three NAHMS dairy studies.

NAHMS Beef 2007-08 Study included 187 herds and obtained up to 40 samples per herd. Fresh fecal pats from cows were shipped overnight for culture for Salmonella. Salmonella isolates were then serotyped,
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antimicrobial susceptibility testing was performed by the broth micro-dilution method using FDA’s NARMS panel.

**Salmonella Results NAHMS Beef 2007-2008 Study**

<table>
<thead>
<tr>
<th>Salmonella Results</th>
<th>Beef 2007-08</th>
</tr>
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<tbody>
<tr>
<td>% Ops Pos</td>
<td>9.2</td>
</tr>
<tr>
<td>% Samples Pos</td>
<td>0.5</td>
</tr>
<tr>
<td>% Pan Susceptible</td>
<td>100</td>
</tr>
<tr>
<td>% Resistant to 1 Antimicrobial</td>
<td>0</td>
</tr>
<tr>
<td>% Resistant to 2+ Antimicrobials</td>
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</tr>
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</table>

**Salmonella Susceptibility testing NAHMS Beef 2007-2008 versus NAHMS Beef 1997 Study**

<table>
<thead>
<tr>
<th>Salmonella Results</th>
<th>Beef 2007-08</th>
<th>Beef ’97</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Ops Pos</td>
<td>9.2</td>
<td>11.2</td>
</tr>
<tr>
<td>% Samples Pos</td>
<td>0.5</td>
<td>1.4</td>
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<tr>
<td>% Pan Susceptible</td>
<td>100</td>
<td>87.2</td>
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<tr>
<td>% Resistant to 1 Antimicrobial</td>
<td>0</td>
<td>12.8</td>
</tr>
<tr>
<td>% Resistant to 2+ Antimicrobials</td>
<td>0</td>
<td>11.5</td>
</tr>
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**Salmonella serotypes from NAHMS Beef 2007-2008 Study**

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Braenderup</td>
<td>2</td>
<td>5.9</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>Meleagridis</td>
<td>2</td>
<td>5.9</td>
<td>1</td>
<td>6.3</td>
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<tr>
<td>Montevideo</td>
<td>6</td>
<td>17.6</td>
<td>2</td>
<td>12.5</td>
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<tr>
<td>Newport</td>
<td>2</td>
<td>5.9</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>I 3,10:::-1,w</td>
<td>2</td>
<td>5.9</td>
<td>1</td>
<td>6.3</td>
</tr>
<tr>
<td>I 6,7:k:-</td>
<td>3</td>
<td>8.8</td>
<td>1</td>
<td>6.3</td>
</tr>
<tr>
<td>All others*</td>
<td>17</td>
<td>50.0</td>
<td>13</td>
<td>81.3</td>
</tr>
</tbody>
</table>

NAHMS Dairy 2007 Study. Samples were collected between February and August 2007 from dairy operations in 17 states. Previous reports provided information on the comparison of individual animal,
**Salmonella**

pools of individual animal, and environmental samples from dairy operations. The objective of NAHMS Dairy 2007 was to compare environmental fecal (culture), bulk tank milk samples (polymerase chain reaction [PCR]) and milk filter samples (PCR) in determining herd *Salmonella* infection status.

Bulk Milk (BTM) and Filter Samples. A single bulk tank milk sample and filter sample were collected from 517 operations; samples were shipped overnight on ice to the Environmental Microbial and Food Safety Laboratory, USDA-ARS, Beltsville, Maryland. RT-PCR used to detect *Salmonella*.

Environmental Samples. Six composite environmental samples were collected on a subset of operations; samples were shipped overnight on ice to the Bacterial Epidemiology and Antimicrobial Resistance Research Unit, USDA-ARS, Athens, Georgia. Culture used to detect *Salmonella* in the samples.

The results showed that 0.8% of operations had *Salmonella* detected in BTM; 24.7% of operations had *Salmonella* detected in filters; 28.6% of operations had *Salmonella* detected in milk or filters. The *Salmonella* prevalence increased as herd size increased and there were no regional differences recognized.

The NAHMS Dairy 2007 Study showed that milk filters are a more sensitive sample for detection of *Salmonella* in the herd than bulk tank milk when using PCR; a combination of milk filters and environmental sampling appears to be the most sensitive herd level sampling methods.

<table>
<thead>
<tr>
<th>Study</th>
<th>Positive for <em>Salmonella</em> / Total Sampled</th>
<th>Operations</th>
<th>Cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy 1996</td>
<td>18/90 (20.0 percent)</td>
<td>194/3,585 (5.4 percent)</td>
<td></td>
</tr>
<tr>
<td>Dairy 2002</td>
<td>30/97 (30.9 percent)</td>
<td>259/3,645 (7.1 percent)</td>
<td></td>
</tr>
<tr>
<td>Dairy 2007</td>
<td>48/121 (39.7 percent)</td>
<td>523/3,804 (13.8 percent)</td>
<td></td>
</tr>
</tbody>
</table>

**USDA Agriculture Research Service (ARS) Salmonella Food Safety Research**

Dr. Paula J. Fedorka-Cray

USDA-ARS, Bacterial Epidemiology and Antimicrobial Resistance

Dr. Fedorka-Cray provided an update on ARS research projects. Food Safety falls under Goal 4 of the Agency Strategic Plan: Enhance Protection and Safety of the Nation’s Agriculture and Food Supply. National Program 108 (NP108) Outputs state that they are to provide (a.) science-based knowledge to provide safe production, storage, processing,
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and handling of plant and animal products; to detect and control of toxin-producing and/or pathogenic bacteria and fungi, parasites, chemical contaminants, mycotoxins, and plant toxins; and (b.) to assist regulatory agencies and the food industry in reducing the incidence of foodborne illnesses. The Program Mission of ARS is to provide through scientific research, the means to ensure that the food supply is safe and secure for consumers and that food and feed meet foreign and domestic regulatory requirements. Food safety research seeks ways to assess, control or eliminate potentially harmful food contaminants, including both introduced and naturally occurring pathogenic bacteria, viruses and parasites, toxins and non-biological-based chemical contaminants, mycotoxins and plant toxins. Since food safety and food security are global issues, our research program involves both national and international collaborations through formal and informal partnerships. ARS’s accomplishments and outcomes are utilized in national and international strategies delivering research results to regulatory agencies, commodity organizations and consumers. ARS’s Vision Statement is to increase public health through the development of technologies which protect food from pathogens, toxins, and chemical contamination during production, processing, and preparation; thus increasing the safety of the food supply.

ARS project locations by state were outlined: Chin-Yi Chen, Eastern Regional Research Center (ERRC), and Wyndmoor, Pennsylvania, characterizes plasmids in multi-antibiotic resistant Salmonella strains. JoAnn VanKessel, BRC, Beltsville, Maryland studies the incidence and ecology of zoonotic bacterial pathogens in dairy production systems, to evaluate and develop on-farm control strategies that will minimize pathogen infection of the herd, maintenance in the environment, and subsequent contamination of the bulk milk. Jonathan Frye, RRC, Athens, Georgia, uses antibiotic resistance data obtained from the Collaboration on Animal Health and Food Safety Epidemiology (CAHFSE) and the National Antimicrobial Resistance Monitoring System (NARMS) - Enteric Bacteria programs and poultry studies to identify sources, reservoirs and amplifiers of resistant food borne and commensal bacteria, as well as the path of dissemination of these resistant bacteria in food producing animals and poultry. Results may be used for risk assessment and in developing mitigation strategies; maps the spread of antimicrobial resistance throughout the U.S. using molecular epidemiology and population genetic studies of antimicrobial resistant bacterial isolates, including participation in USDA VetNet, and analyzes and differentiates antimicrobial resistance mechanisms, both phenotypically and genotypically, and rapidly identify resistant strains. He studies Ceftiofur resistance in Salmonella animal isolates (1999-2003, n=34,411); looked closely at b-lactam resistance in cattle slaughter isolates (2000-2004, n=3,984). He also uses Salmonella genomics for among other things rapid typing of Salmonella; also uses microarray technology to study antimicrobial resistance in Salmonella. His laboratory identified cattle diagnostic isolates as the predominant
source of resistant *Salmonella*; that resistance rose from 4% to 19% over 1999-2003; that 76% of *S. Newport* were resistant and comprised 36% of the total; that resistance was due to a *blaCMY-2* gene on an MDR-AmpC plasmid; that *S. Newport* was the dominant resistant serotype, and that resistance in the U.S. was due to a *blaCMY-2* gene encoded on a conjugal MDR plasmid. In looking at *Salmonella* isolates from slaughter samples (none diagnostic) he found that when 97 isolates with ceftriaxone MIC > 32 µg/ml were tested for ESBLs. No isolates had the ESBL phenotype, no ESBL genes (TEM, SHV, and CTX-M) were detected, 93/97 isolates had the *blaCMY-2* gene, the majority were clones of *S. Newport* (58) and *S. Agona* (14); ESBLs are a major concern, but U.S. cattle had no ESBLs detected; resistance was due to the *blaCMY-2* gene on an MDR plasmid. Shawn M. D. Bearson, Pre-harvest Food Safety and Enteric Diseases, National Animal Disease Center (NADC) Ames, Iowa investigates the molecular basis for swine resistance to *Salmonella* colonization by characterizing the immunologic aspects of infection; in order to identify genes and genetic polymorphisms that are associated with *Salmonella* shedding, they selected infection-response porcine genes to search for genetic variation in various pig populations; they identified 28 Single Nucleotide Polymorphisms (SNPs) in pig genes that respond to *Salmonella* infection, and several of these SNPs are associated with *Salmonella* shedding. The impact of his research has linked specific swine genes and genetic polymorphisms with the porcine response to *Salmonella* infection and shedding, thereby providing potential targets for diagnostic testing, biotherapeutics, and the identification of *Salmonella*-resistant lines of pigs.

Food Safety research in ARS can be located on the internet at http://ars.usda.gov/research/programs/programs.htm?NP_CODE=108 where a list of Projects within the National Program can be found divided by research type, location. Also the National Program Annual Reports, the Five Year National Program Report (2000-2005), and the Five Year National Program Action Plan (2006-2010) may be found.

**USDA-FSIS *Salmonella* Initiatives for Meat, Poultry, and Processed Egg Products**

Daniel L. Engeljohn, Ph.D.
USDA Food Safety Inspection Service (FSIS)

Dr. Engeljohn presented new information on the Presidents new Food Safety Working Group (FSWG). The FSWG is chaired by the Secretaries of HHS and USDA and has three principles guiding its scope of work, i.e., preventing harm to consumers is their first priority, effective food safety inspections and enforcement depend upon getting good data and analysis, and outbreaks of foodborne illness should be identified quickly and stopped. In its aim to deliver results the FSWG seeks to prevent *Salmonella* contamination, to reduce the threat of *E. coli* O157:H7, to build
a national traceback and response system, and to improve its organization of Federal food safety responsibilities.

Biological food safety hazards, i.e., primary pathogens plus emerging pathogens with special emphasis on serotype, remain issues of public health concern. Controls are assessed through the expansion of verification testing programs. *Salmonella*, for example, has the issues of multi-drug resistant types, with concerns for the ongoing problem of *Salmonella* Enteritidis; with the linkage of *Salmonella* to human illness; there have been three food recalls in 2009: in February - poultry contaminated with peanut product in July - ground beef and *S. Typhimurium* DT04; and in August - ground beef and *S. Newport*.

**The Initiatives in 2010** will encompass policies designed to force continued *Salmonella* reduction across all classes of raw products; pre-harvest controls are viewed as essential to an effective food safety system; and FSIS policies will be designed to encourage slaughter establishments, plus egg handling/processing plants to know, interact with, and select qualified suppliers, e.g., FSIS will target inspection resources more frequently and see that they are intensified in establishments that don’t have effective controls to limit food safety hazards.

**Projects** already underway include 1.) end-of-set letters at the completion of a *Salmonella* full sample set (Campylobacter will be same approach); this will identify the percent positive rate comparison to others in a class, and context will be provided regarding average number of serotypes linked to common human illness; 2.) *S. Enteritidis* as a special target due to the persistent increase in percent positive rate in broilers, and 3.) the PHRS (public health ranking system) will target resources if human illness is associated with *Salmonella*.

**Baselines.** Performance standards have already been drafted for beef trim, broiler carcasses, and turkey carcasses; standards are underway for hog carcasses (pre-evisceration; post chill), and poultry parts (post carcass fabrication); and standards are planned for Beef carcasses (pre-evisceration; post chill). Quarterly prevalence studies for all classes of products are also planned.

**Other issues of concern** for FSIS are about potentially missing the diversity of *Salmonella* serotypes due to FSIS lab methodology (i.e., one distinct colony per plate); concern about a laboratory bacteriological medium selecting for certain serotypes (e.g., Newport); concern about international restrictions on antimicrobial use post-harvest (i.e., chlorine); concern for ground product’s high percent *Salmonella* positive rate; concern for small plants’ high percent positive rate; and concern for non ready to eat (NRTE) stuffed poultry that appears ready to eat (RTE).
National Pork Board Update
Dr. Steve Larson
National Pork Board

Dr. Larson discussed the ongoing activities of the pork industry. In the research realm he talked about identification methods to enumerate *Salmonella*; learning more about *Salmonella* serotypes in pork; disease interventions that must be consistent, cost-effective and applicable, and that have an impact on multi-drug resistance (MDR); risk assessment activities; the relationship from Farm to Fork; issues in the lairage areas, and lastly the phenomenon of stress and its effect on salmonellosis.

Antimicrobial resistance issues involve concerns for the impact of treatments in swine operations on the development of resistance in bacteria; concern for mechanisms involved in antimicrobial resistance, dissemination of resistance, the need for mitigation strategies from Farm to Fork. In the realm of metagenomics there are issues of what happens in the swine intestinal tract when animals are given antibiotics? What about genetic transfer of resistance; the intestinal tract immune response, and the question of the effects of antibiotic treatment on pathogens versus commensals in the gut?

He then commented on a systematic review of literature on *Salmonella* spp. in the pork production chain from “slaughter to cooler” written by A. O’Connor, James McKean, and Jim Dickson from Iowa State University, Ames, Iowa. Their task was to assess the points of introduction and amplification of *Salmonella* spp. from slaughter to cooler in the swine industry. From the scientific literature available in 2007 they included studies in which the same cohort of pigs or pigs on the same day were tested; they measured *Salmonella* spp. at more than one point of the food chain; there were no quality criteria, and there was no exclusion because of non-random selection or based on particular culture methods. Data were extracted from the studies such that all studies were treated as unique, i.e., no pooled data, they extracted the plant processing information and the culture methodology. They then arranged all outcomes to be described as after a processing point, i.e., stun, bleed, kill, scald, dehair, singe, polish, bung removal, evisceration, split, stamp, final wash, immediately after chill and 18-24 hours after chilling. They also were sure to consult with other experts when location of sampling was unclear. Their data summarization included descriptive information about the prevalence at each time point thus ignoring with-in study issues; it was a point-to-point comparison. All in all they included 5116 citations from the scientific literature. Results provided empirical evidence that *Salmonella* spp. prevalence on the carcass decrease as the carcass moves toward the cooler. *Salmonella* reduction is a team approach from Farm to Fork. Carcass testing shows a low prevalence such that only 2- 3% are positive across all establishments.
Dr. Erdman presented the USDA Salmonella serotype report to the committee. He provided a few general informational updates to the committee first, i.e., the serotyping backlog at NVSL has been eliminated with the average turnaround time now being 7 days. Also, changes to the VS Form 10-3 submission form are coming; there is a new laboratory reporting system and nomenclature changes, e.g., Typhimurium var Copenhagen is now Typhimurium var 5. When submitting isolates to NVSL isolates must be submitted on a minimum of 3 mL of Nutrient or Trypticase Soy agar in a screw cap tube. Common mistakes in submission are submitting isolates on biochemicals slants and submitting on agar plates.

Serotyping Summary. (See Tables following this report.) The numbers of submissions are similar to last year’s numbers. Those serotypes that have clinical roles which are undefined or listed as research are excluded from additional data. He encouraged all submitters to carefully fill out the VS 10-3 form so that future data can be accurately represented.

The most common serotypes overall are listed for the years 2005 to 2008; for 2008 S. Heidelberg and S. Cerro both increased in frequency and S. Typhimurium 5-decreased.

Cattle submissions from both clinical and non-clinical settings declined in 2008. The five most common cattle clinical and non-clinical serotypes are listed in the Appendix for 2005 to 2008; S. Cerro and S. Montevideo both increased in frequency in clinical cases from cattle, while S. Typhimurium declined.

Clinical swine submissions showed a slight increase in 2008 while non-clinical submissions declined. The serotypes for swine are also shown in the Appendix. The serotype distribution for clinical disease in swine remained the same in 2008 as for 2007.

Non-clinical chicken submissions rose in 2008 while clinical submissions remained very low. A decline was noted in submissions from non-clinical turkey sources and turkey clinical submissions remained again very low in 2008. Both the chicken and turkey serotype data are presented in the Appendix.

Equine submissions showed a slight increase in 2008 from all sources, while dog and cat submissions exhibited a dramatic rise in 2008. S. Typhimurium was found in highest frequency in horses while S. Newport was highest in dogs and cats (see Appendix).

Phage Typing. The numbers of S. Enteritidis isolates phage typed increased while S. Typhimurium numbers declined in 2008 (Appendix). SE Phage types (PT) 8, 13, 23, 13a, and 22 were common with increases seen in 23 and 22 during that time period while a decline in 13a was noted.
S. Typhimurium PT’s listed were DT04b (increased in 2008), DT104 (decreased), RDNC (increased), U302 (decreased), and DT94 (increased).

Molecular Serotyping. Work has been ongoing in the development of the Bioplex assay in conjunction with CDC as a new method to serotype *Salmonellae*. In 2009 NVSL tested 350 isolates, focusing on “O” antigens only; 93% of the Bioplex results matched those from conventional *Salmonella* serotyping, 6% generated no result, and 1% did not match conventional serotyping. The analysis of this joint effort is still in progress.

Pulsed-Field Gel Electrophoresis (PFGE). PFGE at NVSL this year was conducted on 200 Diagnostic isolates and approximately 175 isolates were submitted to the CDC/PulseNet. So far 500 diagnostic isolates have been sent the VetNet program thus adding new PFGE patterns to the national database (Dr. Paula Cray); in addition VetNet has determined antimicrobial susceptibilities of the isolates. Another VetNet project was comparing PFGE predicted serotype to conventional serotyping.

In early 2010 there will be a National Poultry Improvement Plan (NPIP) *Salmonella* Group D Proficiency Test offered.

**Human Salmonellosis Linked to Contact with Live Poultry From Mail-Order Hatcheries Follow Up to a Success Story in Implementing Interventions**

Dr. Casey Barton-Behravesh

Dr. Barton-Behravesh presented an update to an earlier committee report on mail-order hatcheries linked to human salmonellosis. She reviewed the Mail Order Hatchery Industry and the “Summer of Chicks” including recent outbreaks of recurring outbreaks of human *Salmonella* Montevideo infection linked to Hatchery A, the interventions at Hatchery A and their positive effect on human cases. In the U.S. today an estimated 20 mail-order hatcheries supply baby birds; over 50 million chicks are sold annually in U.S. and any one hatchery may supply birds to customers in several states. Business is booming due to the increased demand of the backyard hobbyist, the urban chicken phenomenon; baby poultry are sold at feed stores, ordered through the mail, and sold over the internet. Contact with live poultry as the source of human *Salmonella* infections has resulted in over 25 outbreaks since 1950s. Young children get baby chicks as pets and there is often a seasonal pattern apparent i.e., the peak season for live poultry sales is March-May, though sales occur year round. Cases may occur in daycare centers; there may be involvement of backyard flocks. The serotypes usually involved are *S. Montevideo* and *S. Typhimurium*. Birds do appear healthy. Recent outbreaks have involved *S. Montevideo*, *S. Johannesburg*, *S. Thompson*, and *S. Typhimurium*. Feed stores are aware of risks, but few warn customers. They have shown that interventions at some hatcheries appear to be successful in reducing human illnesses. Also State and local health departments should consider educational messages targeted at feed stores and the public; CDC requests states to use a poultry specific questionnaire in
their investigations. However, interventions are only aids to an eradication program but are not a substitute for a sound biosecurity program.

Although many stores are aware that poultry can cause *Salmonella*, only some state that they warn customers. Public Education: All persons should wash their hands with soap and warm water for at least 20 seconds after touching live poultry or surfaces in contact with live poultry; live poultry should not be kept in facilities with children aged <5 years; children aged <5 years should not be allowed to have direct contact with live poultry; chicks and other live poultry should not be given as gifts to young children; live poultry should be kept separate from areas where food and drinks are prepared or consumed; all surfaces that come into contact with live poultry (e.g., hands, floors, tables, rugs, shipment boxes, dust, and chicken enclosures) might be contaminated with *Salmonella*. Recommendations for Feed Stores: Provide educational material for customers; warning signs and hand-washing stations should be displayed poultry; there should be chick days for order only purchase; keep poultry in back of store to limit customer access; display poultry in covered or glass tanks out of reach of children; follow the advice in the 2009 Compendium of Measures to Prevent Diseases Associated with Animals in Public Settings (http://cdc.gov/mmwr/PDF/rrrr5805.pdf).

The most recent multistate outbreak of *Salmonella* Typhimurium infections associated with live poultry occurred this past summer (2009) from a mail-order hatchery; 139 indistinguishable PFGE isolates from 21 states were discerned. The median age of cases was 12 years (range 0-70 years); there were 64 case-patients in Pennsylvania and New York with a 73% Multi-Locus Variable Analysis (MLVA) match suggesting a focal outbreak in Nebraska. Case-patients were significantly more likely to have had contact with live poultry, contact with chicks, have visited a feed store and visited a National Feed Store Chain X. It was learned that 60% received no information on risks from the feed store of purchase. Many birds kept inside the home. Poultry were traced to a common hatchery, Hatchery C.

**National Poultry Improvement Plan 2009 Update**

Andrew R. Rhorer
USDA-APHIS

Dr. Rhorer provided an overview of the progress for the National Poultry Improvement Plan (NPIP) program (see Appendix for the full report). The *Salmonella* Pullorum and *Salmonella* Gallinarum eradication program began in 1935. Pullorum Typhoid Status: in the calendar Year 2008, there was one isolation/outbreak of *Salmonella* Pullorum reported to the Poultry Improvement staff. There were no isolations/outbreaks of *Salmonella* Pullorum reported during calendar year 2009 from January to October 1, 2009. There have been no isolations of *Salmonella* Gallinarum since 1987 in any type poultry.

*Salmonella* Enteritidis cases were presented for egg-type breeding
positive flocks, and the phage types were listed for 1989 to 2009; there
were no isolations of S. Enteritidis made in any egg-type breeding flock in
2009. Participants from 48 official State agencies are part of the NPIP as
are 130 authorized laboratories.

Provisions for the NPIP are found in the Code of Federal Regulations
9CFR 145, 146, 147 and 56. The General Conference Committee is
the Secretary’s of Agriculture’s Official Advisory Committee on Poultry
Health-Steering Committee. NPIP participating hatcheries include 283
Egg and Meat Type Hatcheries, 49 Turkey Hatcheries, and 721 Waterfowl,
Exhibition Poultry and Game Birds Hatcheries.

Committee Business:

Due to the severe restrictions on travel this year, travel to the USAHA
Annual Meeting in San Diego, Calif. was hampered. As a result the
Committee did not have a quorum of members present to conduct a
business meeting. There were no resolutions presented or other matters
brought before the Committee membership.
### APPENDIX of TABLES – Committee on *Salmonella*

PHLIS: 10 Most Frequently Reported Human *Salmonella* Serotypes, 2008

Dr. Casey Barton Behravesh

<table>
<thead>
<tr>
<th>Rank</th>
<th>Serotype</th>
<th>Number of isolates</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enteritidis</td>
<td>4593</td>
<td>14.9</td>
</tr>
<tr>
<td>2</td>
<td>Typhimurium*</td>
<td>4093</td>
<td>13.2</td>
</tr>
<tr>
<td>3</td>
<td>Newport</td>
<td>2432</td>
<td>7.9</td>
</tr>
<tr>
<td>4</td>
<td>Saintpaul</td>
<td>1407</td>
<td>4.6</td>
</tr>
<tr>
<td>5</td>
<td>Javiana</td>
<td>1207</td>
<td>3.9</td>
</tr>
<tr>
<td>6</td>
<td>Heidelberg</td>
<td>753</td>
<td>2.4</td>
</tr>
<tr>
<td>7</td>
<td>Montevideo</td>
<td>625</td>
<td>2.0</td>
</tr>
<tr>
<td>8</td>
<td>I 4,[5],12:i:-</td>
<td>573</td>
<td>1.9</td>
</tr>
<tr>
<td>9</td>
<td>Muenchen</td>
<td>478</td>
<td>1.5</td>
</tr>
<tr>
<td>10</td>
<td>Oranienburg</td>
<td>431</td>
<td>1.4</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>16592</td>
<td>53.7</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>6880</td>
<td>22.3</td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
<td>6019</td>
<td>19.5</td>
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<tr>
<td>Partially serotyped</td>
<td></td>
<td>1335</td>
<td>4.3</td>
</tr>
<tr>
<td>Rough, mucoid, and/or nonmotile</td>
<td></td>
<td>76</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30,902</td>
<td>100</td>
</tr>
</tbody>
</table>

*Typhimurium includes var 5- (Formerly var. Copehagen)*
Number and incidence* of top 10 *Salmonella* serotypes† in 2008 - Foodborne Diseases Active Surveillance Network, United States (Dr. Casey Barton Behravesh)

<table>
<thead>
<tr>
<th>Rank</th>
<th><em>Salmonella</em> serotype</th>
<th>Number of cases</th>
<th>Incidence per 100,000 persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enteritidis</td>
<td>1,356</td>
<td>2.95</td>
</tr>
<tr>
<td>2</td>
<td>Typhimurium</td>
<td>1,077</td>
<td>2.34</td>
</tr>
<tr>
<td>3</td>
<td>Newport</td>
<td>681</td>
<td>1.48</td>
</tr>
<tr>
<td>4</td>
<td>Javiana</td>
<td>423</td>
<td>0.92</td>
</tr>
<tr>
<td>5</td>
<td>Saintpaul</td>
<td>403</td>
<td>0.88</td>
</tr>
<tr>
<td>6</td>
<td>I 4,[5],12:i:-</td>
<td>269</td>
<td>0.59</td>
</tr>
<tr>
<td>7</td>
<td>Muenchen</td>
<td>213</td>
<td>0.46</td>
</tr>
<tr>
<td>8</td>
<td>Heidelberg</td>
<td>198</td>
<td>0.43</td>
</tr>
<tr>
<td>9</td>
<td>Montevideo</td>
<td>194</td>
<td>0.42</td>
</tr>
<tr>
<td>10</td>
<td>Braenderup</td>
<td>108</td>
<td>0.24</td>
</tr>
</tbody>
</table>

* Per 100,000 persons

† Among 6750 *Salmonella* isolates that were fully serotyped

10 serotypes account for 73% of infections
REPORT OF THE COMMITTEE

Some Recent Large U.S. Multi-State Outbreaks of Foodborne Infections 2006-2009 (n=20). "*" indicates a new food vehicle was discovered. (Dr. Casey Barton-Behravesh, CDC)

2006 - *E. coli* O157 and bagged spinach*
2006 - *E. coli* O157 and shredded lettuce (restaurant chain A)
2006 - *E. coli* O157 and shredded lettuce (restaurant chain B)
2006 - Botulism and commercial pasteurized carrot juice*
2006 - *Salmonella* and fresh tomatoes
2006 - *Salmonella* and fresh tomatoes
2006 - *Salmonella* and fresh tomatoes
2007 - *Salmonella* and frozen pizza
2007 - *Salmonella* and peanut butter*
2007 - *Salmonella* and a vegetarian snack food*
2007 - *Salmonella* and dry dog food*
2007 - *Salmonella* and microwaveable pot pies*
2007 - *Salmonella* and dry puffed breakfast cereal*
2007 - *E. coli* O157 and ground beef
2007 - Botulism and canned chili sauce*
2008 - *Salmonella* and cantaloupe
2008 - *E. coli* O157 and ground beef
2008 - *Salmonella* and fresh produce items*
2009 - *Salmonella* and peanut butter containing foods*
2009 - *Salmonella* and imported white and black pepper*
2009 - *Salmonella* and alfalfa sprouts
2009 – *E. coli* O157 and prepackaged cookie dough*
On February 24, 2009, the Nebraska Department of Health and Human Services identified six isolates of *Salmonella* serotype Saintpaul with collection dates from February 7--14. *Salmonella* Saintpaul is not a commonly detected serotype; during 2008, only three *Salmonella* Saintpaul isolates were identified in Nebraska. This report summarizes the preliminary results of the investigation of this outbreak, which has identified 228 cases in 13 states and implicated the source as alfalfa sprouts produced at multiple facilities using seeds that likely originated from a common grower. On April 26, the Food and Drug Administration (FDA) and CDC recommended that consumers not eat raw alfalfa sprouts, including sprout blends containing alfalfa sprouts, until further notice. On May 1, FDA alerted sprout growers and retailers that a seed supplier was withdrawing voluntarily from the market all lots of alfalfa seeds with a specific three-digit prefix.

### Initial Outbreak Investigation

For this investigation, a case was defined as illness in a person whose stool culture on or after February 1, 2009, yielded *Salmonella* Saintpaul with the outbreak strain pulsed-field gel electrophoresis (PFGE) patterns (XbaI JN6X01.0072, JN6X01.0252, JN6X01.0340, JN6X01.0709, JN6X01.0712, JN6X01.0718, or JN6X01.0719). During January 1, 2008 to January 31, 2009, only four cases of the outbreak strain of *Salmonella* Saintpaul were identified by PulseNet.*

After a nationwide notice was sent February 26 to state public health officials about a cluster of cases of *Salmonella* Saintpaul infection among Nebraska residents; additional cases were reported from Iowa, Kansas, Minnesota, Missouri, and South Dakota. Interviews showed that five of 14 Nebraska patients patronized a common restaurant chain (chain A) and that nine had recently eaten alfalfa sprouts. Among the first seven Iowa case-patients interviewed, one had eaten at restaurant chain A, and six had eaten alfalfa sprouts. Alfalfa sprouts was the most common food item reported.

To determine if a particular food item or restaurant was associated with this outbreak, health officials in Nebraska and Iowa conducted a case-control study. They attempted to identify two controls for each case; a well spouse or partner of the case-patient, and a well friend or colleague of the same sex and similar age as the case-patient. Food consumption histories, including restaurants patronized, were collected from case-patients for the 10 days before symptoms began and from controls for the matching period.

Thirty-two confirmed cases and 32 controls were enrolled. Case-patients were significantly more likely to have eaten alfalfa sprouts than matched controls (27/32 versus 5/32, crude odds ratio [OR] = 29.2, 95%
REPORT OF THE COMMITTEE

Confidence interval [CI] = 7.6–112.4). No other food item was significantly associated with illness. Case-patients were significantly more likely to have eaten at restaurant chain A than were controls (24/32 versus 10/32, OR = 6.6, CI = 1.96–22.93), but this association was not statistically significant after adjustment for exposure to alfalfa sprouts.

By March 19, a total of 186 cases had been identified in Illinois, Iowa, Kansas, Minnesota, Nebraska, and South Dakota. Of the 156 patients with completed interviews, 114 (73%) reported alfalfa sprout consumption.

Linking Cases to a Single Seed Grower

Tracebacks from the initial outbreak investigation indicated that although the sprouts had been distributed by various companies, all originated at the same sprouting facility in Omaha, Nebraska (facility A). Of the 114 patients with reported alfalfa sprout exposure, 112 (98%) could be linked to a restaurant or a retail outlet that had received alfalfa sprouts from facility A. On March 3, 2009, facility A agreed to conduct a voluntary recall.

Facility A produces several types of sprouts, including alfalfa, clover, radish, broccoli, and onion, and distributes those to locations within a 250-mile radius. Facility A reported that it produced sprouts following FDA guidance for reducing microbial food safety hazards for sprouted seeds (1). This included soaking alfalfa seeds for 15 minutes in a 20,000 ppm chlorine solution derived from calcium hypochlorite. The seeds were then rinsed and placed in germination containers; after 48 hours, seed irrigation water was cultured for *Salmonella* and *Escherichia coli* O157. The facility reported that it had no positive test results during January–February 2009.

An evaluation of records correlated the outbreak with the distribution of sprouts from a seed shipment that arrived at the facility on January 13, and last sprouted on February 13. Multiple seed lots, purchased only from seed company B, were used for producing alfalfa sprouts during the period of the outbreak; all seed lots were identified with the prefix 032, indicating that they originated from the same seed grower (grower C). A sample of facility A alfalfa sprouts collected from a Nebraska restaurant on February 28, 2009, grew *Salmonella* serotype Typhimurium. A sample of alfalfa seeds collected at facility A on March 3 and identified with the lot prefix 02 grew *Salmonella* serotype Give.

In mid-April, 42 additional case-patients with onset of illness beginning after March 15 were identified from Florida, Iowa, North Carolina, Michigan, Minnesota, Nebraska, Ohio, Pennsylvania, Utah, and West Virginia (Figure 1). At least 20 of these case-patients reported recently eating sprouts. Alfalfa sprouts eaten by these case-patients were traced back to growing facilities in Michigan, Minnesota, and Pennsylvania that received seed lots identified with prefix 032 from seed company B. Alfalfa sprout irrigation water collected on March 10 from a growing facility in Wisconsin grew *Salmonella* Saintpaul indistinguishable from the outbreak strain. These sprouts also were grown from a seed lot identified with prefix
032 received from seed company B. No human illnesses have been linked to the Wisconsin facility. Preliminary findings indicate that the implicated seed lots were sold in many states and might account for a large proportion of the alfalfa seeds that were being used by sprout growers during this outbreak.

Since February, a total of 228 cases have been reported from 13 states: Nebraska (110 cases), Iowa (35), South Dakota (35), Michigan (18), Kansas (eight), Pennsylvania (seven), Minnesota (five), Ohio (three), Illinois (two), West Virginia (two), Florida (one), North Carolina (one), and Utah (one) (Figure 2). Patients range in age from <1 year to 85 years (median: 29 years); 69% are female. Among patients with available information, 4% reported being hospitalized. No deaths have been reported.

On April 26, FDA and CDC recommended that consumers not eat raw alfalfa sprouts, including sprout blends containing alfalfa sprouts, until further notice (2). On May 1, FDA notified sprout growers and retailers that seed company B was withdrawing voluntarily from the market all alfalfa seeds bearing six-digit lot numbers that start with 032 (3).


Author’s Note:

Raw and lightly cooked sprouts have been recognized as a source of foodborne illness in the United States since 1995 (4,5). In 1999, FDA released guidance to help seed producers and sprout growers enhance the safety of their products (1,4). Specific measures recommended in the guidelines include seed disinfection and microbiologic tests of water used to grow sprouts (1,6).

Although the methods recommended by FDA appear to reduce the risk of sprout-related human illness (7), CDC’s electronic Foodborne
REPORT OF THE COMMITTEE

Outbreak Surveillance System has reports of 13 *Salmonella* and three *E. coli* O157 outbreaks linked to sprouts from 2000 through 2007. Process failures, including inadequate disinfection, sampling, and testing procedures, and incorrect interpretation of test results, have been identified in some of these investigations.

The outbreak described in this report is linked to consumption of alfalfa sprouts produced at several sprout growers and appears to involve only seeds sold by seed company B that originated from grower C. This strongly suggests that the seeds were contaminated. The degree to which the various sprout growers involved have appropriately and consistently implemented FDA recommendations or other protective methods is under investigation. These outbreaks might indicate a need to determine how well this important but voluntary guidance is being implemented. Additional studies of measures to prevent, detect, and eliminate contamination of seeds and sprouts also are needed.

Alfalfa seeds might become contaminated in several ways, although the exact method is unknown. Possible methods include preharvest contamination from use of contaminated water, the use of improperly composted manure as fertilizer, fecal contamination from domestic or wild animals, runoff from animal production facilities, and improperly cleaned harvesting or processing equipment. Seeds also might become contaminated during conditioning, distribution, or improper storage. Many alfalfa seeds are produced for agricultural use, and might not be processed, handled, and stored under conditions appropriate for human food. Conditions suitable for sprouting also are ideal for markedly increasing counts of bacteria that might be present on seeds (8). Unsanitary conditions during processing, storage, distribution, handling, or preparation of sprouts could exacerbate the problem.

Since 1999, CDC and FDA have recommended that persons at high risk for complications of infection with *Salmonella* and *E. coli* O157, such as the elderly, young children, and those with compromised immune systems not eat raw sprouts. While investigations into the current outbreak continue, and until more specific recommendations or control measures can be implemented, FDA and CDC recommend not eating raw alfalfa sprouts, including sprout blends containing alfalfa sprouts. FDA recommends that any sprouts that are eaten should be cooked thoroughly (9).

Acknowledgments

The findings in this report are based on contributions by public health professionals who interviewed and collected data on the case-patients, and the collaborative efforts of 13 state health departments, multiple local health departments, several state departments of agriculture and food regulatory services, FDA, and consultants from the Enteric Diseases Epidemiology Branch, CDC.
References


* The national molecular subtyping network for foodborne disease surveillance.
FIGURE 1. Number of infections (N = 226*) with the outbreak strain of *Salmonella* Saintpaul associated with eating alfalfa sprouts, by date of illness onset --- United States, February--April 2009

* Onset dates were unavailable for two patients among a total of 228 cases.
† Infections first and primarily occurred in Illinois, Iowa, Kansas, Nebraska, and South Dakota.
§ Additional infections occurred in Florida, Michigan, Minnesota, North Carolina, Ohio, Pennsylvania, North Carolina, Utah, and West Virginia, primarily after March 15.

Alternative Text: The figure above shows the numbers and dates of onset of 226 infections that occurred with the outbreak strain of *Salmonella* Saintpaul associated with eating alfalfa sprouts in the United States during February-April 2009. Onset dates were not available for two patients among 228 cases reported.

Infections first and primarily occurred in Illinois, Iowa, Kansas, Nebraska, and South Dakota; followed by a less extensive, secondary wave of illnesses in Florida, Michigan, Minnesota, North Carolina, Ohio, Pennsylvania, North Carolina, Utah, and West Virginia. For most cases, onset occurred during the second half of February or first week of March, peaking at 19 cases on March 1, 2009. All but one of the secondary cases began after March 15.

An arrow points to March 3, 2009, the date of a voluntary recall of alfalfa sprouts produced by facility in Omaha, Nebraska.
FIGURE 2. Number of infections (N = 228*) with the outbreak strain of *Salmonella* Saintpaul, associated with eating alfalfa sprouts, by state --- United States, February--April 2009

* As of May 1, 2009.

**Alternative Text:** The figure above shows a map of the United States and states in which a total of 228 infections occurred during February through April 2009, as of May 1, 2009, with the outbreak strain of *Salmonella* Saintpaul, associated with eating alfalfa sprouts. The 13 states and number of infections shown for each are Nebraska, more than 50 case; Iowa and South Dakota, 20 to 50 cases; Michigan, 10 to 19 cases; and Illinois, Florida, Kansas, Minnesota, North Carolina, Ohio, Pennsylvania, Utah, and West Virginia, 1 to 9 cases.
REPORT OF THE COMMITTEE

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From Morbidity and Mortality Weekly Report (MMWR), *January 29, 2009 / 58* (Early Release);1-6; *Early Release*

On November 25, 2008, an epidemiologic assessment began of a growing cluster of *Salmonella* serotype Typhimurium isolates that shared the same pulsed-field gel electrophoresis (PFGE) pattern in PulseNet.* As of January 28, 2009, 529 persons from 43 states (Figure 1) and one person from Canada had been reported infected with the outbreak strain. This report is an interim summary of results from ongoing epidemiologic studies and recall and control activities by CDC, the Food and Drug Administration (FDA), and state and local public health agencies. Confirmed, reported onset of illness dates have ranged from September 1, 2008, to January 16, 2009. A total of 116 patients were reported hospitalized, and the infection might have contributed to eight deaths. Sequential case-control studies have indicated significant associations between illness and consumption of any peanut butter (matched odds ratio [mOR] = 2.53), and specific brands of prepackaged peanut butter crackers (mOR = 12.25), but no association with national brand jarred peanut butter sold in grocery stores. Epidemiologic and laboratory findings indicate that peanut butter and peanut paste produced at one plant are the source of the outbreak. These products also are ingredients in many foods produced and distributed by other companies. This outbreak highlights the complexities of “ingredient-driven” outbreaks and the importance of rapid outbreak detection and investigation. Consumers are advised to discard and not eat products that have been recalled (Box).

**Initial Outbreak Investigation**

On November 10, 2008, CDC’s PulseNet staff noted a small and highly dispersed multistate cluster of 13 *S.* Typhimurium isolates with an unusual PFGE pattern (XbaI PFGE pattern J0XX0.88) reported from 12 states. On November 25, CDC’s OutbreakNet team, working with state and local partners, began an epidemiologic assessment of that cluster, which had increased to 35 isolates. On December 2, CDC and state and local partners began an assessment of a second cluster of 41 *S.* Typhimurium isolates. The PFGE patterns of the second cluster (XbaI pattern J0XX0.0459/J0XX0.825) were very similar to the patterns in the first cluster and were first noted by PulseNet on November 24, as a cluster of 27 isolates that had subsequently increased to 41 isolates. None of these patterns were seen previously in the PulseNet *S.* Typhimurium database. Testing with a second PFGE enzyme (*Bln*I) showed that isolates from both clusters had the same pattern (J0XA26.0462) and were indistinguishable by multilocus variable-number tandem-repeat analysis, a different PulseNet subtyping method. The outbreak strain has the phage type 3 and is fully susceptible to all antimicrobials in the National Antibiotic...
Resistance Monitoring System panel for gram-negative bacteria.† The clusters also appeared similar epidemiologically, so the two patterns were grouped together as a single outbreak strain, and the investigations were merged. The outbreak strain did not exist in the National VetNet database, which contains PFGE patterns of Salmonella isolates from raw meat and poultry products, and which CDC and the U.S. Department of Agriculture’s Food Safety and Inspection Service monitor.

A case was defined as a laboratory-confirmed infection of S. Typhimurium with the outbreak strain in a person with illness onset date (or, if that date was not known, with date of isolation of Salmonella) on or after September 1, 2008. As of January 28, 2009, onset dates were known for 424 of 529 patients and ranged from September 1, 2008, to January 16, 2009 (Figure 2). Although numbers of reported cases have decreased in recent weeks, the outbreak appears to be ongoing. The median age of patients was 16 years, with an age range of <1 to 98 years; 21% were aged <5 years, and 15% were aged >59 years. Of those patients, 48% were female, 116 (22%) were hospitalized, and the infection might have contributed to eight deaths in patients aged >59 years from Minnesota (three deaths), Virginia (two), Idaho (one), North Carolina (one), and Ohio (one). A median of 16 days elapsed from the day the illness began to the date the PFGE pattern was uploaded to PulseNet (Figure 2).

The initial epidemiologic investigation included detailed open-ended interviews with patients. Patient interviews were conducted by CDC and state and local health departments using a questionnaire with approximately 300 food items. Early interviews, case reports, and identification of small clusters of cases suggested a possible association with institutional settings, although noninstitutionalized patients often reported consumption of peanut butter of multiple brands. In the initial investigation, among the most frequently reported food exposures in the 7 days before illness began, 86% of patients interviewed reported they were likely to have eaten chicken and 77% were likely to have eaten peanut butter. By comparison, the frequencies in the general public of eating these items were 85% for chicken and 59% for peanut butter in a 2006--2007 FoodNet§ food consumption survey (1).

Association with Peanut Butter

Many affected state health departments, including the Minnesota Department of Health (MDH), conducted intensive investigations of patients infected with the outbreak strain. By December 28, MDH had learned from patient interviews that some patients infected with the outbreak strain lived or ate meals in one of at least three institutions (two long-term--care facilities and one elementary school). A review of menus and invoices by MDH and the Minnesota Department of Agriculture (MDA) revealed that the institutions had a common food distributor in North Dakota, and the only food common to the three institutions was King Nut creamy peanut butter. By January 9, 2009, six additional cases in six other institutions were identified by MDH; each of those institutions had received
King Nut peanut butter. An open container of King Nut peanut butter was collected from one of the institutions, a long-term--care facility, on January 5 for testing at MDA. On January 9, the MDA laboratory reported isolation of *Salmonella* from the King Nut peanut butter sample. This was confirmed on January 12 as *S. Typhimurium* of the outbreak strain.

On January 3 and 4, 2009, data were gathered for a case-control study by CDC and state and local health departments to identify whether illness was associated with eating specific food items; 70 cases and 178 controls were enrolled from 12 participating states. For this study, a case was defined as infection with the outbreak strain of *S. Typhimurium* in a person without preceding diarrheal illness in household members and who did not live in an institutional setting, with illness onset (or, if that date was not known, with date of isolation of *Salmonella*) on or after November 1, 2008. Controls recruited using a reverse-digit--dialing system were well persons, matched by case neighborhood and age category (i.e., <18 years or ≥18 years). Food histories were sought for the 7 days before illness onset for case-patients and 7 days before interview for controls. The median ages for case-patients and controls were 18 and 16 years, respectively. By January 9, preliminary analysis found that case-patients were significantly more likely than controls to have eaten any peanut butter in the 7 days before illness began (69% of case-patients versus 48% of controls, mOR = 2.53, 95% confidence interval [CI] = 1.26--5.31, p=0.007). Illness also was associated with eating any of a group of previously frozen chicken products (i.e., chicken nuggets, chicken strips, and other breaded and stuffed chicken products) (35% of case-patients versus 14% of controls, mOR = 4.61, CI = 1.67--14.68, p=0.002), but not with any individual chicken product; no individual frozen chicken product type was reported eaten by more than 10% of case-patients. Illness was not associated with eating roasted peanuts or national brands of jarred peanut butter sold in grocery stores.

On January 6, the Connecticut Department of Public Health Laboratory isolated the outbreak strain of *S. Typhimurium* from a previously unopened five-pound container of King Nut creamy peanut butter. As of January 28, 16 clusters of cases, each with at least two patients infected with the outbreak strain, were reported in five states. All clusters were in institutional facilities. King Nut was the only brand of peanut butter used in the 16 facilities.

All versions of King Nut peanut butter were produced by Peanut Corporation of America (PCA) at a single facility in Blakely, Georgia. An environmental investigation at the PCA plant was initiated by FDA and the Georgia Department of Agriculture on January 9, and a CDC epidemiologist joined the investigation team on January 10. King Nut peanut butter was distributed in bulk packaging to institutions, food service industries, and private label food companies. King Nut peanut butter was not known to be sold directly to consumers or distributed for retail sale in grocery stores.
On January 22, MDA found that a previously unopened container of King Nut peanut butter collected from the North Dakota distributor yielded *Salmonella* serotype Tennessee with a PFGE pattern that was indistinguishable from an outbreak strain in the multistate outbreak in 2006--2007 caused by contaminated peanut butter (2).

**Association with Peanut Butter--Containing Products**

Ongoing patient interviews indicated that many patients did not eat peanut butter in institutions, but had eaten various other peanut butter--containing products. FDA investigators reported that the PCA facility in Blakely produced peanut butter and also peanut paste (also made from ground roasted peanuts) and other peanut products, which were sold to many food companies for use as an ingredient in peanut butter--containing foods; these peanut butter--containing products are widely distributed in the United States and also are distributed in at least 23 other countries and non-U.S. territories.

During January 7-9, a second case-control study was conducted by CDC and state and local health departments to further assess these exposures; 93 cases and 399 controls were enrolled from 35 participating states. For this study, a case was defined as infection with the outbreak strain of *S. Typhimurium* in a person without preceding diarrheal illness in household members and who did not live in an institutional setting, with illness onset (or, if that date was not known, with date of isolation of *Salmonella*) on or after December 1, 2008. Controls were well persons, matched by case neighborhood and frequency matched by age groups (i.e., 0 to <6 years, 6 to <18 years, 18 to <40 years, and ≥40 years), who were recruited using a reverse-digit--dialing system. Controls were interviewed about the same exposure period as their matched case-patient (i.e., 7 days before the onset of the case diarrheal illness). Median ages of case-patients and controls were 17 and 39 years, respectively. Preliminary analysis found that patients were more likely than controls to have eaten prepackaged peanut butter crackers in the 7 days before illness began [73% case-patients versus 17% controls, mOR = 12.25, CI = 5.51--30.9, p<0.0001]. Two cracker brands were individually associated: Austin [43% case-patients versus 3% controls, mOR = 29.68, CI = 8.95--154.66, p<0.0001] and Keebler [20% case-patients versus 4% controls, mOR = 5.38, CI = 1.74--18.32, p=0.003] peanut butter crackers. Both Austin and Keebler brand peanut butter crackers are made at one plant, which is known to receive peanut paste from PCA. No evidence was discovered of an epidemiologic association with eating roasted peanuts.

Intact packages of Austin brand Toasty peanut butter crackers that had been purchased in the United States were obtained from the home of a patient in Canada by the Canadian Food Inspection Agency. Culture of a composite sample of the crackers yielded the outbreak strain of *S. Typhimurium*. *Salmonella* resembling the outbreak strain was isolated by a private laboratory from three intact packages of Austin brand Toasty peanut butter crackers obtained from a patient’s home in Oregon.
Control Measures

On January 9, PCA voluntarily stopped production of peanut butter and peanut paste at the Blakely, Georgia, facility. On January 10, King Nut Company issued a voluntary recall of specific lot numbers of peanut butter manufactured by PCA and distributed under King Nut and Parnell’s Pride labels. On January 16, PCA announced a voluntary recall of all peanut butter and peanut paste produced in its Blakely facility since July 1, 2008. On January 28, the PCA recall was expanded to include all peanuts and peanut products processed at this plant since January 1, 2007. In addition to peanut butter and peanut paste, the expanded recall includes dry- and oil-roasted peanuts, granulated peanuts, and peanut meal. On January 28, 2009, the facility reported that production of all peanut products had stopped. The latest information on the PCA recall can be found on the FDA website.**

To date, FDA inspectors have traced the shipments of these products to approximately 2,100 accounts and sub-accounts. FDA is working to identify additional products that might be affected and to track the ingredient supply chain of those products to remove them from the marketplace. On January 14, the Kellogg Company announced a precautionary hold on Austin and Keebler brands of peanut butter crackers, and on January 16, voluntarily recalled these products produced after July 1, 2008. As of January 28, at least 431 peanut butter--containing products had been recalled by 54 companies that had used ingredients produced by the PCA facility after July 1, 2008.††


Editorial Note:

Each year, approximately 40,000 laboratory-confirmed cases of Salmonella infections are reported to the National Salmonella Surveillance System.§§ S. Typhimurium is the most commonly reported serotype. In 2006, 19% of all reported salmonellosis cases for which a serotype was identified were caused by the Typhimurium serotype (3). This
REPORT OF THE COMMITTEE

outbreak likely is considerably larger than the 529 laboratory-confirmed cases reported to CDC; only an estimated 3% of Salmonella infections are laboratory confirmed and reported to surveillance systems (4). During 2003--2007, an annual average of 18 outbreaks caused by S. Typhimurium were reported to CDC. The rates of hospitalization and mortality observed in the current outbreak are typical for Salmonella, and this strain does not appear to be unusually virulent.

The epidemiologic and laboratory findings from this continuing investigation indicate that peanut butter and peanut paste produced at the PCA plant are the source of the outbreak. More specifically, the outbreak was caused by contaminated peanut butter used in institutions, and by peanut butter and peanut paste used as ingredients in food products. The second case-control study indicated a particular risk with peanut butter crackers, but this does not exonerate other peanut-containing products.

After one brand of peanut butter served in institutions was implicated by epidemiologic and laboratory evidence, the investigation was expanded to include food items that use peanut butter and peanut paste made in the same factory as ingredients in peanut butter-containing products. This was an ingredient-driven outbreak, in which a contaminated ingredient affected many different products that are distributed through various channels and consumed in various settings. Peanut butter and peanut paste are common ingredients in cookies, crackers, cereal, candy, ice cream, pet treats, and other foods. Mass food distribution can lead to widely distributed nationwide outbreaks. The large number of products and brands recalled already, and the large quantities of some products recalled, makes this one of the largest recalls in the United States.

This is the second outbreak caused by contaminated peanut butter in the United States. The first outbreak was caused by contamination of a commercially distributed brand of peanut butter with S. Tennessee during 2006--2007 (2). Only one other previous outbreak associated with peanut butter has been reported; an outbreak of Salmonella serotype Mbandaka infections in Australia in 1996 (5).

The detection of a S. Tennessee isolate with a PFGE pattern that is indistinguishable from the 2006--2007 strain in a recently manufactured container of King Nut peanut butter is notable. However, the S. Tennessee strain is not associated with an increase in illnesses now. The implicated plant in 2006--2007 is located approximately 70 miles from the PCA plant in Blakely. A possible association between the two outbreaks warrants further investigation. The relationship of the S. Tennessee finding to the current outbreak is being investigated further.

The mechanism of contamination for the current outbreak has not yet been determined. However, the recurring problem of Salmonella associated with contaminated peanut butter highlights the importance of including a kill step for harmful pathogens during manufacture (e.g., proper roasting) and of preventing contamination of peanut butter after the initial roasting process. Salmonella organisms persist indefinitely in
high-fat, low-water-activity foods such as peanut butter (6), and in such foods, Salmonella can withstand temperatures as high as 194°F (90°C) for 50 minutes (7). Typically, peanuts for peanut butter are roasted at approximately 350°F (180°C), a temperature that should be sufficient to kill Salmonella in a short period. However, some temperatures used in processing peanut butter or paste in other products might be inadequate to eliminate Salmonella introduced after the initial peanut roasting.

When this outbreak was first detected, its source was not immediately apparent. A likely source of the current outbreak emerged only after several weeks of detailed case interviews, investigations of local clusters of illness, and joint epidemiologic efforts across states. Rapid traceback of the first implicated product to its point of manufacture was critical in unraveling the entire outbreak. Rapid investigation of apparently localized outbreaks can provide critical clues to solving large and dispersed national outbreaks. This outbreak illustrates again the central importance of the capacity to perform Salmonella serotyping and molecular subtyping in public health laboratories for detecting and investigating outbreaks, and the critical value of rapid epidemiologic and regulatory investigative capacity.

Acknowledgments

This report is based, in part, on contributions by the Food and Drug Admin; F Greene, MPH, Connecticut Dept of Public Health Laboratory; WE Keene, PhD, HA Booth, Oregon Public Health Div; and RM Hoekstra, PhD, K Wannemuehler, PhD, Div of Bacterial, Foodborne and Mycotic Diseases, and volunteers in the Director's Emergency Operations Center, CDC

References


* The national molecular subtyping network for foodborne disease surveillance.
† Includes amikacin, amoxicillin-clavulanic acid, ampicillin, cefoxitin, ceftiofur, ceftriaxone, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfisoxazole, tetracycline, and trimethoprim-sulfphamethoxazole.
§ Foodborne diseases active surveillance network.
¶ As of January 27, 2009, FDA was aware of distribution in the following countries and non-U.S. territories: Aruba, Australia, the Bahamas, Bermuda, Canada, the Cayman Islands, Haiti, Italy, Jamaica, Japan, Korea, Malaysia, Mexico, the Netherlands, New Zealand, Norway, St. Maarten, St. Vincent and the Grenadines, Singapore, Slovenia, Spain, the Turks and Caicos Islands, and the United Kingdom.
†† The current list of recalled products with a searchable format can be found on the FDA website (http://www.accessdata.fda.gov/scripts/peanutbutterrecall/index.cfm).
§§ The National *Salmonella* Surveillance System collects information on serotypes of *Salmonella* isolates reported through the Public Health Laboratory Information System, an electronic reporting system. Additional information is available at http://www.cdc.gov/ncidod/dbmd/phlisdata/Salmonella.htm.
¶¶ Data from CDC’s Electronic Foodborne Outbreak Reporting System (eFORS), unpublished data; 2008. Cases reported as of January 29, 2009. Cases beginning in the most recent 3 weeks might not yet be reported.
Salmonella

FAD Sample Classification and Prioritization

Priority 1
- High Suspicion
- Rapid or Extraordinary methods for sample collection and transport
- Testing conducted immediately upon arrival (Overtime services as needed)

Priority 2
- Intermediate Suspicion
- Rapid methods for sample collection and transport
- Testing conducted as necessary (Overtime services as needed)
  If samples arrive:
  - Before close of business: tested immediately
  - After close of business:
    - Tested the following day
    - Saturday: tested on weekends only with prior notification and approval

Priority 3
- Low Suspicion
- Routine methods for sample collection and transport
- Testing conducted in accession order (No overtime services)

Priority A
- Intermediate or Low Suspicion
- Rapid or Extraordinary methods for sample collection and transport
- Testing conducted immediately upon arrival (Overtime services as needed)
- Potential circumstances associated with the investigation indicate that it is prudent to obtain diagnostic sample testing results as rapidly as possible.

NOTE: refer to VS Memo 502.4, Tables IV 3-5 (pages 13-24) for additional information.
REPORT OF THE COMMITTEE

Foreign Animal Disease (FAD) Investigation Is Initiated....

Initiated by the AVIC and SAHO...

- Assigns Foreign Animal Disease Diagnostician (FADD) V. A. 2
- Ensures EMRS Referral Control # is assigned V. A. 3
- Assigns FAD/EDI Case Coordinator(s) V. A. 4
- Ensures that initial case report is prepared and transmitted to the FAAD V. A. 7
- Consults with FADD, NVSL and NAHLN laboratory to determine a diagnostic sample submission plan. Includes AVIC and SAHO for state of NAHLN lab, if different from the state of sample origin. V. A. 8
- Consults with FADD to ensure that an investigation classification and a diagnostic sample submission priority are assigned V. A. 9
SALMONELLA


- Consumers should not eat any peanut butter or peanut-containing products that have been recalled.
- Consumers who have recalled products in their homes should discard those products.
- Consumers also should avoid eating products made with peanut butter or peanut paste if they are unsure whether these products have been recalled. National brands of jarred peanut butter sold in grocery stores have not been implicated in this outbreak.
- Persons with pets should know that certain pet foods and pet treats can contain peanut butter, including dog biscuits and bird food. Persons with a recalled pet product in the home should not feed the product to their pet or other animals.
- To determine whether a product has been recalled, consumers can search the list of recalled products at the Food and Drug Administration (FDA) website (http://www.fda.gov/oc/opacom/hottopics/salmonellatyph.html) or telephone the consumer hotline number on the product packaging to get information directly from the product manufacturer.
- Consumers without Internet access can telephone 1-800-CDC-INFO (1-800-232-4636), 24 hours a day, 7 days a week, for product recall information from the FDA website and for other information on salmonellosis.
- Persons who think they might have become ill from eating peanut butter or peanut–containing products should consult their health-care providers. Infants, elderly persons, and persons with impaired immune systems are more likely than others to develop severe illness.
REPORT OF THE COMMITTEE

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### REPORT OF THE COMMITTEE


Paula Fedorka-Cray  
USDA-ARS

#### Table: Top Five Human and Animal Serotypes 2000-2008

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CDC data not available for 2007 or 2008
Salmonella Serotypes from Animals and Related Sources Reported during 2004 to 2008

M.M. Erdman DVM, PhD
National Veterinary Services Laboratories, USDA-APHIS-VS

Serotyping Summary

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TOTAL 102847 | 38856 | 48307 | 12938 | 2746 |

Most common serotypes from all sources

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# REPORT OF THE COMMITTEE

## Most Common Serotypes
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## Most Common Serotypes
### Cattle – Clinical

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### Most Common Serotypes
#### Swine – Clinical

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REPORT OF THE COMMITTEE

Most Common Serotypes
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### Most Common Serotypes
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### Most Common Serotypes
#### Turkey – Clinical

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REPORT OF THE COMMITTEE

Most Common Serotypes
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Most Common Serotypes
Dog/Cat – All Sources

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### SALMONELLA

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#### Typhimurium Phage Typing – All Sources

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<td>DT104</td>
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<td>DT208</td>
<td>DT104a</td>
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Pullorum-Typhoid Status:
In Calendar Year 2008, there was one isolation/outbreak of *Salmonella* Pullorum reported to the Poultry Improvement Staff. There were no isolations/outbreaks of *Salmonella* Pullorum reported during Calendar Year 2009 from January to October, 2009. There have been no isolations of *Salmonella* Gallinarum since 1987 in any type poultry.

<table>
<thead>
<tr>
<th>Hatchery Participation in the National Poultry Improvement Plan</th>
<th>Testing Year 2008</th>
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<tbody>
<tr>
<td>Egg and Meat-Type Chickens:</td>
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<tr>
<td>Participating Capacity</td>
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<tr>
<td>Turkeys Participating Capacity</td>
<td>48</td>
</tr>
<tr>
<td>Waterfowl, Exhibition Poultry and Game Birds Capacity</td>
<td>35,224,523</td>
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<tr>
<td>Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary, Testing Year 2008</td>
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<tr>
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<tr>
<td>Participating- Number</td>
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<tr>
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<tr>
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<td>Primary Breeding Flocks</td>
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<tr>
<td>Primary Breeding Flocks</td>
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<tr>
<td>Birds- Proportion of Total</td>
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<td>Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary, Testing Year 2008</td>
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<td>Participating- Number</td>
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<tr>
<td>Birds in Flocks-Number</td>
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<td>Primary Breeding Flocks</td>
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<td>Birds-Proportion of Total</td>
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## Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

### Testing Year 2008

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<tr>
<td>Primary Breeding Flocks-Birds-Proportion of Total</td>
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## Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

### Testing Year 2008

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### U.S. Salmonella enteritidis Clean- Egg-Type Chickens

No. of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2009

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<th>Dead Germ</th>
<th>Bird</th>
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<td>Georgia</td>
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<tr>
<td>Birds in Flocks</td>
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<td>46000</td>
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<td>Illinois</td>
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<td>Birds in Flocks</td>
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Indiana Environmental Dead Germ Bird

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### U.S. *Salmonella enteritidis* Clean- Egg-Type Chickens

No. of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2009

<table>
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<th>Birds in Flocks</th>
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<td>91600</td>
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<td>Oregon</td>
<td>15092</td>
<td>9</td>
<td>91600</td>
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<td>10000</td>
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<td>Environmental</td>
<td>Dead Germ</td>
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### U.S. *Salmonella enteritidis* Clean - Egg-Type Chickens

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<th>Dead Germ</th>
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#### Egg-type Chicken breeding flocks with isolates of *Salmonella enteritidis* by phage type and by year 1989-2008

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REPORT OF THE COMMITTEE ON SCRAPIE

Chair: Charles Palmer, CA
Vice Chair: Kristine R. Petrini, MN

Deborah L. Brennan, MS; Shane A. Brookshire, GA; Marie S. Bulgin, ID; Beth W. Carlson, ND; John R. Clifford, DC; Thomas F. Conner, OH; Walter E. Cook, WY; Linda A. Detwiler, NJ; Nancy E. East, CA; William F. Edmiston Jr. DVM, TX; Anita J. Edmondson, CA; Dee B. Ellis, TX; Dave E. Fly, NM; Keith R. Forbes, NV; Michael J. Gilsdorf, MD; William L. Hartmann, MN; Susan J. Keller, ND; James W. Leafstedt, SD; Mary J. Lis, CT; Jim R. Logan, WY; Michael R. Marshall, UT; Cheryl A. Miller, IN; Jewell G. Plumley, WV; Stanley R. Potratz, IA; Michael R. Pruitt, OK; Anette Rink, NV; Paul E. Rodgers, WV; Joe D. Ross, TX; Ben Smith, WA; Diane L. Sutton, MD; Lynn A. Tesar, SD; Hector E. Webster, CA; Stephen N. White, WA; Nora E. Wineland, CO; David W. Winters, TX; Cindy B. Wolf, MN.

The Committee met on October 13, 2009 at the Town and Country Hotel, San Diego, Calif., from 12:30 to 5:00 p.m. At least 18 members and 22 guests were present.

Chair Chuck Palmer reviewed the Committee’s 2008 Resolution which urged the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to request adequate funding for the National Scrapie Eradication Program budget. The response from USDA-APHIS-VS indicated that they would be reconsidering all disease program funding requests and needs, and would be prioritizing its overall budget accordingly.

Scrapie Eradication and Certification Program Update
Diane Sutton
USDA-APHIS-VS

In fiscal year (FY) 2009 the Scrapie Eradication Program focused on: (1) cleaning up infected and source flocks utilizing a genetic based approach; (2) tracing and testing exposed animals and animals in exposed flocks; (3) expansion of Regulatory Scrapie Slaughter Surveillance (RSSS) to new collection sites; (4) producer education, (5) ID compliance; (6) implementing the National Scrapie Surveillance Plan, (7) working through the World Organization for Animal Health (OIE) to remove Nor98-like scrapie from the scrapie chapter and development of a policy for handling Nor98-like cases in the U.S., and (8) development of a proposed rule to revise 9 CFR parts 54 and 79.

Scrapie Flock Certification Program: As of July 31, 2009, there were 1,830 flocks participating in the Scrapie Flock Certification Program
REPORT OF THE COMMITTEE

(SFCP). Of these flocks 543 were certified flocks, 1,241 were complete monitored flocks, 41 were export monitored, and 5 were selective monitored flocks.

National Scrapie Surveillance Plan Implementation: The National Scrapie Surveillance Plan is posted at http://www.aphis.usda.gov/vs/nahss/sheep/national_scrapie_surveillance_plan_08192008.pdf. The plan provides a comprehensive review of scrapie surveillance in the U.S., explains the basis for implementing state-of-origin sampling targets and ultimately flock level surveillance, and establishes minimum targets for FY 2009 and 2010. In FY 2009, Area Action Plans were developed to help meet state-of-origin sampling and ID compliance targets identified by the National Scrapie Surveillance Plan. This activity resulted in increased sampling in states not meeting plan targets.

Infected and Source Flocks: Thirty-three percent fewer newly infected and source flocks were identified in FY 2009 through July compared to the same month in FY 2008 (Figure 1). As of July 31, 2009, there were 21 scrapie infected and source flocks with open statuses. In FY 2009, 21 new source flocks and 8 new infected flocks had been reported; 26 flocks had completed a clean-up plan and been released. The ratio of infected and source flocks released to newly identified infected and source flocks for FY 2009 = 0.9 : 1.

Positive Scrapie Cases: As of July 31, 2009, 65 positive cases in sheep or goats were reported by the National Veterinary Services Laboratories (NVSL); 34 were field cases and 31 were RSSS cases collected between October 1, 2008 and July 31, 2009 and confirmed by August 20, 2009. Field cases are positive animals tested as part of a disease investigation including potentially exposed, exposed and suspect animals. Twenty cases of scrapie in goats have been confirmed by NVSL since implementation of the regulatory changes in FY 2002. The most recent positive goat case was confirmed in July 2009 and is epidemiologically linked to the same herd in Michigan as the positive goat cases that were found in FY 2008. The positive goat was a pet animal quarantined as part of the FY 2008 investigation. No additional animals were exposed.

Regulatory Scrapie Slaughter Surveillance (RSSS): RSSS started April 1, 2003. It is a targeted slaughter surveillance program which is designed to identify infected flocks. Samples have been collected from 223,452 animals since April 1, 2003: this total includes 695 rectal biopsies collected in Texas as part of a surveillance pilot project. There have been 415 NVSL confirmed positive animals since the beginning of RSSS. As of July 31, 2009, 34,193 samples, including 513 rectal biopsies, have been collected in FY 2009. Thirty one samples collected in FY 2009 have tested positive for scrapie; 28 of these were from black-faced sheep and 3 from mottle-faced sheep. Two of these RSSS cases originated from a source flock identified at the end of FY 2008. Four other animals originated from flocks containing other RSSS
positive sheep. There was an 11% decrease in percent positive black face sheep sampled at slaughter (.18 to .16%) between FY 2008 and FY 2009 as of July 31, 2009 if multiple positives from the same flock are excluded (Figure 2). RSSS was designed based on the findings of the Center for Epidemiology and Animal Health (CEAH), Scrapie: Ovine Slaughter Surveillance (SOSS) study. The results of SOSS can be found at http://www.aphis.usda.gov/vs/ceah/cahm/Sheep/sheep.htm.

**Scrapie Testing:** As of July 31, 2009, 36,524 animals have been sampled for scrapie testing: 34,193 RSSS samples (number includes 513 rectal biopsies from Texas), 1,663 regulatory field cases, and 668 live-animal biopsies.

**Animal ID:** As of September 1, 2009, 160,294 sheep and goat premises had been assigned identification numbers in the Scrapie National Generic Database and 126,123 premises had received official ear tags.

**Figure 1**
Scrapie Eradication Program Educational Materials
Cindy Wolf
University of Minnesota, College of Veterinary Medicine

Dr. Wolf presented information on new and updated educational materials that have been developed in conjunction with USDA-APHIS and the National Institute for Animal Agriculture (NIAA). This included a new reference CD "A Guide to the National Scrapie Eradication Program for Veterinarians", as well as the following materials:

- ABCs of Genetic Based Flock Clean-up and Monitored Plans for Classical Scrapie Infected, Source and Exposed Sheep Flocks, brochure 2009, English & Spanish
- A Guide to the National Scrapie Eradication Program for Veterinarians, CD 2009
- Why Eradicating Scrapie in U.S. Goats is so important, PowerPoint available on CD Nov 2009.
- Identification Requirements of the National Scrapie Eradication Program for Sheep, PowerPoint available on CD 2008
- Genotyping: A Tool for controlling classical scrapie, PowerPoint available on CD 2008
- Role of Market and Dealer in the Eradication Program poster
- Sheep Identification poster
SCRAPIE

• What You as a Producer Need to Know
• Requirements for Going to ‘the Show’
• Sale and tagging record book

These educational resources can be ordered by contacting the NIAA at: 13570 Meadowgrass Dr, Suite 201, Colorado Springs, CO 80921, Ph: 719-538-8843 Fax: 719-538-8847, or online at scrapie@animalagriculture.org. They can also be viewed in their entirety at www.eradicatescrapie.org.

ARS Research Update
Katherine O’Rourke
USDA-Agriculture Research Service (ARS)

With the continuing progress of the joint federal-state-industry scrapie eradication program in reducing the prevalence of classical scrapie in sheep, ARS is investigating potentially minor sources of infection, including scrapie in goats and scrapie in sheep of minor prion genotypes. USDA-APHIS and the state regulatory agencies in Colorado and Michigan have submitted live goats with scrapie exposure and these animals have provided the first reports on prion accumulation in the placenta of infected does as well as insights into diagnostic strategies and genetic resistance. In the very small number of goats examined, the placenta was positive only in the terminal year of the disease, in contrast to sheep scrapie in which the placenta is usually positive at one year of age. At least one kid born to a doe with a positive lymphoid biopsy but with a negative placenta, has become lymphoid biopsy positive. This suggests that other sources of infection might occur in goats. Experimental feeding of milk and experimental transmission of blood from experimentally infected does will be initiated in the next year of the project. Rectal lymphoid biopsies in goats showed very low levels of abnormal prion protein in young goats and antemortem diagnosis is challenging. Genetic changes at prion protein positions 146 and 222 are potential candidates as resistance genes. Experimental challenge of goats was initiated last year and goats will be observed for at least seven years.

Sheep with a genetic change at prion protein 112 have been reported to have a prolonged incubation time. In the small numbers of animals available, rectal biopsies were observed to be positive at approximately 24 months, rather than the 14 months observed with sheep without the mutation. Sheep with experimental administration of Nor98-like scrapie had negative placentas at year one and are clinically normal at 1.5 years; these ewes will be bred again for lambing at two years post-inoculation.

Update on Transmissible Spongiform Encephalopathies (TSE) of Sheep and Goats
Linda Detwiler
Mississippi State University

Dr. Detwiler highlighted scientific papers that were presented at the recent Prion 2009 presentations given at this meeting. There is still
considerable debate over the specific nature meeting held in Greece September 23-25, 2009. This included recent publications as well as overviews of the agent. The biggest discrepancy is that evidence of infectivity does not correlate to the detection of the abnormal form of the prion protein (PrPsc). Multiple studies have demonstrated infectivity (some with significant levels) in certain tissues with no or low levels of PrPsc.

Protein misfolding cyclic amplification (PMCA) is a relatively new technique that greatly increases sensitivity in detecting the presence of prions. PMCA functions on the principle that a prion (PrPres) acts as a seed or template that actively recruits normal prion protein and alters the conformation. PMCA uses sonication cycles to amplify the reaction between the PrPres seed and normal prion protein (PrPc). PMCA reactions seem to be able to amplify minuscule quantities of pre-existing PrPres seeds. Currently PMCA is used in research settings. There is discussion about its use as a commercial test.

As science advances there have been breakthroughs in obtaining information regarding the tissue distribution of infectivity in a scrapie infected sheep and the routes of agent shed. It has now been well established that scrapie and experimental bovine spongiform encephalopathy (BSE) in sheep can be efficiently transmitted in blood (Houston et. al., 2008). In a study designed to look at the risks associated with human blood transfusions and vCJD, sheep experimentally infected with BSE were used as the model. This study found that all blood components (platelets, buffy coat, and nonleucoreduced plasma) would transmit the disease to recipients. Furthermore, it appears that transmissions occur irrespective of volume, plasma content and white cell count. Blood and products may transmit infection as early as 30% of the incubation. Thus far, sheep receiving leucodepleted product are still free from evidence of clinical disease. (survival time between 600-800 days). (McCutcheon et al, Prion 2009)

There have been 3 recent publications that demonstrate colostrum, milk and milk components (cream, casein-whey, cellular pellets) from certain genotypes of scrapie-infected sheep transmit infectivity. (Konold et. al., 2008; Lacroux et. al., 2008; Maddison et. al., 2009)

Atypical scrapie continues to be detected throughout Europe, in the U.S. and Canada. In some countries of Europe the vast majority of cases are atypical versus classical. In Europe, a twelve-country study (Fediaevsky et.al., Prion 2009) was conducted to determine the extent of the contagious nature. Questionnaires were used to collect country level data on 1) control measures, 2) results of active surveillance and 3) testing resulting from outbreak control. Prevalence data was modeled using linear regression mixed models and meta-analysis. Mean prevalence for abattoir surveillance was 6 cases per ten thousand and 8 cases per ten thousand in fallen stock. Meta analysis on data from 11 countries found the probability of detecting secondary cases of atypical scrapie in positive flocks similar to the probability observed in animals for healthy
slaughter. Also, the probability of detecting secondary cases of scrapie in flocks infected with classical scrapie was significantly higher than the probability of detecting secondary cases in atypical scrapie positive flocks (OR=32.4, CI95%: 20.7-50.7). These results suggest that atypical scrapie is not contagious or has a very low level of transmissibility under natural conditions compared to classical scrapie.

A study was also conducted in Norway to determine the potential contagiousness of Nor 98 scrapie. Animals from 7 flocks with classical scrapie and 58 flocks with atypical scrapie were examined. There were multiple secondary cases of scrapie in the flocks with classical disease. There was only one of the 58 atypical flocks that had another positive. The other case in this flock happened to be the mother of the index case (the flock size was very small). In this study, not all flocks totally were completely depopulated. The results indicate that atypical scrapie is clearly less contagious, if at all.

There are a number of issues to keep on the radar screen in regard to the TSEs:

- Atypical scrapie – What are the risks to other species?
- What is the actual level of variant Creutzfeldt Jakob disease (vCJD) and what are the real risks associated with the contamination of the human blood supply?
- Is there a subclinical (carrier) state in humans with vCJD?; if so are these individuals a continuing risk to the blood supply?
- Most likely there will be newly emerging TSEs?
- Transmission between species is unpredictable hence there needs to be surveillance for emerging disease.

**Regulatory Program Changes for Scrapie**

Diane Sutton
USDA-APHIS-VS

Dr. Sutton then highlighted some upcoming regulatory changes that may affect the scrapie program. These include a new VS Memo which provides the option for states to manage Nor98-like scrapie cases as a pilot project, thereby eliminating the need for depopulation in these flocks. She also mentioned revisions had been drafted for the scrapie sections (Parts 54 and 79) of the Code of Federal Regulations (CFR) which include:

- Giving the Administrator authority to relieve requirements for sheep and goats exposed to scrapie types, such as Nor98-like, that do not pose a significant risk of transmission;
- Increasing flexibility in how investigations can be conducted and allow the epidemiology in a specific flock to be given more consideration in determining flock and animal status;
- Adding genetic-based approach to regulation;
- Making goat ID requirements for interstate movement similar to sheep in preparation for slaughter surveillance in goats;
- Tightening up the definition of slaughter channels;
REPORT OF THE COMMITTEE

• Expanding individual ID requirement to all sexually intact animals, unless moving as a group lot (allows mixed-source groups moving in slaughter channels under 18 months);
• Limiting use of tattoos and implants to animals not moving through concentration points and not in slaughter channels;
• Establishing recordkeeping requirements similar to current Uniform Methods and Rules (UM&R) compliance guidance; and
• Establishing surveillance requirements for consistent states.

These proposed rules will likely be available for public comment sometime during FY2010. USDA is also developing a proposed rule to update the import requirements for sheep and goats, their embryos, and products and for exotic ruminants not addressed in other rulemaking, to mitigate risks from scrapie and BSE.

Overview of Nor98-like Scrapie
Bradd Barr
California Animal Health and Food Safety Laboratory

Dr. Barr gave an overview of Nor98-like scrapie and discussed diagnostic testing. He reviewed the literature and detailed how Nor98-like scrapie, also referred to as atypical scrapie, differs from classical scrapie in several ways. The evidence suggests that Nor98-like scrapie is clinically, pathologically, biochemically, and epidemiologically unrelated to classical scrapie. Furthermore, Nor98-like scrapie may not be contagious and may, in fact, be a spontaneous degenerative condition of older sheep. He also presented information showing that the BioRad ELISA test is currently the most sensitive test for diagnosing Nor98-like scrapie.

Case Review Nor98-like Scrapie in the United States
Kris Petrini
Minnesota Board of Animal Health

Dr. Petrini reviewed the findings of the six cases of Nor98-like scrapie that have been diagnosed in the United States and compared them to findings from European cases. None of the sheep that were diagnosed with Nor98-like scrapie in the United States exhibited clinical signs and only one animal per flock was positive. The animals from three of the flocks had already been euthanized or slaughtered when Nor98-like scrapie was diagnosed and the remaining three were depopulated. With more and more evidence that Nor98-like scrapie does not transmit readily from animal to animal, if at all, the need for depopulation in affected flocks is questionable. Petrini also recapped recent literature which supports the idea that Nor98-like scrapie may result from a spontaneous degenerative condition.
Dr. Logan talked about the proposed VS Memo regarding Nor98-like scrapie. A discussion on how to handle these cases in the United States followed. One concern that was brought up is that even if animals from flocks diagnosed with Nor98-like scrapie are not required to be depopulated, producers may lose the ability to market their animals. The Committee also discussed diagnostic testing for scrapie. Enzyme-linked immunosorbent assay (ELISA) tests have a greater sensitivity for finding Nor98-like scrapie than the IHC test, which is currently being used in the United States. It is therefore likely that cases of Nor98-like scrapie may be going undetected in the United States. However, since the sensitivity of the immunohistochemistry (IHC) test for classical scrapie is better than the ELISA, Dr. Sutton said that there is no plan to use the ELISA test in the scrapie eradication program in the immediate future.

Committee Business:

The possible benefits of passing a resolution to address concerns about Nor98-like scrapie in the current regulatory program was discussed. However, since USDA-APHIS has already approved a VS Memo which addresses the immediate concerns, and since the proposed Code of Federal Regulations (CFR) rule changes will allow the administrator more flexibility to deal with Nor98-like scrapie, the Committee did not feel a resolution was necessary at this time.
REPORT OF THE COMMITTEE ON SHEEP AND GOATS

Chair: William F. Edmiston Jr., TX
Vice Chair: Don P. Knowles, WA

Derek J. Belton, NZ; Scott C. Bender, AZ; Deborah L. Brennan, MS; Marie S. Bulgin, ID; John R. Clifford, DC; Max E. Coats, Jr., TX; Thomas F. Conner, OH; Linda A. Detwiler, NJ; Nancy E. East, CA; Anthony M. Gallina, FL; Chester A. Gipson, MD; Jeffrey J. Hamer, NJ; Joseph N. Huff, CO; Paul L. Jones, OR; James W. Leafstedt, SD; Howard D. Lehmkuhl, IA; Mary J. Lis, CT; Jim R. Logan, WY; Linda L. Logan, TX; Gordon ‘Cobbie’ Magness, SD; David T. Marshall, NC; Michael R. Marshall, UT; Cheryl A. Miller, IN; Ron C. Miller, PA; Charles Palmer, CA; Kristine R. Petrini, MN; Michael R. Pruitt, OK; Anette Rink, NV; Suelee Robbe-Austerman, IA; Paul E. Rodgers, WV; Joe D. Ross, TX; Joan D. Rowe, CA; Mo D. Salman, CO; William P. Shulaw, OH; Ben Smith, WA; Diane L. Sutton, MD; Cleve Tedford, TN; David Thain, NV; Peter H. Timm, CA; Hector E. Webster, CA; Ellen M. Wilson, CA; George O. Winegar, MI; Nora E. Wineland, CO; David W. Winters, TX; Cindy B. Wolf, MN.

The Committee met on October 14, 2009 at the Town and Country Hotel, San Diego, Calif., from 8:00 a.m. to 10:50 a.m. There were 18 members and 21 guests present.

NAHMS Sheep 2011 and Goat 2009 Studies
Katherine Marshall
National Animal Health Monitoring Service (NAHMS), USDA

The NAHMS Goat 2009 study is currently receiving second questionnaires and mailing kits to producers who are participating in the study. Of the 5,500 producers initially contacted to participate in the NAHMS Goat 2009 study, 2,483 (45%) completed the first questionnaire and 1,080 of those consented to having their names turned over and continuing in the study. Second questionnaires are being received and data validation and analysis is occurring. The first reports are expected in early 2010.

The NAHMS Sheep 2011 study needs assessment will take place in November 2009 through January 2010 via online and mail methods. The objectives for the study will then be developed in February 2010, with data collection beginning in January 2011.

Recommendations on Best Management Practices for Domestic Sheep on Public Lands Shared with Bighorn Sheep
Walter Cook, Assistant State Veterinarian of Wyoming and USAHA Joint Bighorn-Domestic Sheep Working Group presented the working group report of the recommendations of best management practices for domestic sheep, domestic goats and bighorn sheep. This report is included in full at the end of the Report of the Committee on Wildlife Diseases in these proceedings.
Discussion and Action on Domestic/Bighorn Sheep Joint Working Group Report
William Edmiston
Chair, Committee on Sheep and Goats

The Chair introduced a resolution concerning research regarding bighorn sheep and domestic sheep interaction that was approved by the Wildlife Committee. The original resolution from 2007 included language regarding the need for research. The working group report did not address this aspect of the 2007 resolution.

The Committee added specific language directing it to the United States Departments of Agriculture and Interior’s research agencies and non-government organizations. The members of the Committee on Wildlife Diseases agreed with these changes and the resolution was adopted by the Committee on Sheep and Goats.

Domestic/Bighorn Interaction and Research - Where do we go from here? Research Brainstorming and Prioritization
Don Knowles
Vice Chair, Committee on Sheep and Goats
USDA-ARS

Don Knowles recommended Big Horn sheep and domestic sheep research be aimed at the concept of species compatibility because it includes more than specific disease research. The intent of the two committee chairs is that research would be jointly conducted by wildlife and domestic livestock researchers.

Discussion of Brucella ovis Testing Issues and Research Needs
Jim Logan, Wyoming State Veterinarian; Cindy Wolf, practitioner and sheep producer; and Jeffrey Nelson, National Veterinary Services Laboratory (NVSL), USDA

*Brucella ovis* has continued to be a source of infertility and thereby of economic significance to the United States sheep industry. Currently available diagnostic methods have not been adequate to accurately determine the disease status of rams. Questions regarding cross-reactivity with other organisms, residual colostral antibody interference, and disparate results between laboratories complicate interpretation of the true disease status.

Additionally questions remain about the role of the ewe in the perpetuation of the disease within a flock. Many times flocks have been found to be infected following years of negative ram tests and with ewe additions. The role of the female in *B. ovis* transmission has not been thoroughly studied.

Committee Business

The Committee reviewed and passed the following Resolutions, conducted throughout the meeting.

- Collaboratively develop more sensitive and specific diagnostic tests and also better define the transmission of *B. ovis* in sheep populations.
• Recommending that the NAHMS sheep study 2011 proceed.
• Research regarding bighorn sheep and domestic sheep interaction, also approved by the Committee on Wildlife Diseases, with friendly amendments.

New Business
The Committee passed a resolution presented by the Committee on Import-Export concerning OIE guidelines for importing live animals.
REPORT OF THE COMMITTEE ON TRANSMISSIBLE 
DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Chair: Julie D. Helm, SC
Vice Chair: Marion Garcia, Republic of Georgia

The Committee met on October 12, 2009 from 1:00 to 4:30 p.m. and October 13, 2009 from 12:30 to 5:30 p.m. at the Town and Country Hotel.
REPORT OF THE COMMITTEE

in San Diego, Calif. There were 37 Committee members and 42 guests in attendance, for a total of 79. Chair Julie Helm presided, assisted by Vice-Chair Marion Garcia. The Chair welcomed the Committee, summarized the 2008 meeting, and reported on the responses to the 2008 Resolution.

2008 Resolution 33, “Additional resources for validation of genomics-based pathogen detection technologies” was approved. The United States Department of Agriculture (USDA), Animal & Plant Health Inspection Service (APHIS) supports cooperation with other government entities to meet pathogen detection needs, will develop and evaluate genomic-based pathogen detection & sequencing technologies with support from the Department of Homeland Security.

Dr. Eric Jensen, Aviagen, Inc, and Chair of the Mycoplasma Subcommittee, gave the subcommittee report. The report was approved by the Committee and is included in these proceedings.

Dr. Eric N. Gingerich, University of Pennsylvania, gave the Infectious Laryngotracheitis (ILT) Subcommittee report. The report was approved by the Committee and is included in these proceedings.

Dr. David Swayne, USDA, Agricultural Research Service (ARS), Southeastern Poultry Research Laboratory (SEPRL), Chair of the Avian Influenza and Newcastle Disease Subcommittee, gave the subcommittee report. The report was approved by the Committee and is included in these proceedings.

Dr. Bob O’Connor, Foster Farms, presented the annual disease status report for the broiler industry. The report was approved by the Committee and is included in these proceedings.

Dr. Eric N. Gingerich, University of Pennsylvania, delivered the annual disease status report for the table egg industry. The report was approved by the Committee and is included in these proceedings.

Dr. Marion Garcia, Veterinary Consultant, Tbilisi, Republic of Georgia gave the annual disease status report for the turkey industry. The report was approved by the Committee and is included in these proceedings.

Dr. John Smith, Chair, USPOULTRY Research Advisory Committee, presented the U.S. Poultry & Egg Association Research Report. The report was approved by the Committee and is included in these proceedings.

Dr. Julie Helm, Clemson University Livestock Poultry Health, presented the annual status report for the National Poultry Improvement
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Plan (NPIP) for the Senior Coordinator, Mr. Andrew H. Rhorer, USDA-APHIS-VS. The report was approved by the Committee and is included in these proceedings.

Ms. Mary Lea Killian, USDA-APHIS-VS, National Veterinary Services Laboratory (NVSL), delivered the annual status report for the NVSL Avian Influenza and Newcastle Disease diagnostics. The report was approved by the Committee and is included in these proceedings.

Dr. Matthew Erdman, USDA-APHIS-VS, NVSL, delivered the annual NVSL Diagnostic Bacteriology, Mycoplasma, Pasteurella, and Salmonella report. His report was approved by the committee and is included in these proceedings.

Dr. Gregorio Rosales, Aviagen North America, Huntsville, AL presented the Avian Diseases and Oncology Laboratory, USDA-ARS, Contributions to the U.S. Poultry Industry and Future and is included in these proceedings.

Research Funding for Avian Diagnostic and Oncology Laboratory and Southeast Poultry Research Laboratory

Drs. Eileen Thacker and Steven Kappes USDA-ARS,

Funding for ARS laboratories is managed on a national level. This is an important premise to understand when considering the potential for future funding of the Avian Diagnostic and Oncology Laboratory (ADOL). Priorities for research funding are considered on a five-year cycle in order to support long-term, high-risk issues in support of animal industry. When priorities are being set, all animal production species in the entire country are considered. ARS is currently at the beginning of a new five-year cycle and is actively poling the various animal agriculture stakeholders to identify diseases and priorities most important to industries at this time. In March, stakeholders will be able to voice their priorities at a workshop. The research scientist will then have the opportunity to express the direction they would like their research to go by submitting a research plan. Financial constraints and the size of ARS preclude doing everything. Additionally, under Congressional mandate, Congress, through their stakeholders, may decide what research should be conducted.

ARS recognizes fine work of ADOL and how it supports the industry. However, the Government budget process does impose some limitations. The budget process usually starts in March timeframe and culminates in February with the President’s Budget. Along the way, direction from the Administrator, Financial Management, Office of Program Policy Analysis and Government Accountability (OPPAGA), the Under Secretary, and Office of Management and Budget (OMB) each make modifications.
REPORT OF THE COMMITTEE

The President’s budget is presented to Congress which can also make modifications. Due to budget constraints, ARS has had to put programs up for cut even though they do not want to. The Omnibus should protect ADOL for now. The current administration has undertaken an effort to cut down on earmarks. ARS recognize the value of ADOL scientists to the industry and would like to see it continue. There is a modernization plan for Southeastern Poultry Research Laboratory (SEPRL). As part of this plan, Congress has asked if ADOL could be moved to SEPRL. This is the current plan: as SEPRL modernization takes place, ADOL will be moved to co-locate with them.

The Monday session adjourned at approximately 4:30 p.m. The meeting reconvened at 12:40 p.m. on Tuesday, October 13, 2009.

Dr. David Suarez, USDA-ARS-SEPRL, gave an update on Influenza, Newcastle Disease and parvovirus research activities at SEPRL. The report is included in these proceedings.

Dr. Lindsey Garber, USDA-APHIS-VS Centers for Epidemiology and Animal Health (CEAH), reported on the National Animal Health Monitoring System (NAHMS) Poultry 2010 Needs Assessment. Dr. Garber’s report is included in these proceedings.

Dr. Kristy Pabilonia, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, gave a presentation on Urban Chicken and Game Bird Surveys which is included in these proceedings.

California Infectious Bursal Disease Virus (IBDV) in Pullets – Laboratory and Field Perspectives
Dr. Gabriel Sentíes-Cué,
California Animal Health and Food Safety Laboratory System, Turlock-Branch University of California, Davis; and
Dr. Nancy Reimers
Gregg Cutler Associates, International
Drs. Sentíes-Cué and Reimers gave presentations on the California Infectious Bursal Disease Virus (IBDV) in Pullets – Laboratory & Field Perspectives. Dr. Sentíes-Cué reviewed the pathogenesis and clinical presentation of IBD virus (Birnavirus) with emphasis on immune suppression and secondary complications from this. He then reviewed the characteristics of Birnaviruses diagnostic pathotypes which are differentiated by looking at the VP2 protein (antigenic variation) and VP1 protein. Strains of IBDV which emerged in the late 1980s included a very virulent strain. The primary feature of virulent strains of IBDV is its ability to induce higher mortality than classical strains. In December 2008
in a confined area of California, two layer pullet farms became infected with IBDV. Birds had been vaccinated three times against IBDV with intermediate strains. Gross pathological lesions were numerous and characterized by necrosis of lymphoid tissue in various organ systems. Serological titers were very low, mostly in group 0. Direct electron microscopy showed viral particles consistent with Birnavirus. Challenge studies were conducted on Specific Pathogen Free (SPF) chickens with high mortality (91 to 100%) and in broilers with no mortality but disease and lower body weight. Total of five farms have been involved in this outbreak, all in a very confined area of California. Dr. Reimers reviewed the field presentation of the flocks. The detection of this virus was unexpected, in that it was not here before, and investigation on its distribution in susceptible populations is ongoing. Private, state and federal veterinary leaders are working in cooperation with the poultry industry on control and surveillance efforts. Extensive ongoing research is on going to help refine prevention and control measures.

Dr. Brendan Lee, Center for Animal Health and Food Safety, University of Minnesota, updated the Committee on the continuing work related to the 2007 Resolution 54, “Movement protocols for eggs, egg products, and day-old chicks within, out of, and into disease control areas”. His report is included in these proceedings.

NAHRS and the National List of Reportable Animal Diseases (NLRAD)
Dr. Bruce Stewart-Brown
Perdue Farms

Dr. Stewart-Brown, representing poultry in the National Animal Health Reporting System (NAHRS) Steering Group presented NAHRS and the National List of Reportable Animal Diseases (NLRAD). The intent of the NAHRS is to help the U.S. and consequently the industry represent our national statistics when reporting. The NLRAD is one of the products of the NAHRS process. This list should help eliminate the differences between States in their reporting requirements. The list is broken down into two categories: Notifiable Diseases (emergency) and Monitored Diseases (important). Each category is characterized by different timing, response and reporting associated with it. The draft list for avian species has seven Notifiable Diseases (Duck Viral hepatitis, highly pathogenic avian influenza, low pathogenic avian influenza (in poultry as per Chapter 2.7.12.of the Terrestrial Animal Health Code), Exotic (Virulent) Newcastle disease as per OIE definition, Fowl typhoid (Salmonella gallinarum), Pullorum disease (Salmonella pullorum, and Turkey rhinotracheitis) and eight Monitored diseases: (Avian chlamydiosis, Avian infectious bronchitis, Avian infectious laryngotracheitis, Avian mycoplasmosis (M. gallisepticum), Avian mycoplasmosis (M. synoviae), Fowl cholera (Pasteurella multocida),
REPORT OF THE COMMITTEE

Infectious bursal disease (Gumboro disease, Marek’s disease), all of which are on the World Organization for Animal Health (OIE) list. Each disease has a definition associated with it. Presenting the lists at USAHA this year initiated a review and comment period which will result in a final list to be presented at the USAHA Annual Meeting next year. If this system is adopted, it will make for consistency across the States and define roles for labs, private vets, etc.

Dr. Jonathan Zack, National Center Animal Health Emergency Management, USDA-APHIS-VS, gave an update on the Novel H1N1 2009 virus, National Veterinary Stockpile (NVS) activities, Foreign Animal Disease Preparedness & Response Plan (FAD PReP), and the Secure Egg Supply (SES) Activities – Continuity of Business Plan. His update is included in these proceedings.

Dr. Pat Klein, Poultry Program, USDA-APHIS-VS, gave an update on the VS 2015 – One Health Overview.

Dr. Michael David, Director of Sanitary International Standards, National Center for Import and Export, USDA-APHIS-VS, was unable to attend, but did supply the annual update on the World Organization for Animal Health (OIE) poultry activities through email to the Committee members. His comments are included in these proceedings.

Committee Business:

The Committee approved a Resolution entitled The USDA-ARS Avian Diseases and Oncology Laboratory (ADOL) - Proposal to Maintain and Enhance Poultry Tumor Virus and Genetic Disease Resistance Research Programs, urging that the USDA-ARS continue to place a high priority on ADOL’s tumor virus and genetic resistance to disease programs. Further, urging the House and Senate Agriculture Appropriation committees to secure funding to ensure that the ARS-ADOL poultry research capabilities are preserved and enhanced to maintain their ability to continue research in these important areas.

The Committee approved a Resolution entitled, Notifiable Avian Influenza Surveillance Cooperative Agreement Funding, urging the USDA-APHIS-VS to maintain adequate funding and risk based allocation to states to fully support the national notifiable avian influenza (NAI) domestic poultry program. Further, the USAHA urges Congress to continue to appropriate these monies to USDA-APHIS-VS for the NAI program.

The Committee approved a Resolution entitled, Failure of importing countries to follow OIE guidelines for importations of animals, urging USDA-APHIS-VS to initiate all trade negotiations with reference to compliance with OIE guidelines and Sanitary and PhytoSanitary rules for trade.
The Committee approved a Resolution entitled, Containment of Very Virulent Infectious Bursal Disease Virus (vvIBDV) in California, urging USDA-APHIS-VS to apply all necessary resources to assist the State of California in eliminating vvIBDV from California and urging USDA-APHIS-VS to support the validation and distribution of a real-time RT-PCR for the detection and differentiation of vvIBDV for use in a national surveillance program.

These Resolutions were forwarded to the Committee on Nominations and Resolutions for review.
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON MYCOPLASMA

Eric L. Jensen, Chair

The Subcommittee met at the Town and Country Hotel in San Diego, Calif., on October 11, 2009 with 29 attendees.

Dr. Eric Jensen, Alabama, presented the report of the Mycoplasma subcommittee. Dr. Scott Gustin, Arkansas, presented on the Mycoplasma synoviae (MS) situation and vaccination with Vaxsafe® MS in Northwest Arkansas, and Dr. Naola Ferguson-Noel, Georgia, presented on MS diagnostic challenges. Both presentations are summarized below.

Andrew Rhorer, National Poultry Improvement Plan (NPIP), submitted a report showing that there was a significant increase in the number of reported cases of MS in meat-type chickens in 2008-09 and that a conditional license was approved for a live MS vaccine at the request of the Arkansas State Veterinarian and poultry industry in Arkansas. The NPIP-sponsored mycoplasma diagnostic workshop for training laboratory technicians and the panel of convalescent chicken sera against MS and Mycoplasma gallisepticum (MG) produced by Dr. Ferguson-Noel, University of Georgia, continue to be essential tools to support NPIP authorized laboratories. The turkey industry has shown significant interest in the addition of a “U.S. Mycoplasma Iowae Clean” classification to the NPIP.

Participants reported that the incidence of MS in meat-type chickens, outside of the Arkansas area, has been relatively low over the past year but continues to be quite common in commercial egg layers. Only sporadic cases of MG have been reported in meat-type chickens and turkeys. As both MS and MG continue to be frequently detected in backyard flocks (chickens, turkeys and other types) they serve as a reservoir for these diseases.

Mycoplasma synoviae Situation and Vaccination with Vaxsafe® MS in Northwest Arkansas
Scott J. Gustin,
Cobb-Vantress, Inc.

In the past five years, the incidence of infections with Mycoplasma synoviae (MS) has risen significantly in the northwest Arkansas poultry producing region. This region would also encompass northeastern Oklahoma and southwestern Missouri as several complexes expand into these neighboring areas. This is due to a number of factors, but those cited by the local production companies would include an increase in non-traditional commercial layer operations (cage-free and free-range), a shift in the demographics and cultural practices of contract growers, and poorer methods of control in flocks. In the past MS cases would be infrequent,
TRANSMISSIBLE DISEASES OF POULTRY
AND OTHER AVIAN SPECIES

isolated, and often controlled within companies by quarantine of farms and improved biosecurity practices on affected farms and complexes. However, what has changed recently is that more integrators have had widespread outbreaks in broiler breeding flocks and with dramatic multiplying of the organism through vertical transmission to broilers and subsequent horizontal transmission to nearby flocks and between integrator complexes.

Whereas in the past MS infections were fairly innocuous in breeding stock and also in broilers (unless exacerbated by IBV/NDV field infection or vaccination), the current MS strains in the area appear to have greater transmissibility and pathogenicity in both broilers and breeding stock. (Studies are currently underway at universities to determine if this is truly the case.) Respiratory disease has been evident in broiler breeders with increases in mortality and egg production drops fairly common. In broilers, lesions have primarily been respiratory in nature with some severe cases of airsacculitis and condemnation.

Surveillance of cases has been performed through a variety of serological and antigen tests including plate testing, enzyme linked immunosorbent assay (ELISA), Hemaglutinin Inhibition (HI), and conventional and real-time polymerase chain reaction (PCR). Sequencing of the isolates has demonstrated that the isolates are well conserved within the industry and are of 2-3 subtypes. Control of the disease has been focused around segregation of MS positive eggs within complexes to minimize exposure, medication of affected breeder flocks to reduce shed (tetracyclines, tylosin through feed/water), controlled slaughter of affected breeders (when possible), and enhanced biosecurity. Nonetheless, the degree of infection within some complexes and the need to reduce the susceptible population of hen flocks has necessitated an additional strategy, vaccination.

At the present time, there exists no licensed live MS vaccine for use in the U.S. It was decided in this scenario a live MS vaccine would have several advantages over a killed MS bacterin. The decision of some complexes to vaccinate first required the consensus of all poultry stakeholders in the area. A conditional license to import and apply a live MS vaccine (Vaxsafe® MS, Bioproperties) was approved by USDA National Center for Import and Export and the respective state veterinarians. Complexes choosing to vaccinate had to identify the specific farms to be vaccinated as well as a defined start and end to the vaccination. At this juncture, it appears that the decision to vaccinate has been beneficial but the process is still underway.
**Mycoplasma Synoviae Diagnostic Challenges**

Naola Ferguson-Noel  
Dept. of Population Health, Poultry Diagnostic and Research Center,  
College of Veterinary Medicine, University of Georgia

The disease problems caused by *Mycoplasma synoviae* (MS) include synovitis and respiratory disease. MS has not been traditionally a serious problem in poultry production in the U.S. However, MS has been responsible for serious respiratory disease and/or synovitis in several areas of the world, including Eastern Europe, Holland, Mexico, Brazil and Argentina. More recently MS infection has resulted in severe respiratory disease in the Southeastern U.S. A major factor in the type and severity of the disease problem caused by MS is the virulence and pathotype of the strain involved.

The diagnosis of MS is usually made by:
- Serology – serum plate agglutination (SPA), Hemagglutination inhibition (HI) and enzyme-linked immunosorbent assay (ELISA)
- Polymerase chain reaction (PCR) – conventional and real-time
- Culture
- Bioassay

The SPA test is fast and inexpensive. Birds generally react in 5-10 days and flocks remain positive indefinitely. However, false positive reactions are common and the quality of antigen varies. This test is usually very sensitive (positive flocks are seldom missed), the exception has been MS in turkeys. In recent reports the SPA test has also missed MS infections in broiler breeders. This is a serious concern as the SPA test is often the primary means of screening for MS infection.

PCR is becoming a popular approach to screening for pathogenic avian *mycoplasmas*. It is rapid and sensitive (theoretically 1 organism) – generally real-time is more sensitive than conventional PCR. Birds are often positive by PCR before seroconversion. The sensitivity of PCR is affected by the quality of the sample. The specificity of the PCR depends on the primers and probes. Laboratory contamination during sample preparation can be a major problem. Flocks should not be destroyed on the basis of PCR positives without other evidence of infection. There is little consistency between laboratories with respect to protocols, controls and validation of diagnostic PCRs. There have been recent incidents in which false positive PCR reactions have resulted in extensive and costly testing to confirm these false positives.

The introduction of a live MS vaccine will complicate the diagnosis of MS infection. There are many advantages to vaccination but the live MS-H vaccine will result in seroconversion as well as positive PCR and culture results. The vaccine is also capable of transmitting to in contact poultry. The MS-H strain can be differentiated from wild type MS by *vlhA* sequencing.
All of the current diagnostic techniques have their drawbacks; e.g., lack of specificity (SPA), a lag in response (HI), expense (bioassay), susceptibility to contamination and false positives (PCR). Also, different MS strains may result in atypical responses. It is important to understand the limitations of the tests and prudent not to rely on any one test too heavily.

We may need to re-evaluate our expectations with respect to the sensitivity of the screening tests in the face of current MS situation in the U.S. MS PCR appears to be a more sensitive test than SPA, although it is more expensive and there are few established standards.
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON INFECTIOUS LARYNGOTRACHEITIS

Contributing authors: Brandon Doss, Sherrill Davison, Louise Dufour-Zavala, Maricarmen Garcia, Eric Gingerich, Frederic Hoerr, Julie Helm, Ray Hilburn, Sarah Mason, and John Smith

Introduction: Vaccinal Laryngotracheitis (VLT) is an acute viral respiratory disease primarily of chickens. Economic losses attributable to VLT have been important in many poultry producing areas throughout the United States and the world. Despite efforts to control the disease through vaccination and implementation of biosecurity measures, outbreaks of VLT are still a threat to the poultry industry.

Prior suggested action items – 2008: The committee believes that:

• Evaluations (field and laboratory) of currently available vectored vaccines by the in ovo route in broilers should be continued.
• Research should be conducted to develop newer molecular vaccines to control and prevent VLT.
• Future research with the vectored products should include quantitative evaluation of viral shed and evaluation of the potential development of a carrier state after challenge.
• Economics must be considered with the development of newer vectored products.
• In the future, an effort to collect detailed data on mortality, duration of clinical signs, weight gain, vaccine usage and other epidemiological parameters is essential to have a more comprehensive evaluation of the currently available vaccines and control measures.
• Further research studies on innate immunity to ILT (infectious laryngotracheitis) should be conducted.
• States should adopt the Model State Program – VLT (USAHA – 2005).

Update – 2009

Observations – VLT outbreaks

Outbreaks of VLT in broilers continued to be of significance this year in several states. The morbidity and mortality associated with these breaks ranged from minimal to significant. Clinical signs observed in some of the reported breaks included conjunctivitis, tracheitis, hemoptysis, and secondary airsacculitis. All of the reported VLT cases were epidemiologically linked to the use of ILT vaccine, primarily CEO (chick embryo origin) vaccine. It appears the reason for failure to control VLT in broilers is widespread use of HVT-LT (herpes virus of turkeys) and Fowl
poxvirus (FP-LT) vectored vaccines in these flocks. A recent research project at the University of Georgia demonstrated that birds vaccinated with these vaccines in ovo and then challenged shed as much virus as unvaccinated birds. These vaccines appear to mitigate clinical signs and mortality, but do not prevent infection and shed. Growers appear to be lulled into a false sense of security and become less concerned about biosecurity. An economical ILT vaccine suitable for mass application in broilers that provides good protection against infection and shed without harsh vaccine reactions is sorely needed.

It was noted that the Model State Program – VLT (USAHA 2005) has not been adopted in total by any states but the information contained in it has been very useful to serve as guidelines for developing a states’ control program.

Regional Updates – VLT Incidence, Vaccination Strategies, and Control Measures

**Northeast** – One region has smoldering problems in broilers and the use of vectored and CEO vaccines are used for control. Other broiler production areas did not report any significant activity. No major problems were reported in layers. A variety of the different vaccines are used depending on the risk of challenge.

**Southeast** – Most states reported a much lower number of cases in broilers from last year. No problems were noted in the state that only allows the use of tissue culture (TC) vaccine. One state continues to experience a high incidence rate. This state is using a zone method for control whereas the infected zone uses CEO vaccine, the buffer zone a vectored vaccine, and the free zone no vaccine. Cleanout of litter is not allowed after an outbreak, a 21-day minimum downtime is required, and houses are heated to 100°F for 100 hours prior to placement of chicks. If litter is spread, it is only spread within their respective zone. Layers flocks showed good control of VLT using CEO or vectored HVT vaccines.

**Midwest** – No problems with VLT was reported in broilers. In layers, VLT has been controlled in a historically high incidence area using the HVT vectored vaccine. Outbreaks in two layer complexes were reported. One contained all non-vaccinated birds and 10% mortality was experienced. The other complex that broke contained ½ of flocks that had received the HVT vectored vaccine. Those flocks showed very little problem whereas the non-vaccinates had significant mortality.

**Southwest** – Minimal problems with VLT in broilers was seen in the state that only allows TC vaccine to be used. Significant problems were seen in one state where the Poultry Improvement Committee and the Poultry Federation collaborated on the development of a revised VLT Control plan. This plan includes a revised case definition, new testing/typing protocol, and biosecurity recommendations for known positive flocks. According to this plan, the region is divided into 5 zones based on geographic boundaries and poultry production schedules. Isolates
from each of the 5 zones will be typed to ensure that the ILT is vaccine associated. No problems with VLT were reported in commercial layers.

**West** – Sporadic VLT activity was reported in one state in broilers and no problems were reported in egg layers.

**Research Update**
Recently funded projects by the U.S. Poultry and Egg Association include 1) University of Georgia – preliminary studies on the genome of ILT for eventual use in developing a gene-deleted vaccine, and 2) North Carolina State University – ILT vaccine efficacy studies.

**Vaccine Company Updates**
CEVA-Biomune – Auburn University is conducting research on the effect of using the FP-LT inovo followed by CEO vaccine at 14 days of age administered in the water on production parameters compared to only using CEO vaccine.

Intervet/Schering Plough – Investigations of outbreaks of VLT in egg layers where the HVT vectored vaccine was used showed that either a different HVT vaccine was added to the mixture or misadministration of vaccine where a significant number of chicks were missed was involved.

**Current suggested action items – 2009**
- Research should be conducted to develop newer vaccines to control and prevent VLT in broilers.
- States should adopt the Model State Program – VLT (USAHA – 2005).
- Promote studies on the epidemiology of VLT outbreaks in broilers to determine the significant routes of spread.
The 7th International Symposium on Avian Influenza (ISAI) was held at the Continuing Education Center, University of Georgia, Athens, Georgia, USA, April 5-8, 2009. The co-chairs of the meeting were Ian H. Brown United Kingdom, David Stallknecht, USA, and David E. Swayne, USA, and an international committee developed the scientific program. The symposium was organized by Mary Pantin-Jackwood, Erica Spackman and Darrell Kapczynski. The symposium had 411 participants from 54 countries who presented 79 oral talks and 122 posters on various aspects of avian influenza research, diagnosis and epidemiology in poultry. With the 7th ISAI, a wild bird ecology and epidemiology component was added as were poster awards for students and young scientists. The symposium hosted two satellite meetings: 1) ½ day OFFLU meeting for World Organization for Animal Health (OIE) and Food and Agricultural Organization, and 2) a luncheon meeting to begin organizing an international paramyxovirus conference. The 8th ISAI will be held in 2012 in the United Kingdom. The proceedings of the 7th ISAI will be published as a Supplemental Issue of Avian Diseases. Proceedings from the 1st-6th ISAI are available from AAAP for a nominal fee (AAAP@uga.edu, http://www. aaap.info/educmat/). Proceedings of the 1st to 4th symposia are available as a CD. The proceedings of the 5th and 6th ISAI are available on the Avian Diseases website (http://avdi.allenpress.com/avdionline/?request=index-html), by CD or by hardcopy.

Additionally, the subcommittee gives the following summary on exotic diseases of poultry as provided by OIE. For the period July 2008 to June 2009, 80 countries reported virulent Newcastle disease either as outbreaks, clinical disease or are considered endemic countries. Eighteen countries in Asia, Africa and Europe (Bangladesh, Cambodia, China, Egypt, Germany, Hong Kong, India, Indonesia, Iran, Japan, Laos, Mongolia, Nepal, Nigeria, Russia, Thailand, Togo and Vietnam) reported outbreaks of high pathogenicity avian influenza; all as H5N1 subtype of the A/chicken/Guangdong/996 lineage. Eleven countries reported incidences of H5 or H7 low pathogenicity avian influenza: 1) Belgium – H5 serology in breeding geese & ornamentals, 2) Canada – H5N2 associated with respiratory disease in meat turkeys, 3) Czech Republic – H7N9 in breeding geese, 4) Dominican Republic – H5N2 in village poultry, 5) France – H5N3 in breeding ducks, 6) Germany – H5N3 and H7N7 zoo birds and poultry, 7) Haiti – H5N2 in village poultry, 8) Japan – H7N6 in commercial Japanese quail, 9) Romania – H5N3 in ducks and geese, 10) Spain – H5 in ducks, and 11) USA with H7N9 in broiler breeders Kentucky and H7N9...
REPORT OF THE COMMITTEE

In commercial turkeys (Minnesota). A survey for avian influenza vaccine use in the USA for the 1 year period indicated usage of only H1 and N3 inactivated vaccine in breeder turkeys against classical swine influenza strains. A total of 7,965,000 doses were used in Virginia (64,000 pending), Michigan (131,000), Arkansas (470,000), Ohio (1,150,000), Minnesota (1,329,000), Missouri (1,660,000), and North Carolina (3,161,000).

A limited survey was conducted on Newcastle disease virus (NDV) vaccine usage in the USA. For coverage of 20 million meat turkeys, HVT vectored product was used in 5.5M birds, fowl poxvirus vectored product in 5.5M birds and no NDV vaccine was used in 9M birds. In breeder turkeys, B1 killed was used in 200,000 birds and LaSota live and killed in 650,000 birds. In 31M egg layers, all used live vaccine (B1, Clone 30, or LaSota), usually 2 or 3 doses, with some boosting 1 or 2 doses with killed B1 or LaSota. In broilers, 2B birds used 1 or 2 doses of B1, C2, or LaSota, and 500M used 1 dose of HVT vectored product. For 26M broiler breeders, 3 to 5 doses of live B1 or LaSota with 1-2 boosts of killed B1 or LaSota were typical.

With the global pandemic of H1N1 influenza A in humans, only a single outbreak has been reported in 2 turkey breeder flocks in Chile.
Mortality versus Bird Size: of the three bird sizes surveyed (light, mid-, heavy), the 5-6 lb category has increased in mortality, whereas the other two have decreased. No explanation for this trend was offered by the Veterinarians in Broiler Production group surveyed for this report.

Seven Day Mortality: of the three bird sizes reporting, an increase in early mortality was noted in the light and middle categories. No explanation for this trend was offered by the Veterinarians in Broiler Production group surveyed for this report.

Condemnation: the lowest condemnation, Whole Bird (WB), as well as Parts occurs in the small bird category. This trend continued in 2009, thus far. And, as in years past, the mid-sized broiler condemnation (WB, as well as Parts) is the highest, followed closely by the largest category of broilers.

Ranking of Disease Issues: Coccidiosis and laryngotracheitis rank the highest (and equally) among the concerns of ten Veterinarians in Broiler Production responding to the survey. This is similar to 2008, except that Runting/Stunting Syndrome dropped considerably from a high ranking to only one response in 2009. *Mycoplasma* and Infectious Bronchitis ranked similarly to 2008, but leg issues increased to equal levels of concern in 2009. “Breeder Flushing/Mortality” appears to be a new disease issue facing the industry this year versus last.

Ranking of NON-Disease Issues: Exports was once again a number one issue, but it was ranked equally with concerns related to Antibiotic legislation. Also, Food Safety was listed as the 2nd highest concern behind the aforementioned. This is a considerable increase from 2008, where it appeared as a nominal concern from those surveyed. Also, of note, Animal Welfare is still a concern to Veterinarians in Broiler Production as an issue not relating to disease.
REPORT OF THE COMMITTEE

U.S. Table Egg Industry Annual Report

Eric Gingerich
University of Pennsylvania School of Veterinary Medicine

Overall health of the national table egg layer flock is very good. This is due to the continued availability of high quality vaccines, flock supervision from professional, well-trained flock supervisors, readily available veterinary technical assistance from primary breeder, vaccine company, diagnostic laboratory, and consulting veterinarians, high quality nutrition provided by professional nutritionists, housing of a majority of layers in environmentally controlled facilities in cages off litter, and the use of sound biosecurity practices. An increase in the finding of diseases thought once to be eradicated has been seen on the rise in cage-free production.

A recent poll of the Association of Veterinarians in Egg Production (AVEP) was conducted. The members were asked to rate a long list of common diseases as to their prevalence and severity in their area of service on a scale of 1 to 4 with 1 = no problems, 2 = scattered problems, 3 = a common problem, and 4 = serious, widespread problems. The survey revealed the following diseases of concern occurring in U.S.:

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Caged Pullets</th>
<th>Caged Layers</th>
<th>Cage-free Pullets</th>
<th>Cage-free Layers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Respondents</td>
<td>14</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>Starveouts (chicks) – 2.43</td>
<td>Colibacillosis – 2.64</td>
<td>Coccidiosis – 2.4</td>
<td>Cannibalism</td>
</tr>
<tr>
<td>2</td>
<td>Yolk infections – 2.29</td>
<td>Cannibalism – 2.57</td>
<td>Yolk infections – 2.3</td>
<td>Colibacillosis – 2.6</td>
</tr>
<tr>
<td>3</td>
<td>Peripheral neuropathy – 2.07</td>
<td>M. gallisepticum – 2.50</td>
<td>Ascarids – 2.2</td>
<td>Mites – 2.3</td>
</tr>
<tr>
<td>4</td>
<td>Coccidiosis – 1.93</td>
<td>Calcium depletion – 2.32</td>
<td>Marek’s – 2.0</td>
<td>Ascarids – 2.3</td>
</tr>
<tr>
<td>5</td>
<td>Laryngotracheitis – 1.86</td>
<td>Coccidiosis and Focal duodenal necrosis – tie 2.25</td>
<td>Starveouts – 2.0</td>
<td>Coccidiosis and hysteria – tie 2.1</td>
</tr>
</tbody>
</table>

The survey also asked about other issues and diseases of concern on a scale of 1 to 4 with 1 = low concern and 4 = very high concern. In the opinions of the 15 respondents, a very high level of concern was expressed for 1) welfare issues (3.60), 2) the lack of effective treatments (3.29), and 3) Salmonella enteritidis (SE) (3.00). A high level of concern was expressed for avian influenza (2.93). A moderate level of concern was shown for the availability of helpful vaccines (2.40).

Colibacillosis is a problem mainly of young flocks with mortality...
rates of 0.5 to 4% per week starting shortly after housing. It is felt that this condition is most often secondary to upper respiratory challenges with *Mycoplasma gallisepticum* (MG), *Mycoplasma synoviae* (MS), ammonia, infectious bronchitis (IB), etc. It also may be a primary problem if water lines are contaminated with *E. coli*. The overall incidence of early onset colibacillosis is down from recent years. A post-molt colibacillosis syndrome is also seen in some flocks due to declining immune system function, an ascending infection of the reproductive tract, upper respiratory infections, etc. A new tool to use against *E. coli*, a live *E. coli* vaccine, was introduced in mid to late 2006 and has been increasingly used successfully as both a preventative and as a treatment in the face of an outbreak.

MG continues as an issue in multi-aged facilities and is successfully controlled in most cases through vaccination. Each complex must customize its vaccination program to control the strain on the farm. Ts-11 and 6/85 live vaccines are used for controlling mild strains of MG while F-strain live vaccine is being used to control more pathogenic strains. The live pox-vectored recombinant MG vaccine is being used in a variety of situations and appears to be useful in low challenge situations but still continues to be evaluated in high challenge facilities. Vaccine failures with all vaccines are somewhat common and the unit must resort to medication programs using tylosin or tetracycline antibiotics. Some operators are now applying the F-strain vaccine by eyedrop in an effort to increase its efficacy.

Calcium depletion is normally associated with low intake of calcium, phosphorus, and/or vitamin D3 especially early in production with low feed intakes. Peripheral neuropathy of pullets is an autoimmune diseases resembling Marek’s paralysis and seen in two of the major egg laying strains typically between five and eight weeks of age. Focal duodenal necrosis is felt to be due to *Clostridium colinum* and results in losses of egg weight gain and/or egg production depending on the severity of the infection. The use of the antibiotic bacitracin and/or probiotics, prebiotics, and botanical products are used successfully for prevention.

Cannibalism continues to be seen especially in high light intensity situation both caged and cage-free. In these cases, the 10-day rule for beak trimming result in longer beaks than desired compared to a beak trim at four to eight weeks and results in an increase in incidence and severity of cannibalism.

Coccidiosis and necrotic enteritis continues as a problem in caged pullets and layers due to contamination of houses with coccidial oocysts from past outbreaks and recycling of these oocysts by flies or beetles. Vaccination of pullets is being used successfully as control.

Diseases under control and of low incidence are as follows: infectious laryngotracheitis (ILT), Marek’s Disease of cage-free pullets, mites in cage-free layers, infectious bronchitis, fowl coryza, and urolithiasis/gout.
These diseases tend to be localized to a region or a farm. The pox-vectored recombinant ILT vaccine has been determined to not be a replacement for chick embryo origin (CEO) vaccines in high challenge areas. The HVT-vectored ILT vaccine continues to show good results in high challenge regions and should reduce the amount of CEO vaccine used in layer flocks that may spread to broilers. Cage-free pullets tend to have more Marek’s Disease than caged pullets due to the inability to satisfactorily clean and disinfect some of the cage-free facilities. Mites are of concern in cage-free layers as treatment is very difficult as spraying insecticides onto the vent area of the layer is much more difficult with layers on the floor. Fowl coryza is a regional disease (southern California, Florida, and south Texas) and is controlled well by the use of bacterin.

Diseases that are very rarely a problem for table egg layers are pox, Marek’s, Newcastle, infectious bursal disease, chick anemia virus, erysipelas, and fowl cholera.

An outbreak of very virulent Infectious Bursal Disease (vvIBD) was seen in a confined area of California in December 08 and May 09 associated with high mortality (15 to 35%) of 11 and 14 week-old pullets (December 08) and 28-day-old pullets (May 09). A company/consulting veterinarian directed quarantine was put in place as this is not a reportable disease so state and federal authorities did not get involved. The company restricted movement of layers to within the region, established strict biosecurity, is using cleaning and disinfection techniques designed to kill the virus, and is using sentinel birds to establish success of the program.

Poultry welfare concerns are increasing as activist groups continue their activities against the caged egg industry. After winning the ballot initiative in California, the Humane Society of the United States (HSUS) is now focusing on Ohio and Michigan, two other states with ballot initiatives. Ohio is placing its own ballot initiative on the ballot for this fall proposing to establish a Livestock Care Board that would be responsible for any and all issues dealing with animal welfare in the state. The response to this ballot initiative by HSUS has not been revealed as yet. Michigan bent to HSUS threats to place a ballot initiative similar to California Prop 2 on this fall’s ballot by agreeing to a plan to ban presently used cages by 2020, a longer time frame in which to comply than would have occurred if HSUS ballot initiative would have passed.

The lack of effective treatments for diseases such as colibacillosis, ascarids, Capillaria spp., fowl cholera, etc. is a very high concern and a welfare issue for the diseases that can cause much suffering due to illness. The list of antibiotics that can be used in egg layers is quite short – bacitracin, oxytetracycline, neomycin, and chlortetracycline. Erythromycin can be used but there is no supply. The lack of an anti-parasitic product for used in controlling ascarids, or other nematodes, is especially troublesome as these conditions are becoming increasingly common in cage-free production.

SE is apparently more of a concern now due to the unknown effect of
the Food and Drug Administration (FDA) Egg Safety Rule. The need for an FDA program for controlling SE in eggs was not felt to be needed by the industry as it was being addressed adequately by state and industry egg quality assurance programs until the announcement on July 7, 2009 that the FDA Final Egg Safety Rule is to become enforced beginning in July 2010. At this time, several questions still remain as to the workings of the program. The program entails obtaining chicks from NPIP SE Clean breeders, rodent and fly monitoring and control programs, biosecurity, cleaning and disinfection of premises, training of persons involved, testing of manure samples at 14-16 weeks, 40 to 45 weeks, and six weeks after molt. If any of the manure tests are positive for SE, egg testing must take place. All testing and compliance efforts are funded by the producer. Laboratories available for testing may be difficult to find. The procedures required by FDA for testing are more sensitive and tedious than used presently and will require expenditures by the laboratories for equipment not required presently. Producers who have a flock that tests egg positive and do not have a pasteurization or hard-cooking plant that will take their eggs are in a dilemma as to what to do with that flock.

Avian Influenza (AI) continues to be a very high concern across the country. Active and passive surveillance programs are increasing across the U.S. in response to the threat of high pathogenic H5N1 Highly Pathogenic AI (HPAI) from Asia. There is great concern in the layer industry in regard to the amount of time before egg movement can take place once a quarantine is placed on a premise in a control zone. Egg storage on large farms is often not capable of storing more than 72 hours worth of production. The United Egg Producers (UEP), Iowa State University, and the U.S. Egg Association have proposed a FAST (Federal and State Transport) Plan for Movement of Egg Products for the table and breaking egg industries to allow movement of product within 48 hours after quarantine. This is done by assuring that a farm 1) has good biosecurity practices by being pre-approved, and 2) is negative for AI by a) testing five dead birds per house by AI real time PCR, and b) reporting daily mortality and egg production to the authorities. Discussion and research as to the best ways of bird euthanasia and disposal from large cage layer houses and complexes continues. The threat of H5 or H7 low pathogenic AI (LPAI) for layer flocks on the East coast is much reduced due to the efforts by New York and New Jersey Departments of Agriculture and USDA to reduce the positivity of the live bird markets from 60% positive markets in 2004 to near 0 since. No significant AI isolations have been made in layer flocks in the U.S. in the last year. A majority of egg operations are complying with the National Poultry Improvement Plan (NPIP) low pathogenic AI (LPAI) program for commercial layers.

Vaccine use continues to be the mainstay of disease prevention second to biosecurity. The supply of useful vaccines continues to be quite adequate and appears to be keeping up with the layer industry needs. It
will be interesting to see if this good supply of vaccines continues with the consolidations now occurring in the poultry vaccine business.

The egg industry has experienced good egg prices and profits for the last year. Feed prices have stabilized and are lower than in 2008. Reduced numbers of layers due the UEP required reduction in layers per cage and fewer layer houses being built due to uncertainty about the future of caged layer production are felt to be the reasons.
In preparation for this report to the USAHA Committee on the Transmissible Diseases of Poultry and Other Avian Species, the subcommittee chairman, Dr. Clark, and turkey industry colleague, Dr. Pyle, a majority of the U.S. turkey industry professionals and veterinarians involved in turkey production, responded to a survey about the health status of turkeys produced in August 2008 through August 2009. The turkey industry reports several disease challenges for this 12 months varying by geographical regions within a state and across the United States. This report will list, Table 1, the challenges by disease and issues.

The “lack of approved efficacious drugs” continues to be the top disease issue ranked in Table 1. The withdrawal of the new animal drug application (NADA) for enrofloxacin in 2005 for use in poultry leaves the industry with no adequate therapeutic response to colibacillosis (ranked 3\text{rd} from 4\text{th}), or fowl cholera (ranked 9\text{th} from 8\text{th}). The controversy over the use of antibiotics in animal agriculture remains a major concern for the turkey industry and for all of animal agriculture.

Cellulitis remains a major disease issue across all geographic regions; as the survey average increased to a score of 3.8 (from 3.3 in 2008) and ranked 2\text{nd} (from 3\text{rd}), from 3.1 and 5\text{th} in 2007, respectively. Analysis indicates range of concern; 69\% of respondents score cellulitis a 4 or 5 (severe), 13\% score it a 2 or 1 (mild). Cellulitis is most commonly seen in, but not limited to, commercial male turkeys nearing market age. The prevalence and severity of cellulitis continues to increase. Veterinarians reply that the occurrence is confirmed at younger ages and in both toms and hens. Clostridium septicum, C. perfringens type A, or C. sordelli is isolated from fluid or affected tissue samples of affected or dead birds. Affected turkeys present with two or more of the following signs: subcutaneous emphysema (crepitus); serous or serosanguineous subcutaneous fluid; vesicles on the skin, especially on the breast/inguinal area; moist, dark, wrinkled skin, especially breast/inguinal area; cellular necrosis (microscopic); organ involvement (spleen/liver); vesicles on the skin, and/or moist, dark, wrinkled skin, on the tail area. The affected flock will have mortality greater than or equal to 0.5 dead per 1,000-birds, fitting the individual bird definition, for two consecutive 24-hour periods. Research on the pathogenesis and control is on-going. Opinions vary as
REPORT OF THE COMMITTEE

to risk factors and potential causes of the problem.

Poul enteritis of unknown etiologies has increased in importance, to position 4th from 5th, with a score of 3.3 (from 3.0). Some of the recent poul enteritis concerns have been characterized as Poul Immunosuppression Pancreatic Enteritis Syndrome (PIPES); controlled studies with astrovirus and rotavirus isolates have reproduced PIPES. The immunosuppression persists for the life of the bird. PIPES does not have excess mortality as associated with PEMS. Turkey Coronavirus (TCV), as a defined cause of enteritis, was ranked 32nd (Table 1) with three reported cases (Table 2).

Late mortality continues to rank as the 5th health issue. Late Mortality may be defined as mortality, in excess of 1.5% per week, in toms (males) 17-weeks and older; mortality is not diagnosed to a specific disease or cause. Excess cumulative mortality of 5-10% in toms prior to slaughter has been reported. Late mortality may be associated with physiologic or biomechanical deficiencies following early rapid growth in heavy toms achieving genetic potential; aggressive behavior noted in mature toms; cannibalism; leg problems and/or hypertension.

Leg problems (6th) are ranked among the top concerns of the turkey industry. Leg problems are a common complaint, such as, spiral fractures of the tibia or femur. Leg Problems may be defined as lameness, particularly in toms, several weeks prior to slaughter. Leg problems are attributed to various conditions (refer to Table 1), including, pododermatitis, fractured femurs, fractured tibia, osteomyelitis (OM), tibial dyschondroplasia (TDC), spondylolisthesis, “Shaky Leg”, etc.

Blackhead, also known as Histomoniasis, increased to position 11 in 2009 (16th in 2008; 22nd in 2007). It is one disease with no efficacious drug approved for use in turkeys. There were 67 reported cases of blackhead (Table 2). Losses to blackhead have been severe and sporadic cases are occurring in North America. The disease can be devastating in the individual flocks affected. Dimetridazole was extremely efficacious and previously approved for use in turkeys for the prevention and treatment of blackhead; it was banned in 1987. The lack of any legal treatment for histomoniasis is of concern, especially in the case of valuable turkey breeder candidate flocks. Losses to blackhead have been severe in several areas of Europe, and sporadic cases are occurring in North America. It seems unconscionable that we are unable to prevent the suffering and death in flocks affected by histomoniasis when effective treatments exist, but were taken away from the poultry industry due to misuse in another industry.

Heat stress ranked 16th following another mild summer. Poult Enteritis Mortality Syndrome (PEMS ranked 25th versus 33rd previously), Ornithobacterium rhinotracheale (ORT, ranked 10th versus 13th previously) and protozoal enteritis (15th versus 24th) all increased in ranking on this year’s survey. Avian Metapneumovirus (AmPV ranked 34th compared to 32nd) dropped in importance in the latest survey.
**TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES**

*Mycoplasma synoviae* (MS, infectious synovitis) infections, ranked 27th, are one cause of synovitis. It may be present in flocks 10-12 weeks of age with typically low mortality and low morbidity. There were 8 cases of MS reported (Table 2). The primary breeders have remained free of MG, MM and MS. Sporadic, but increasingly frequent infections with *Mycoplasma*, both *M. gallisepticum* (MG) and MS, often in association with backyard poultry and broiler breeder flocks is an ongoing concern, having the greatest impact when a breeder flock is infected and has to be destroyed.

Over the past 10 years the U.S. animal agriculture industry has been continually challenged with numerous attempts to ban the use of antibiotics in livestock and poultry. The current attempt at the federal level is with the [111th Congress] Preservation of Antibiotics for Medical Treatment Act of 2009, introduced into both the House and Senate [H.R.1549.IH; S.619.IS], otherwise known as PAMTA 2009. The turkey industry opposes PAMTA 2009, a bill that would devastate the ability to protect animal health by unnecessarily and inappropriately removing several classes of important antibiotics from the market. Prevention, control and growth promotion uses of antibiotics minimize the therapeutic use of antibiotics in livestock and poultry. The turkey industry welcomes honest discussion of science-based, pragmatic options allowing producers to farm in the best interests of their animals and customers while providing consumers’ assurance our use of these vital, safe and effective production tools is professional, judicious and does not jeopardize these products’ effectiveness in human medicine.

In October 2008, the Association of Veterinarians in Turkey Production sent a letter to FDA in protest of Docket No. FDA-2008N-0326 comprehensive cephalosporin extra-label drug use (ELDU) proposed ban. The ban was later dropped by the Food and Drug Administration (FDA). The FDA intent was to prohibit the extra-label use of cephalosporin antimicrobial drugs in food-producing animals, based on data that extra-label use of these drugs in food-producing animals will likely cause an adverse event in humans and, as such, presents a risk to the public health. The data was called into question and an extensive risk assessment was requested by the industry.

Turkey Production in 2008 increased to 7922.09 from 7561.58 million pounds (live weight). Overall domestic per capita consumption for turkey products decreased from 17.60 (2008) to 16.90 (2009, preliminary) pounds. Exports decreased from 676 (2008) to 547 (2009, preliminary) million pounds. Production in 2008 increased to 273.1 million head slaughtered with an average live weight (lbs) of 28.97, compared to prior year of 266.7 and 28.34, respectively (reference: Turkey Sourcebook, NTF).
Table 1. Turkey health survey (September) of U.S. veterinarians in turkey production ranking current disease issues
(1= no issue to 5 = severe problem). Survey response (reply) is 100% (n=23).

<table>
<thead>
<tr>
<th>Issue</th>
<th>Score Average (1-5)</th>
<th>Score Mode (1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of approved, efficacious drugs</td>
<td>4.7</td>
<td>5.0</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>3.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Colibacillosis</td>
<td>3.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Poult Enteritis of unknown etiologies</td>
<td>3.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Late Mortality</td>
<td>3.1</td>
<td>4.0</td>
</tr>
<tr>
<td>Leg Problems</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Bordetella avium</td>
<td>2.7</td>
<td>3.0</td>
</tr>
<tr>
<td>Breast Blisters and Breast Buttons</td>
<td>2.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Cholera</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Ornithobacterium rhinotracheale (ORT)</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Blackhead (Histomoniasis)</td>
<td>2.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Salmonella</td>
<td>2.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Cannibalism</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>H3N2 Swine influenza</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Protozoal Enteritis</td>
<td>2.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Heat stress</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Osteomyelitis (OM)</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Tibial Dyschondroplasia (TDC, Osteochondrosis)</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Avian Influenza</td>
<td>2.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Bleeders</td>
<td>2.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Coccidiosis</td>
<td>2.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Fractures</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Round Worms (Ascaridia dissimilis)</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Shaky Leg Syndrome</td>
<td>1.9</td>
<td>2.0</td>
</tr>
<tr>
<td>Mycoplasma iowae (MI)</td>
<td>1.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Newcastle Disease Virus (NDV)</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Mycoplasma synoviae (MS)</td>
<td>1.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Erysipelas</td>
<td>1.6</td>
<td>2.0</td>
</tr>
<tr>
<td>PEMS (Poult Enteritis Mortality Syndrome)</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Necrotic enteritis</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Mycoplasma gallisepticum (MG)</td>
<td>1.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Turkey Coronavirus</td>
<td>1.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Spondylolisthesis (Kinky-Back)</td>
<td>1.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Avian Metapneumovirus</td>
<td>1.1</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Table 2. Turkey health survey (September) of U.S. veterinarians in turkey production.
Survey response (reply) is 100% (n=23).

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2008</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases (##) of Blackhead</td>
<td>67</td>
<td>63</td>
<td>68</td>
</tr>
<tr>
<td>(Histomoniasis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cases (##) of Mycoplasma synoviae (MS)</td>
<td>38</td>
<td>47</td>
<td>52</td>
</tr>
<tr>
<td>Cases (##) of Turkey Coronavirus (TCV)</td>
<td>3</td>
<td>10</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Since inception of the program in 1969, almost $23 million have been distributed to researchers across the United States. Between 1994 and 2008, grants exceeded $850,000 per year, and topped $1 million in 11 of those 15 years. The recent economic downturn has impacted investment income, and grants were reduced in 2009-2010 to preserve capital. Grant proposals are reviewed twice yearly (except for annually in 2009-2010) and recommended by a Research Advisory Committee (RAC) consisting of twelve industry-employed individuals who are turkey, broiler or layer veterinarians, nutritionists, food safety experts, environmental engineers, and poultry production and processing specialists.

No consideration is given to the geographic location or institutional affiliation of the grant applicants. Over 50 universities, government agencies, and private firms have been funded over the years. The research proposals stand on their own merit and receive a thorough discussion and confidential scoring by the members of the RAC after an assigned expert in the subject area presents the proposal to the Committee as its “in-depth reviewer”. The members of the RAC are appointed by the Association and serve as uncompensated volunteers for the Association.

The greatest amount of funds has been directed toward the subject area of Diseases, which has received over $8.5 million. Poultry Production is second at almost $4 million, and Food Safety has received over $3.5 million. Waste Management has received over $2.9 million. Other areas funded include processing and further processing, poultry nutrition, egg product-related research, and worker health. There is overlap in the subject categories assigned to the projects so these numbers should not be interpreted as absolute. For example, a project could impact both production and diseases or diseases and food safety.

Grant funds are intended to assist researchers in addressing the immediate problems of the poultry industry, preferably providing information that can be put to use in the short term rather than providing basic knowledge. Basic research is funded occasionally but with the intention that it lead to the resolution or prevention of a real problem. Support for graduate students is often included in the grants, so the program also assists in training the next generation of poultry researchers. Approximately 30% of proposals have been funded.

More information on the deadlines for the submission of research proposals and the accessing of summaries of completed projects may be obtained at www.poultryegg.org by clicking on “Research”. The summaries
TRANSMISSIBLE DISEASES OF POULTRY
AND OTHER AVIAN SPECIES

This research funding program by the U.S. Poultry and Egg Association is a good example of how an industry can help itself by obtaining important information it needs while funding the education of graduate students and post-docs in poultry related subject areas. It is definitely a mutually beneficial relationship. Funding for the program comes from the net revenues from the International Poultry Exposition, held each January in Atlanta, which is the world’s largest trade show for the poultry, egg and feed industries.
REPORT OF THE COMMITTEE

National Poultry Improvement Plan Annual Report

Andy Rhorer
USDA-APHIS-VS


Pullorum-Typhoid Status: In calendar year 2009 (January 1 through October 1, 2009), there were no isolations /outbreaks of *Salmonella pullorum* reported to the Poultry Improvement Staff. There was one isolation/outbreak of *Salmonella pullorum* (standard strain) reported during calendar year 2008. There have been no isolations of *Salmonella gallinarum* since 1988 in any type poultry. U.S. Pullorum-Typhoid Clean participating hatcheries include: 28 egg and meat-type chicken hatcheries, 48 turkey hatcheries, and 775 waterfowl, exhibition poultry and game bird hatcheries.

Table 1: NPIP U.S. Pullorum-Typhoid Clean Participating Breeding Flocks and Number of Birds in Flocks:

<table>
<thead>
<tr>
<th>Breeding Type</th>
<th>Number of Flocks</th>
<th>Number of Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg-Type Chickens</td>
<td>187</td>
<td>3,205,906</td>
</tr>
<tr>
<td>Meat-Type Chickens</td>
<td>5,140</td>
<td>75,820,652</td>
</tr>
<tr>
<td>Turkeys</td>
<td>518</td>
<td>4,603,212</td>
</tr>
<tr>
<td>Waterfowl, Exhibition, Game Birds</td>
<td>3,648</td>
<td>1,475,373</td>
</tr>
<tr>
<td>Total</td>
<td>9,493</td>
<td>85,105,143</td>
</tr>
</tbody>
</table>

Avian Influenza Status: In calendar year 2009 (January 1 through October 10, 2009), there was 1 Kentucky premises with H7N9 Notifiable Low Pathogenicity AI (LPNAI) in broiler breeders, 1 Illinois premises with H7N9 LPNAI in meat turkeys, and 3 Minnesota premises with H7N9 LPNAI in meat turkeys.
Table 2: NPIP U.S. Avian Influenza Clean and U.S. H5/H7 Clean Participating Breeding Flocks; and U.S. H5/H7 Avian Influenza Monitored Participating Commercial Flocks:

<table>
<thead>
<tr>
<th>Subpart Type</th>
<th>No. Flocks</th>
<th>No. Birds in Flocks</th>
<th>No. Tests Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg-Type Chicken Breeders</td>
<td>182</td>
<td>3,358,794</td>
<td>20,724</td>
</tr>
<tr>
<td>Table-Egg Layers</td>
<td>3,425</td>
<td>257,835,389</td>
<td>179,915</td>
</tr>
<tr>
<td>Meat-Type Chicken Breeders</td>
<td>5,145</td>
<td>87,287,608</td>
<td>653,540</td>
</tr>
<tr>
<td>Meat-Type Chicken Breeders</td>
<td>141,112</td>
<td>8,705,025,422</td>
<td>1,481,470</td>
</tr>
<tr>
<td>Turkey Breeders</td>
<td>631</td>
<td>5,797,789</td>
<td>57,226</td>
</tr>
<tr>
<td>Meat-Type Turkeys</td>
<td>14,873</td>
<td>200,688,775</td>
<td>226,477</td>
</tr>
<tr>
<td>Waterfowl, Upland Gamebirds, Ex. Poultry</td>
<td>1,313</td>
<td>13,532,425</td>
<td>103,751</td>
</tr>
<tr>
<td>Total</td>
<td>166,681</td>
<td>9,273,526,202</td>
<td>2,723,103</td>
</tr>
</tbody>
</table>

Authorized Laboratories Activities: The University of Georgia Poultry Diagnostic and Research Center provides quality assurance panel of convalescent contact infected chicken sera against MG and MS to Authorized Laboratories as a check test tool. The National Veterinary Services Laboratories issues a group D Salmonella check test and an avian influenza check test for the Agar Gel Immunodiffusion Test annually for Authorized Laboratories of the NPIP. Laboratory training provided to the Authorized Laboratories includes Annual Hands-on Salmonella Isolation and Identification Workshop, *Mycoplasma* Diagnostic Workshop and the Avian Influenza Diagnostic Workshop.
REPORT OF THE COMMITTEE

National Veterinary Services Laboratories Avian Influenza and Newcastle Disease Diagnostics Report

Mary Lea Killian
National Veterinary Services Laboratories
USDA-APHIS-VS

Live Bird Marketing System (LBMS). As part of the ongoing LBMS surveillance for presence of avian influenza virus (AIV) and avian paramyxovirus type-1 (APMV-1), the National Veterinary Services Laboratories (NVSL) tested 4,377 specimens in 672 submissions from 11 states (Connecticut, Florida, Massachusetts, Maine, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island) by virus isolation in embryonating chicken eggs. The surveillance is a collaborative effort between individual States and the United States Department of Agriculture. However, only specimens submitted to the NVSL, which include all presumptive positive specimens detected at the State level, are reported here.

In FY 2009, AIV or APMV was isolated from 7% (46 of 672) of submissions and 2% (85 of 477) of specimens tested. AIV subtype H5N2 was the most common subtype found in the LBMS this year; it was isolated from 14 specimens in 4 submissions from NY. The H5 AIVs were low pathogenicity avian influenza (LPAI) virus by the chicken pathogenicity test and/or deduced amino acid profile at the hemagglutinin (H) cleavage site. Genetic studies showed the H5 viruses to be most closely related to recent North American H5 viruses circulating in wild ducks. Other subtypes of AIV isolated from the states where the specimens originated, and the number of isolations were: H2N2 (NY, n=6; PA, n=1), H2N3 (PA, n=1), H6N2 (FL, n=1), H10N7 (OR, n=1). The remaining 60 viruses isolated were identified as APMV; 54 were APMV-1 from 4 states (MA, NJ, NY, PA) and 4 were identified as pigeon paramyxovirus type-1 (PPMV-1) from NJ. Pathogenicity of representative APMV-1 isolates was determined by the intracerebral pathogenicity index (ICPI, n=9) test and/or by analysis of the deduced amino acid profile at the fusion protein cleavage site (n=32). All but 4 isolates were characterized as low virulent (lentogenic pathotype) strains; the 4 isolates were characterized as pigeon paramyxovirus type-1 (PPMV-1), a pigeon-adapted variant of Newcastle disease virus. In addition, an APMV-4 was identified in one specimen from New Jersey, and an APMV-6 in one specimen from New Jersey.

Low Pathogenicity Avian Influenza (LPAI) in Commercial Poultry and Backyard Birds. Surveillance for AIV in commercial poultry is conducted under provisions of the National H5 and H7 Low Pathogenicity Avian Influenza Control Program implemented in September, 2006. Although most of the testing is performed locally, the NVSL provides reagents for the agar gel immunodiffusion (AGID) test and
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

confirmation testing of positive specimens. During FY 09, two detections of notifiable LPAI (LPNAI) in commercial poultry were reported to the World Organization for Animal Health (OIE). The first detection occurred in April, 2009 in a single flock (two houses) of approximately 20,000 broiler breeders in Kentucky that were positive for antibodies to H7N9 during routine National Poultry Improvement Program (NPIP) monitoring. Subsequently, swabs collected from the flock were positive for H7 specific RNA but no virus was isolated. The flock was depopulated. The second detection was an outbreak of H7N9 AIV in commercial meat turkeys in Minnesota. Between May and September, 2009 more than 55 houses (approx. 500,000 birds) in seven premises (4 counties) in Minnesota were found to be infected. Antibodies to H7N9 were detected in birds from all seven premises and in August an H7N9 virus was isolated from the 7th premises. The virus was shown to be LPNAI and most closely related to North American H7 viruses circulating in wild waterfowl. Premises with young turkey poults were depopulated; all other premises were depopulated by controlled marketing within the state of Minnesota. Surveillance in affected areas is continuing.

In addition to the two reports to OIE, three epidemiologically independent events occurred in commercial poultry where antibodies to AIV were detected but no virus or specific RNA was detected. Detections of specific H5 or H7 antibodies in commercial flocks without isolation of virus or detection of specific RNA are not notifiable. The first flock was detected in April when antibodies to H7N9 were detected in a flock of 0,000 meat turkeys in Illinois as a result of premarket testing. At the time of testing, no clinical disease was reported. The second and third flocks occurred in Tennessee and both involved H7N9; a grandparent flock (2 houses, 14,700 birds) of broiler breeders (April) and a flock of 14,900 17-week-old broiler breeders (May). All three farms in Illinois and Tennessee were depopulated.

Detection of additional LPAI AIV or AIV-specific antibodies in poultry/birds is shown in Table 1.

AI Diagnostic Reagents Supplied by the NVSL. During FY 2009, a total of 15,112 units of AGID reagents (antigen and enhancement serum) were shipped to state, university, and private laboratories in 35 states and Puerto Rico. The quantity is sufficient for approximately 1,813,440 AGID tests. An additional 383 units (45,960 tests) were shipped to 10 foreign laboratories.

Reverse real-time (rRT)-PCR Proficiency Test Panels. The National Animal Health Laboratory Network (NAHLN) laboratories conducting surveillance testing for AI and/or ND are required to have one or more diagnosticians pass an annual proficiency test (PT) to perform official rRT-PCR tests. In FY 2009, PTs were distributed to 280 diagnosticians in 55 laboratories for AI rRT-PCR and 277 diagnosticians in 54 laboratories for APMV-1 (Newcastle disease) rRT-PCR.
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AIV Surveillance in Wild Waterfowl. In 2009, waterfowl surveillance for highly pathogenic notifiable H5N1 in Alaska and the lower 48 states continued. The surveillance is a cooperative effort of USDA's Animal and Plant Health Inspection Service (APHIS, NVSL), Wildlife Services (WS, National Wildlife Research Center, Fort Collins, Colorado) and the Department of Interior's United States Geological Survey (USGS, National Wildlife Health Center, Madison, Wisconsin). Specimens collected from wild-caught and hunter-killed waterfowl, the environment and feces were screened by rRT-PCR for AIV specific ribonucleic acid (RNA) at WS, NAHLN laboratories and at the U.S. Geological Survey (USGS) laboratory in Madison, WI. All presumptive H5 and H7 positive specimens were submitted to the NVSL for confirmation and virus isolation. Between October 2008 and September 2009, 903 presumptive positive specimens were received for confirmation testing. No HPNAI H5N1 was detected; however, LPAI H5N1 virus was detected in specimens submitted from three states (Kentucky, Minnesota, and Wyoming). A total of 93 H5 viruses (various N subtypes) from 26 states and 71 H7 viruses (various N subtypes) from 27 states were isolated. All H5 and H7 AIVs were characterized as LPAI viruses of North American lineage. Other AIV subtypes isolated included H1, H2, H3, H4, H6, H10, and H11. Details of the wild bird surveillance will be reported separately.

NEWCASTLE DISEASE

Isolations of Virulent Newcastle Disease Virus (vNDV). In FY 2009, no vNDV was isolated from domestic poultry or birds confiscated by U.S. Customs. However, vNDV was isolated from one lot of Passerine birds imported through a quarantine facility in California, and pigeon paramyxovirus type-1 (PPMV-1) was isolated from 18 pigeons in 7 states (California, Connecticut, Florida, Illinois, Minnesota, New Jersey and Texas). In addition, vNDV was isolated from a wild cormorant specimen from Pennsylvania (October 2008).

Isolations of Low Virulent Newcastle Disease Virus (IoNDV). During FY 2009, 65 isolates of APMV-1 were received for characterization at the NVSL or were isolated at the NVSL from diagnostic submissions. The specimens originated from 14 states (California, Connecticut, Florida, Iowa, Massachusetts, Minnesota, New Jersey, New York, Oregon, Pennsylvania, Texas, Washington, Wisconsin, and Wyoming). All of the isolates were characterized as IoNDV by the intracerebral pathogenicity index (ICPI) and/or by deduced amino acid motif at the fusion protein cleavage site.
<table>
<thead>
<tr>
<th>State</th>
<th>Species</th>
<th>Subtype of AIV* (number)</th>
<th>Antibody Subtypes (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>Turkey</td>
<td>H2N8(2)</td>
<td></td>
</tr>
<tr>
<td>Delaware</td>
<td>Guinea fowl</td>
<td></td>
<td>H6N2</td>
</tr>
<tr>
<td>Florida</td>
<td>Chicken Swan</td>
<td></td>
<td>H6N2 (2) Multiple</td>
</tr>
<tr>
<td>Georgia</td>
<td>Duck</td>
<td></td>
<td>Multiple</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>Turkey Duck</td>
<td></td>
<td>H1a, H3N3, H5N3a Multi</td>
</tr>
<tr>
<td></td>
<td>Duck</td>
<td></td>
<td>H6N1,4</td>
</tr>
<tr>
<td>Maryland</td>
<td>Chicken</td>
<td>H4N2</td>
<td></td>
</tr>
<tr>
<td>Minnesota</td>
<td>Turkey</td>
<td>H4N2</td>
<td>Multiple</td>
</tr>
<tr>
<td>New York</td>
<td>Duck</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td>Duck</td>
<td>H4N2, H6N2</td>
<td></td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>Chicken Environment</td>
<td></td>
<td>H4N6, H4N8</td>
</tr>
<tr>
<td>Tennessee</td>
<td>Chicken</td>
<td></td>
<td>H9N2(2)</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>Swan</td>
<td></td>
<td>Multiple</td>
</tr>
</tbody>
</table>

*Low pathogenicity AIV by the chicken pathogenicity test.
*Zoological garden
REPORT OF THE COMMITTEE

National Veterinary Services Laboratories Update: *Salmonella*, *Pasteurella* and *Mycoplasma* from Poultry

Matt Erdman
National Veterinary Services Laboratories
USDA-APHIS-VS

*Salmonella*

From January 1 through December 31, 2008, NVSL serotyped 20,735 *Salmonella* isolates recovered from animals, their environment, or feed. The most common serotypes found in chickens and turkeys this year are listed in Tables 1 and 2 respectively. Phage typing results for *Salmonella enteriditis* are shown in Table 3.

**TABLE 1: MOST COMMON SEROTYPES - CHICKENS Jan-Dec 2008**

<table>
<thead>
<tr>
<th>Serovar</th>
<th>Clinical No. Isolates</th>
<th>Non-Clinical No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteriditis</td>
<td>35</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Kentucky</td>
<td>28</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>12</td>
<td>Enteriditis</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>9</td>
<td>Typhimurium</td>
</tr>
<tr>
<td>4,5,12:i:-</td>
<td>5</td>
<td>Typhimurium 5-</td>
</tr>
<tr>
<td>All others</td>
<td>21</td>
<td>Montevideo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Senftenberg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Schwarzengrund</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4,5,12:i:-</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Salmonella</em> untypable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>110</strong></td>
<td><strong>6038</strong></td>
</tr>
</tbody>
</table>

**TABLE 2: MOST COMMON SEROTYPES – TURKEYS Jan-Dec 2008**

<table>
<thead>
<tr>
<th>Serovar</th>
<th>Clinical No. Isolates</th>
<th>Non-Clinical No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>109</td>
<td>Senftenberg</td>
</tr>
<tr>
<td>Hadar</td>
<td>34</td>
<td>Hadar</td>
</tr>
<tr>
<td>Agona</td>
<td>24</td>
<td>London</td>
</tr>
<tr>
<td>Montevideo</td>
<td>22</td>
<td>Saintpaul</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>16</td>
<td>Muenster</td>
</tr>
<tr>
<td>All others</td>
<td>154</td>
<td>Agona</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heidelberg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kentucky</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Newport</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anatum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>359</strong></td>
<td><strong>1357</strong></td>
</tr>
</tbody>
</table>
### TABLE 3: *Salmonella enteriditis* Phage Typing Results Jan-Dec 2008

<table>
<thead>
<tr>
<th>Rank</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13 (76)</td>
<td>13 (98)</td>
<td>8 (156)</td>
<td>8 (103)</td>
<td>8 (240)</td>
</tr>
<tr>
<td>2</td>
<td>8 (25)</td>
<td>8 (80)</td>
<td>13 (96)</td>
<td>13 (29)</td>
<td>13 (82)</td>
</tr>
<tr>
<td>3</td>
<td>23 (12)</td>
<td>22 (14)</td>
<td>23 (16)</td>
<td>23 (16)</td>
<td>23 (58)</td>
</tr>
<tr>
<td>4</td>
<td>13a (8)</td>
<td>13a (13)</td>
<td>4 (12)</td>
<td>13a (15)</td>
<td>13a (43)</td>
</tr>
<tr>
<td>5</td>
<td>2 (2)</td>
<td>23 (9)</td>
<td>13a (8)</td>
<td>1b (1)</td>
<td>RDNC (10)</td>
</tr>
<tr>
<td>6</td>
<td>8a (1)</td>
<td>4b (4)</td>
<td>2 (2)</td>
<td>2 (1)</td>
<td>2 (4)</td>
</tr>
<tr>
<td>7</td>
<td>28 (1)</td>
<td>2 (3)</td>
<td>4a (2)</td>
<td>6a (1)</td>
<td>22 (3)</td>
</tr>
<tr>
<td>8</td>
<td>6a (1)</td>
<td>RDNC (2)</td>
<td>22 (1)</td>
<td>6a (2)</td>
<td>8a (1)</td>
</tr>
<tr>
<td>9</td>
<td>9b (1)</td>
<td>30 (1)</td>
<td>Others (2)</td>
<td></td>
<td>12 (1)</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>223</td>
<td>297</td>
<td>167</td>
<td>444</td>
</tr>
</tbody>
</table>

**Pasteurella and Mycoplasma**

NVSL received 163 isolates for somatic typing in 2009, a slight decrease from 2008 (Table 4). NVSL also supplied 40 ml of *P. multocida* typing sera, a decrease from 159 ml in 2008.

### TABLE 4: *Pasteurella multocida* somatic typing. Table shows number of isolates for each type.

<table>
<thead>
<tr>
<th>Type</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 3</td>
<td>46</td>
<td>54</td>
</tr>
<tr>
<td>Type 3, 4</td>
<td>39</td>
<td>33</td>
</tr>
<tr>
<td>Type 1</td>
<td>33</td>
<td>14</td>
</tr>
<tr>
<td>All other</td>
<td>80</td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td>198</td>
<td>163</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

USDA-ARS Avian Diseases and Oncology Laboratory -- Contributions to the U.S. Poultry Industry and Future

A. Gregorio Rosales
Aviagen Incorporated

Janet E. Fulton
Hy-Line International

According to the USDA's Economic Research Service (AIS-86, December 2008) poultry meat and eggs added $36.7 billion to the U.S. economy. The poultry industry is the second largest food animal industry in the U.S. Poultry meat and eggs are one of the most popular and economic sources of protein for American consumers and trade partners around the world. In the U.S. alone, the consumption of chicken meat exceeds 80 lbs per capita (higher than any other meat product). In addition, approximately 70% of the worldwide commercial egg layers, broilers and turkey industries depend on poultry breeding stock supplied by primary breeding companies based in the U.S.

Currently, the U.S. and global poultry industries face numerous and growing challenges that could detrimentally affect production and supply of these vital products. Continued concerns about the effects of viral infections capable of causing tumoral diseases in poultry flocks are a major issue for the future of the poultry industry. The development of new and improved vaccines against evolving Marek’s disease field virus (MDV) strains; new diagnostic and virus assay methods for the detection and elimination of all groups of Avian Leukosis (ALV) and Reticuloendotheliosis viruses (REV) from both primary breeding populations and live vaccines; and improved genomic/immunogenetic tools are some of the most important areas of concern to ensure the health, welfare and continued productivity of the U.S. poultry industry.

The USDA-ARS conducts highly relevant basic research on tumor virus diseases that is critical to the future well-being of the U.S. poultry industry. For over 50 years the USDA-ARS, Avian Diseases and Oncology Laboratory (ADOL) in East Lansing, Michigan has been the world’s leading institution on avian tumor virus research with an impressive record of accomplishments. Since 2005 ADOL has served as the World Animal Health Organization (OIE) Reference Laboratory for Marek’s disease, the national and international Center of Excellence for Avian Tumor Virus Research, and is the national reference Diagnostic Laboratory for tumorous diseases of poultry. ADOL’s staff is comprised of renowned scientists who have been leaders in various areas related research and diagnosis of avian tumor viruses, poultry genomics and immunogenetics and genetic resistance to disease. Further, these
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Scientists develop and maintain unique and highly specialized poultry lines essential in distinguishing endogenous and exogenous ALVs, genetic disease resistance research, and the production and quality assurance of poultry vaccines.

Over many years the ADOL research programs and services have substantially benefited the commercial egg laying, broiler, turkey, and allied industries such as primary breeders, vaccine manufacturers and commercial diagnostics. In addition, ADOL has been a preferred center for the education and training of many USDA/APHIS scientists and other researchers working in universities and private research institutions in the U.S. and around the world. Some of the most notable achievements and contributions of ADOL are summarized below:

1. Developed HVT and other vaccines against Marek’s disease. This has resulted in over $100 million estimated savings/year as a result of reduced bird condemnations or increased egg production.
2. Developed diagnostic reagents essential for ALV eradication programs.
3. Invented the *in ovo* vaccination methodology which provided significant savings in labor and led to the formation of a new industry (e.g. Embrex that was recently acquired by Pfizer, Inc.).
4. Developed the first cell-culture vaccine for hemorrhagic enteritis of turkeys. The invention was patented and several U.S. poultry vaccine manufactures have been producing the vaccine under a USDA Royalty generating non-exclusive license.
5. Generated the first transgenic chicken and documented use of pathogen-derived resistance against disease.
6. Developed the first molecular genetic map of the chicken genome. This has been used as the framework for the chicken genome sequence.
7. Provided tools and knowledge for the diagnosis and control of the massive 1990s outbreaks of ALV subgroup J in broiler breeders and their progeny. Such outbreaks threatened the viability of the entire broiler breeder industry.
8. Developed unique reagents such as viruses, antibodies, PCR primer sets, deoxyribonucleic acid (DNA) probes, monoclonal antibodies, etc. These reagents are extensively used in the diagnosis and characterization of avian tumor viruses. ADOL executed numerous material transfer agreements (MTAs) and Biological License Agreements to supply various laboratories in the USA as well as in other countries with these specific reagents.
9. Developed more effective protocols for screening live-virus vaccines for contamination with ALV. USDA-APHIS-CVB revised Supplemental Assays Methods (SAM-405) to include these tests.
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developed by ADOL (SAM-415).

10. Provided the vaccine manufacturing industry, APHIS and OIE with protocols for detection of reticuloendotheliosis virus (REV) in live virus vaccines.

11. Developed first high density genetic marker panel. The panel is used to characterize, fingerprint, and trace back commercial chickens.

12. Developed a DNA-based technology to assess the genetic susceptibility of chicken lines to ALV. This technology is being adopted by poultry breeders.

13. Developed and maintains 41 genetically unique chicken lines; these lines have been included in the National Registry of Genetically Unique Animal Populations. These lines are essential for immunogenetics research and are being used by various research institutions.

14. Recently scientists at ADOL developed a new generation (recombinant) vaccine strain against Marek’s disease using two molecular technologies named Overlapping Cosmid Clone and Bacterial Artificial Chromosome (BAC). The new experimental vaccine referred to as “Meq-deleted Marek’s disease virus” has been shown in both laboratory and field trials to be superior to currently available commercial vaccines. Four vaccine manufacturers have executed Material Transfer Agreements with USDA-ARS.

Future Needs:

For the reasons presented above, the poultry and allied industry stakeholders across the United States are very concerned about maintaining and enhancing research to protect the industry. The threat posed by continuously evolving and/or emerging new strains of tumor viruses requires the development of new methodologies to select for genetic disease resistance.

ARS-ADOL poultry research capabilities must be preserved and enhanced to maintain their ability to continue research in these important areas. Over the past few years budget constraints have had a negative impact on the scientists’ ability to conduct research as cost of supplies and equipment have increased. In particular, stakeholders request the addition of $1 million in annual appropriations to ARS to 1) add a DVM/Ph.D. pathologist to address research in Marek’s disease and 2) add additional funding to maintain the highly specialized chicken genetic lines and support the integrated research needed to identify and investigate the genes directly involved in resistance to Marek’s disease, all subgroups of Avian Leukosis Viruses, and general disease resistance.
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Impact:

USDA/ARS programs are critically important for the future of animal agriculture and ADOL's research programs and services are vital for the future well-being of the U.S. and global poultry industry. The need for continuous research related to poultry tumor virus and genetic resistance to disease is and will continue to be at the forefront for enabling the U.S. poultry industry to be efficient, meet welfare standards, and provide a safe, economic and wholesome protein source for consumers in this country and abroad.
Novel H1N1 Influenza

Beginning in April 2009, cases of acute respiratory disease were reported in humans caused by a novel H1N1 influenza A virus in Mexico. The causative agent was complex reassortant influenza A virus with gene segments from North American classic H1N1 swine viruses, North American avian viruses, human influenza A virus and Eurasian H1N1 swine viruses. To study infectivity and transmissibility of the 2009 novel H1N1 strain in poultry, turkeys, chickens, domestic ducks and Japanese quail were intranasally challenged with the virus and naïve birds put in contact. No clinical disease was produced. Detection of virus replication was infrequent, and only in the oropharyngeal swabs of intranasally inoculated Japanese quail. There was no contact transmission of the viruses for any of the species. These data suggest turkeys, chickens, and domestic duck have low risk for field infection, but Japanese quail might become infected, but because replication and shedding was limited to the respiratory tract and the virus did not transmit to quail by contact, suggested low potential for initiation and sustaining an outbreak unless the virus mutates or reasserts with an avian influenza virus.

Avian Influenza Virus

Sporadic cases of H5N1 have occurred in pigs and various carnivorous mammals. To understand the route of transmission that oral ingestion might play and the pathogenesis, several H5N1 HPAI viruses were studied in pig and ferret models. Intranasal inoculation produced infection, initiated in the respiratory tract in both pigs and ferrets. Feeding of infected chicken meat to pigs produced asymptomatic infection with virus present in tonsil and respiratory tract but not in the digestive tract. By comparison, 2 H5N1 viruses in infected chicken meat fed to ferrets produced only respiratory infection while the A/Vietnam/20/04 virus produced a combined respiratory and digestive tract infection, initiated simultaneously in both sites.

The chicken's major histocompatibility complex (MHC) and non-MHC genes have a profound influence on the resistance or susceptibility to certain pathogens. Recently, 100% survival in the field by Thai indigenous chickens to H5N1 high pathogenicity avian influenza (HPAI) outbreaks was attributed to B21 MHC haplotype while the B13 MHC haplotype was associated with 100% mortality in the field, although virus infection was not determined in this study. To determine the influence of the
MHC haplotype on HPAI resistance, a series of MHC congenic white leghorn chicken lines (B2, B12, B13, B19 and B21) and lines with different background genes but with the same B2 MHC haplotype (Line 63 and 71) were intranasally challenged with low dose (10 mean chicken lethal dose 50) of H5N1 HPAI virus rgA/chicken/Indonesia/7/2003. None of the lines were completely resistant to lethal effects of the challenge as evident by mortality rates ranging from 40 to 100%. This did not support the Thai field results. In addition the MX gene's affect on avian influenza virus resistance was examined. The polymorphism at position 631 of the MX gene has previously been reported to be important in antiviral resistance. Studies in chickens with and without the polymorphism were studied, and some differences in mean death time were observed but no difference in overall mortality was seen. The role of the MX gene in disease resistance to influenza remains unresolved.

A new technique to evaluate antigenic characteristics of available vaccines to circulating field strains, referred to as antigenic cartography, is being developed for poultry use. Antigenic cartography converts hemagglutination inhibition (HI) data from a tabular form to a 2-D or 3-D map, similar to what phylogenetic trees do for sequence data. This information is being applied to H5N1 isolates and vaccines available in Egypt to help select vaccines that will provide the best protection. This data will be confirmed with a vaccine/challenge study.

Ducks have been implicated in the dissemination and evolution of H5N1 highly pathogenic avian influenza (HPAI) viruses. Vaccination of domestic ducks against H5N1 HPAI is being conducted as a method of control but with mixed results. One of the observations from the field is that Muscovy ducks (Cairina moschata) respond differently to vaccination than other common domestic duck species (Anas sp.). Differences in the severity of clinical signs, antibody titers, and viral shedding after vaccination were observed between these two duck species, with Muscovy ducks presenting less protection after vaccination and longer duration of virus shedding. Differences were found in the innate immune response between Pekin and Muscovy ducks which may explain the differences observed in response to vaccination. This information should be taken into account when implementing vaccine strategies for control of HPAI in different bird species.

**Newcastle Disease Epidemiology and Diagnostics.**

Avian Paramyloviruses of serotype-1 are detected in the U.S. with the USDA validated real-time RT-PCR (RRT-PCR) assays used by diagnostic laboratories in the National Animal Laboratory Health Network. The matrix gene (M) assay is used as a screening assay to detect all APMV-1, even those of low virulence. The fusion gene (F) assay is tested with matrix positive samples to identify virulent isolates. The matrix test however does not detect many class I APMV-1 viruses, which include primarily low virulence wild bird isolates and live bird market isolates,
because the matrix test was designed primarily for class II viruses. As part of the laboratory effort to evaluate NDV viruses from other countries, a group of class II virulent APMV-1 isolates from Pakistan from genotypes VII and VI were not detected by the M assay. Analysis of the Pakistan viruses showed mismatches in the probe that accounted for the false negative. A modified probe with degenerate bases was developed that allowed the detection of the Pakistan as well as the other class II viruses. A second issue with the RRT-PCR test was also identified with the fusion probe. Previously we have published data that virulent pigeon viruses are not detected by the F assay due to too many mismatches between the probe and virus sequences. Our current work shows that APMV-1 isolated from cormorants in some northern states in 2008 also are not detected by this fusion assay. Interestingly some of these cormorant viruses also do not hemagglutinate chicken red blood cells. Improved protocols with new primer and probe sets have been designed to correct all of these deficiencies. The APMV-1 viruses represent a widely divergent group of viruses and molecular tools like RRT-PCR to remain effective need to be evaluated for specificity and sensitivity on an ongoing basis.

**Enteric Diseases of Poultry**

Poultry enteric disease is marked by diarrhea, stunting, increased time to market, immune dysfunction and increased mortality. Numerous viruses have been detected in the intestinal tract of poultry, and have subsequently been implicated in enteric disease. Using a random PCR technique we successfully identified novel chicken and turkey parvoviruses in intestinal homogenates from enteric disease-affected birds. Sequence analysis of these viruses demonstrated that the chicken and turkey parvoviruses were closely related to each other and representative of a novel genus within the Paroviridae family. Experimental infection of day-old broiler chickens with this novel chicken parvovirus caused enteric disease with characteristic signs to runting-stunting syndrome. In a nationwide survey, using a diagnostic PCR assay we demonstrated that these parvoviruses are widely distributed in commercial poultry flocks in the United States. Our in-house ELISA test to detect maternally acquired antibodies and antibodies produced following acute infection proved to be a valuable tool to study epidemiology and biology of chicken and turkey parvoviruses.
The National Animal Health Monitoring System (NAHMS) is a non-regulatory division of the United States Department of Agriculture (USDA) designed to help meet the Nation’s animal-health information needs. NAHMS is currently preparing for a national poultry study to take place in 2010. An information needs assessment was conducted. A questionnaire was distributed to broiler, layer, turkey, and primary breeder veterinarians via their respective professional organizations. The questionnaire was also distributed to federal and state veterinarians and university research/extension personnel. Additionally, discussions were held with each poultry veterinary group to further clarify their information needs as well as with the U.S. Animal Health Association (USAHA) Committee on Transmissible Diseases of Poultry and Other Avian Species in October 2008.

Based on the input from stakeholders, the objectives for the NAHMS 2010 poultry study are as follows:

1. Describe the structure of commercial poultry industries (broiler, layer, turkey, and primary breeder), including interactions, movements, and biosecurity practices. Describe farm level practices for layer and broiler primary breeder and multiplier flocks. Identify critical factors for exclusion of disease (such as *Mycoplasma* or infectious laryngotracheitis).

2. Estimate the prevalence and identify risk factors associated with Clostridial dermatitis (cellulitis/gangrenous dermatitis) on turkey grower farms.

3. Estimate the size of the urban chicken population in four U.S. cities. Describe bird health, movement and biosecurity practices of urban chicken flocks.

Approximately 60 broiler, layer, turkey, and primary breeder companies, accounting for the majority of poultry production, have been invited to participate in the study. The study is planned to begin in May 2010. A company questionnaire (one survey per company) addressing industry structure may be completed either on-line or as a paper version. A sample of farms from companies having layer or broiler primary breeder or multiplier (parent) flocks, will be selected to complete a farm-level breeder questionnaire, addressing biosecurity and movement on breeder farms.

Turkey companies will select a sample of their most and least affected grower farms for the Clostridial dermatitis case-control study. A questionnaire addressing potential risk factors will be completed.
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for each farm. Biologic sampling plans have not been finalized. Under consideration are culture to assess toxin and other organism pathogenecity markers, intestinal histopathology to determine intestinal changes that precede an outbreak, Clostridial spore counts and coccidia in the litter, and pH testing of water, soil, and/or litter.

The urban chicken study will be conducted in four cities (Los Angeles, Denver, New York, and Miami). A survey of residents in these cities will be conducted to estimate the size of the urban chicken population. Additionally, a survey will be conducted of customers purchasing chicken feed at feed stores and pet shops to describe practices of urban chicken owners.
Over the past two years, Colorado State University has conducted three projects focused on characterizing backyard poultry and upland game bird populations.

The Metropolitan Denver area was the focus of the first project. In order to determine the prevalence of backyard poultry flocks within this geographical area, single-family residences were randomly selected from census data in census block form. Residences were approached by a canvassing team from Colorado State University and residents were asked about poultry ownership. If the resident reported that poultry were present at the residence, a survey on general flock information was administered. Preliminary data shows that in the central Denver area, 1.64% of residents contacted owned a poultry flock while in the suburban areas at the periphery of the Denver area, 4.35% of residents contacted owned a poultry flock. Poultry flock sizes ranged from 1-130 birds, with most flocks consisting of 20 birds or less. Species represented included chickens, turkeys, upland game birds, waterfowl, peafowl and pigeons.

In order to characterize the backyard flock population in Colorado, a survey was conducted to collect information on general flock characteristics, husbandry practices, purpose of flock ownership, biosecurity practices, human-bird interactions and general health status. Surveys were sent to backyard flock owners and 317 out of 784 surveys were returned (40% response rate). Two-thirds of the flocks represented by the surveys are composed of 50 or fewer birds, while the other one-third is composed of more than 50 birds. Turnover of birds within flocks was frequent and the vast majority of flocks were multi-species flocks. The primary purpose for flock ownership was raising laying hens for family egg consumption. Approximately 46% of flock owners had moved one or more birds from the flock to another site within the past twelve months. Most of the movement was intrastate but some was interstate. There was a general lack of biosecurity practices and veterinary care associated with these flocks.

A nationwide survey was conducted to collect information on the U.S. upland game bird industry. We received contact information for 10,081 upland game bird flock owners from 43 states. We randomly selected and interviewed 218 upland game bird flock owners by phone. Surveys addressed general flock characteristics, husbandry practices, commercial status, raised for release status, bird movement, general health status, human-bird interactions, interactions with wild birds and animals, housing and biosecurity practices. Facilities were characterized as commercial (breeding/growing) - 22%, release (hunting/wildlife repopulation) – 54%,...
or hobby (exhibition/companion animal) - 24%. Median flock size over 12 months was 600 birds, with commercial facilities housing the highest number of birds at a median of 2,302 birds. Flocks housed a median of three different species of birds and 50% of flocks raised birds year-round. The purpose of most of the flocks was to raise birds for hunting or dog training. Overall, there was extensive bird movement recorded. In addition, there was a general lack of use of biosecurity practices and limited use of veterinary services.
Resolution 54 Update: Move to a Secure Egg Supply during HPAI Outbreak

Contributing Authors: Dr. James Roth, ISU, Dr. Darrell Trampel, ISU, Dr. Danelle Bickett- Weddle, ISU, Dr. Will Hueston, U of Minn, Dr. Dave Halvorson, Dr. Tim Goldsmith, U of Minn, Dr. Brendan Lee, U of Minn, Dr. Girum Shiferaw, U of Minn, Todd McAloon, Mark Friedow, Dr. Hugo Medina, Pat Stoner, Dr. Nestor Adriatico, Mohammed Mousa, Dr. Hershell Ball, Trudy Baumeister, Dr. Rich Dutton, Lolita Luchsinger, Howard Magwire, Dr. Bill Garr, Cal Jackson, Dr. John Brown.

In April 2006 United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS) met with all segments of the poultry industry to discuss its Animal Disease Response Preparedness Plan. While supporting the quick response to disease outbreak, the industry realized that the proposed response plan would cause significant challenges to continuing to supply customers with eggs and egg products because of the current 'just-in-time' supply chain model of the industry. A representative group of the egg sector was able to get a resolution passed at the U.S. Animal Health Association (USAHA) meeting in 2007, aimed at having USDA-AHPIS-Veterinary Services (VS) include business continuity in Highly Pathogenic Avian Influenza (HPAI) outbreak response plans. The USDA-AHPIS-VS acknowledged the industry's concerns about business continuity and maintaining product supply to customers, but stated that any policies instituted while seeking to maintain the supply chain, must be based on sound science and epidemiology. Since then a very active and dedicated group of industry, government and academia representatives have met almost every two weeks with the goal of developing acceptable guidelines and programs that would ensure the safe movement of eggs and egg products within, in and out of a HPAI control zone during an outbreak. The group has had many successes and continues to work towards its goal while welcoming new input from others who have interest in the safe movement of eggs and egg products.

Memoranda of Understanding
The working group is working with and encouraging State Animal Health Officials to establish memoranda of understanding (MOU) with neighboring states that will help govern the response to movement of eggs and egg products based on the best science available during an HPAI outbreak. To date only one MOU has been signed between Minnesota and Iowa. But the group continues to work towards this goal, and currently a number of other states are working towards signing MOUs.

Secure Egg Plan
The Secure Egg Supply Plan (SES) was developed to avoid unnecessary destruction of eggs from healthy flocks in a high pathogenicity avian influenza (HPAI) Control Area. The SES plan is a
science-based preparedness plan developed by The Egg Sector Working Group, which includes representatives of the egg industry, USDA-APHIS-VS, the University of Minnesota, and Iowa State University. The overall goal of the SES plan is to safely move eggs and egg products from, into or within a HPAI Control Area without endangering the health of uninfected flocks. The plan also supports a continuous supply of eggs for the U.S. public, facilitates business continuity for the egg industry and their retail and food service customers and fosters a high level of government, industry, and consumer confidence.

Most egg production facilities do not have the capacity to store eggs or egg products for a prolonged period of time. In addition, just-in-time supply practices mean that a brief interruption in movement can result in large shortages of eggs to consumers. Historically, emergency preparedness plans for HPAI involved extensive prohibitions on movement of poultry, eggs and egg products as part of efforts to control and eradicate an outbreak. Scientific studies of HPAI transmission dynamics and risk assessments have provided additional insights on ways to effectively manage HPAI while minimizing the disruption of egg movement in the food supply chain. Risk assessments suggest that pasteurized eggs and egg products produced by healthy flocks with good biosecurity in an HPAI Control Area could be marketed without delay. Holding other low risk eggs and egg products in cold storage before entering market channels provides confidence that they present no risk for HPAI transmission.

The SES plan has two components:

The Federal and State Transport (FAST) Eggs Plan was developed by the Center for Food Security and Public Health at Iowa State University in collaboration with the egg industry, poultry veterinarians, and USDA APHIS-VS. The objective of the FAST Eggs Plan is to minimize the risk of exposure of poultry flocks to HPAI and thereby to limit the spread of HPAI during an outbreak. This is accomplished by:

- Audited minimum biosecurity standards for egg farms pre-approved by the State Animal Health Official and the Area Veterinarian-in-Charge
- Location verification of participating farms
- Epidemiology data to identify potential exposure and document flock production parameters
- Active surveillance in each layer house via daily RRT-PCR testing
- Geospatial Risk Estimate based on unmitigated risks and proximity to infected flocks
- Secure website to share information with Incident Commanders and authorized personnel
- Provides a high level of confidence that eggs are free of HPAI virus.
The Egg Movement Control Model (EMCM) Plan was developed by the egg industry, poultry veterinarians, and USDA APHIS’ Center for Epidemiology and Animal Health (CEAH) in collaboration with the Center for Animal Health and Food Safety at the University of Minnesota. The objective of the EMC plan is to develop science-based guidelines for permitting the movement of eggs and egg products from operations in a HPAI control zone while effectively managing the risk of release of HPAI virus. The EMC plan is based on the following:

- Daily flock observation for abnormal clinical signs
- Daily RRT-PCR testing of samples from each flock on a farm
- Sanitation practices performed on a daily basis by egg producers
- Proactive product-specific risk assessments
- Application of product-specific biocontainment procedures
- Permit guidelines for specific eggs and egg products

How do the FAST Eggs Plan and the EMCM Plan work together?

The FAST Eggs Plan and the EMCM Plan support a rapid and effective response to HPAI outbreaks. The FAST Eggs Plan minimizes the risk of infection coming into an uninfected flock, and the EMC Plan reduces the risk of infection spreading through the movement of eggs and egg products. The FAST Eggs Plan assists Incident Commanders in effective management of HPAI outbreaks. The EMC Plan supported by the CEAH risk assessments helps Incident Commanders issue movement permits for eggs and egg products that carry negligible risk of HPAI transmission. Both plans assist APHIS, Food Safety Inspection Service (FSIS), and Food and Drug Administration (FDA) fulfill their roles with respect to eggs and egg products.

Benefits of the Secure Egg Supply Plan

Consumers

- Continuous supply of fresh egg products
- Reduced work disruption and reduced negative economic impacts for rural communities
- Continued food safety in the event of an HPAI outbreak

Industry

- Business continuity within and between states is enhanced during an outbreak of HPAI.
- Supports compartmentalization and international trade.
- Increased biosecurity promotes flock health by excluding many pathogens.
- Early detection of avian influenza in egg production flocks is facilitated.
- Prevents spread of HPAI from an index outbreak to other egg production flocks.
REPORT OF THE COMMITTEE

Regulatory agencies

- Supports the National HPAI Response Plan
- Supports the Incident Command system
- Provides information on biosecurity levels and diagnostic test results at participating egg farms
- Provides guidance on movement permitting

Conclusion

The working group has developed a number of science-based tools that will be very useful to both regulatory officials and the industry in a HPAI outbreak. The next steps involve completing the Secure Egg Plan but more importantly introducing these tools to State and Federal animal health officials and create buy in to the usefulness of these tools. Confidence in these tools will assist in convincing State Animal Health Officials to signing memoranda of understanding.
Novel H1N1 2009 Virus: Some of the genes in this new virus are similar to influenza viruses that normally occur in swine in North America. Further study has shown that this new virus is very different from what normally circulates in North American pigs. It has two genes from influenza viruses that normally circulate in pigs in Europe and Asia. It is known as a “quadruple reassortant” virus because it also has genes from influenza viruses that circulate in birds and humans.

Novel H1N1 2009 Virus Timeline: March and April, 2009: Novel influenza A (H1N1) a new flu virus of swine origin caused illness in Mexico and the United States. April 15, 2009: The first novel H1N1 patient in the United States was confirmed by laboratory testing at CDC. May 2, 2009: Canada announced that the H1N1 2009 virus was found in pigs at a farm in Alberta, Canada. June 11, 2009: A pandemic is declared by the World Health Organization. June 19, 2009: H1N1 2009 virus reported in all 50 states in the United States and the District of Columbia. June 25, 2009: Argentina confirmed cases of H1N1 novel strain on a commercial pig farm. July 31, 2009: Australia, reported an outbreak of influenza in swine. August 21, 2009: Chile reported an outbreak of Influenza A H1N1 in turkeys.

Joint FAO/WHO/OIE Statement on H1N1 2009 virus and the safety of pork: Influenza viruses are not known to be transmissible to people through eating processed pork or other food products derived from pigs. Pork and pork products, handled in accordance with good hygienic practices recommended by the World Health Organization, Codex Alimentarius Commission and the OIE, will not be a source of infection. Authorities and consumers should ensure that meat from sick pigs or pigs found dead are not processed or used for human consumption under any circumstances.

Food Safety Key Points: The novel H1N1 2009 virus is not spread by food. You cannot get this virus from eating pork or pork products. Because the novel H1N1 2009 virus continues to evolve, USDA continues to study the virus to provide the best protection for both public and animal health.

SIV Surveillance Plan: Swine influenza virus (SIV) surveillance has been in existence for many years within the swine industry. In 2008, USDA and CDC began developing a pilot program for a more integrated approach to identifying new SIVs. Implementation of the pilot program was accelerated, given the April 2009 human pandemic, and includes surveillance for the H1N1 2009 virus in swine.
**REPORT OF THE COMMITTEE**

**SIV Surveillance Plan Goals:** Determine if Novel H1N1 2009 Flu virus exists in U.S. Swine. Detect new influenza strains in swine in a timely manner. If present, determine distribution of the new strains in swine. Determine genetic characteristics of new viruses necessary for vaccine and diagnostics development.

**SIV Surveillance Plan Sampling:** Swine populations associated with a human infection of H1N1 2009 virus. On farm swine showing clinical signs of influenza-like illness. Swine showing signs of clinical illness at events where there is increased exposure to people (fairs, markets, etc.).

**Should H1N1 2009 Virus be Found in U.S. Swine:** Herds identified with the Novel H1N1 2009 Virus will be monitored so only swine that are fully recovered are sent to other premises or to slaughter. A monitored movement is one where a group of swine is determined to be free from clinical signs of influenza-like illness by or under the supervision of a licensed veterinarian before the movement can occur.

**Preparedness: National Veterinary Stockpile (NVS) Activities:** NVS has acquired poultry depopulation equipment and placed it in locations around the country. It has reconfigured the emergency response packages to improve disease and species specificity, and has begun implementation of an advanced electronic system for managing simultaneous deployments.

**Preparedness: FAD PReP:** FAD-PReP access is available on-line: https://fadprep.lmi.org or email (owen@lmi.org) to request access, and includes new National Animal Health Emergency Management System guidelines drafted for Health and Safety, Biosecurity, PPE, Cleaning and Disinfection, Others. Unified State-Federal-Tribal-Industry planning and operations; Science based approach that protects public health and animal health, and that stabilize animal agriculture, the food supply, and the economy; Direct every FAD incident or outbreak toward a clearly defined and obtainable outcome; Prepare clear and concise plans, procedures and outreach materials to ensure a thorough understanding among all stakeholders; Traceability is essential for control of contagious disease of animals. Traceability is also essential for continuity of business for non-infected animals, vaccinated animals, non-susceptible animals, and animal products.

**Preparedness: Secure Egg Supply (SES) - Continuity of Business:** The Secure Egg Supply Plan (SES) was developed to avoid unnecessary destruction of eggs from healthy flocks in a high pathogenicity avian influenza (HPAI) Control Area. The SES plan is a science-based preparedness plan developed by The Egg Sector Working Group, which includes representatives of the egg industry, USDA-APHIS-VS, the University of Minnesota, and Iowa State University. The overall goal of the SES plan is to safely move eggs and egg products from, into or within a HPAI Control Area without endangering the health of uninfected
flocks. The plan also supports a continuous supply of eggs for the U.S. public, facilitates business continuity for the egg industry and their retail and food service customers and fosters a high level of government, industry, and consumer confidence.
The World Organization for Animal Health (OIE) has updated or drafted new animal disease Code chapters for 2009. At its May 2009 General Session Meeting, the International Committee adopted new text to several existing chapters. In addition, the OIE’s Terrestrial Animal Health Standards (Code) Commission met in September of 2009 to propose further modifications to several chapters for consideration in 2010. Of interest to the poultry industry, the following chapters were updated or are being proposed for further modification:

**Avian Influenza (AI).** For 2009, the Code chapter on AI received only minor updates, however, the United States has asked the Terrestrial Animal Health Standards Commission to consider revising a couple of the sections in the chapter as many Member countries continue to misinterpret the chapter as it pertains to the export of fresh poultry meat. For 2010, the OIE proposes to incorporate many of the comments submitted by the United States and is distributing these chapters for comment. The revised chapter will be offered for adoption in 2010.

**Newcastle Disease (ND).** The Code chapter on ND also received minor changes for 2009. However comments submitted by the United States for 200 have been adopted. These include combining feather meal and poultry meat meal (all meals) under the same basic treatment requirements.

**Biosecurity Procedures in Poultry Production.** The OIE has drafted a new chapter addressing basic biosecurity and hygiene procedures. This chapter will be distributed for comment and offered for adoption in 2010.

**West Nile Fever.** This chapter received minor modifications in 2009 to clarify several sections. For 2010 the OIE has accepted comments from the United States, and will propose removing chicks and poults as species that are susceptible to the virus.

**Animal Welfare.** No new specific guidelines for animal welfare were adopted this past May. However, for 2010 the existing chapters on transportation and slaughter include some new text pertaining to poultry. The United States will share these chapters with its stakeholders and comment as appropriate. In addition, an OIE ad hoc group met in June of 2009 to draft guidelines on animal welfare and broiler production systems. It is expected that the OIE will distribute this first draft for Member country comment and input later in 2009 or early 2010.
REPORT OF THE COMMITTEE ON
TRANSMISSIBLE DISEASES OF SWINE

Chair: Mark J. Engle, TN
Vice Chair: Harry Snelson, NC

Paul L. Anderson, MN; Marianne Ash, IN; Lisa Becton, IA; Carter Black, GA; Philip E. Bradshaw, IL; Becky L. Brewer-Walker, OK; Corrie C. Brown, GA; Tom Burkgren, IA; Jon D. Caspers, IA; Max E. Coats, Jr., TX; Jim E. Collins, MN; Fred L. Cunningham, MS; Effingham Embree, Jr., IL; Gene A. Erickson, NC; James M. Foppoli, HI; Nancy A. Frank, MI; Cyril G. Gay, MD; Michael J. Gilsdorf, MD; Jennifer L. Greiner, DC; Thomas J. Hagerty, MN; Edwin C. Hahn, IL; Rod Hall, OK; Greg N. Hawkins, TX; Michael E. Herrin, OK; Sam C. Hines, MI; Sam D. Holland, SD; Rex D. Holt, GA; Ken Horton, TX; Melissa A. Justice, IN; Marcus E. Kehrli, Jr., IA; Elizabeth A. Lautner, IA; James W. Leafstedt, SD; Donald H. Lein, NY; Tsang Long Lin, IN; Bret D. Marsh, IN; David T. Marshall, NC; Chuck E. Massengill, MO; James D. McKean, IA; David A. Nolan, KS; Sandra K. Norman, IN; Gary D. Osweiler, IA; Kerry Peterson, IN; Kristine R. Petrini, MN; Tom Ray, NC; Mo D. Salman, CO; David D. Schmitt, IA; Rick L. Sibbel, IA; Dennis Slate, NH; James E. Stocker, NC; Paul L. Sundberg, IA; Seth R. Swafford, CO; Paul O. Ugstad, NC; Patrick Webb, IA; Margaret A. Wild, CO; Larry L. Williams, NE; George O. Winegar, MI; Nora E. Wineland, CO; Paul Yeske, MN.

The Committee met on October 13, 2009 at the Town and Country Hotel, San Diego, Calif., from 12:30 to 5:20 p.m. There were 19 members and 22 guests present.

Dr. Carter Black, State Veterinarian, Georgia, presented the report from the Feral Swine Subcommittee on Brucellosis. Dr. Black provided a brief history of the subcommittee and provided a report of the activities of the committee. The subcommittee was provided updates from:

- Southeastern Cooperative Wildlife Disease Study (SCWDS) on the new publically available Feral Swine Mapping System (www.feralswinemap.org)
- USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) regarding foreign animal disease (FAD) and Program Disease surveillance activities and a foot-and-mouth disease (FMD) research study in feral swine
- Texas Animal Health Commission on Brucella suis in cattle
- USDA Swine Health Programs regarding program diseases
- University of Illinois on research regarding sequencing of PRV virus from feral and domestic origins

More detailed information can be found in the Report of the Feral Swine Subcommittee on Brucellosis and Pseudorabies, included in these proceedings at the end of the Report of the Committee on Brucellosis.
Panel Session: Response to H1N1 - What did we do? What did we learn?

Novel H1N1 2009 Influenza – Implications for the U.S. Swine Herd
Dr. Patrick Webb
National Pork Board

The U.S. pork industry continues to take a proactive approach towards managing the novel H1N1 event, which has caused significant economic repercussions to an industry already experiencing 21 months of financial losses. When news of the novel H1N1 outbreak in humans hit in late April, crisis management plans were ready to be put into action. These actions included rapid communications out to producers explaining the issues and actions they needed to take on the farm to better protect the U.S. swine herd.

To address the H1N1 outbreak in a comprehensive way, the National Pork Board joined with the National Pork Producers Council, the U.S. Meat Export Federation and the American Association of Swine Veterinarians to focus on four main objectives:
• To reassure U.S. consumers and America’s international trading partners that U.S. pork is safe.
• To protect the U.S. swine herd from becoming infected with novel H1N1.
• To monitor the coverage of novel H1N1 by the media, social media, government and industry, and supply these organizations with science-based, accurate information.
• To be prepared to protect and defend the U.S. pork industry against unwarranted attacks and allegations.

As this event continued to unfold, the pork industry worked closely with USDA Animal and Plant Inspection Service (APHIS); USDA Agricultural Research Service (ARS); Centers for Disease Control and Prevention (CDC), State Veterinarians and State Public Health Officials to address research, surveillance and response issues. The industry is supportive of the USDA approach to surveillance and the USDA response guidance that uses a monitored approach, to mitigating the discovery of novel H1N1 in the U.S. swine herd, which will not disrupt the commerce or threaten the welfare of swine. The industry will continue to proactively address novel H1N1 issues and U.S. pork producers are prepared to act in the best interest of the public, the animals in their care, their employees and their communities.
H1N1: The Gift that keeps on Giving
Dr. Jen Greiner
National Pork Producers Council (NPPC)

National Pork Producers Council has been very active at the national and state levels making sure that policy makers have science based information regarding novel H1N1 and the safety of pork. The NPPC trade team has been active engaging trading partners to ensure comprehension of the safety of U.S. pork. Currently NPPC is working with members of the U.S. House and Senate to send a letter to the Obama administration requesting dollars for pork purchases under Section 32 and adequate funding for integrates and comprehensive swine disease surveillance. State Pork Producer Associations have been active interfacing with the State Veterinarian, State Public Health Officials and local media delivering messages regard the safety of pork.

Pandemic H1N1 Influenza AASV Response
Dr. Harry Snelson
American Association of Swine Veterinarians (AASV)

The AASV has been actively disseminating accurate information to its’ membership and encouraging engagement at the local, State and National level to mitigate the novel H1N1 event. AASV has been actively engaging USDA Center for Veterinary Biologics to improve the process to rapidly bring vaccines to market. An Ad hoc working group developed a position statement regarding novel H1N1 and swine workers, swine heard vaccination, vaccine strain selection, and swine movements that were approved by the AASV Board of Directors (www.aasv.org)

Swine Influenza Virus (SIV) Surveillance Highlights
Dr. Sarah Tomlinson
USDA-APHIS-VS

Multiple lessons were learned from the novel H1N1 event. Preplanning and collaboration that was accomplished under an SIV pilot project prior to novel H1N1 event was valuable to implementing novel H1N1 surveillance. A comprehensive approach to disease surveillance is necessary for rapid response to emerging disease issues and USDA can play a crucial coordinating role to bring stakeholders together when these events occur. This response to the novel H1N1 event represents a good example of a one health approach to emerging diseases.
H1N1 Research – What We Know Now
Dr. Marcus Kehrli
USDA-ARS

The National Animal Disease Center-USDA-ARS Virus and Prison Diseases of Livestock Research Unit prioritized novel H1N1 research to rapidly address this issue. Dr. Kehrli provided a brief review of SIV prevalence in the U.S. swine herd which highlighted that the gamma cluster influenza were the dominate subtype. The research unit was involved early in the novel H1N1 event, a result of prior relationship built with CDC regarding swine influenza. As a result ARS was successful in developing diagnostic tests that were shared with the National Veterinary Services Laboratory for validation and use in the National Animal Health Laboratory Network. In conjunction ARS was able to undertake pathogenesis and transmission studies in swine using novel H1N1 isolated from humans and demonstrated that the novel H1N1 acts similar to endemic strains of SIV in the U.S. Research was also done that provided evidence that the novel H1N1 is not found outside of the respiratory tract in swine. There is early evidence from ongoing research at ARS that U.S. swine herd may have some cross protection to the novel H1N1 virus from current circulating strains of SIV and some commercially available vaccines. There was discussion after Dr. Kehrli’s presentations in the audience regarding the need for more funding for ARS to improve research and response capabilities for emerging issues.

National Surveillance for Swine Influenza Virus in Swine
Dr. Sarah Tomlinson
USDA-APHIS-VS

Dr. Tomlinson discussed a brief history of swine influenza virus (SIV) in the swine industry, current SIV control measures including vaccination and bio security and challenges for designing a surveillance program for a non regulated disease. It is recognized that there is a need to better understand the current SIV picture in the U.S. swine herd and work was undertaken in prior years to work with industry, CDC and USDA to address this issue. This work was vital to the development and implementation of the novel H1N1 surveillance plan. The current plan utilizes three streams for sample collection which include swine epidemiologically linked to H1N1 positive humans, swine with exhibiting influenza like illnesses (ILI) at exhibitions and diagnostic laboratory submissions of swine with a history of ILI. To date 36 National Animal Health Laboratory Network (NAHLN) laboratories are participating in the program and 18 labs have reported SIV testing. There have been 164 samples tested using the Matrix PCR, 18 using the N1 PCR, and 20 tests using virus
isolation and to date the novel H1N1 virus has not been detected in the U.S. swine herd. USDA is very open to proactively work with the industry on addressing challenges help increase the level of surveillance occurring in the U.S. herd.

The meeting continued with additional presentations.

**USDA Swine Health Programs Update**
Dr. Troy Bigelow
USDA-APHIS-VS

Dr. Bigelow provided an overview of feral swine issues in the U.S. and the work veterinary services has been doing with the Southeastern Cooperative Wildlife Disease Study (SCWDS) on the new publically available Feral Swine Mapping System (www.feralswinemap.org). An update was provided on Swine Brucellosis and pseudorabies virus (PRV) and program activity. Currently tall States are free of swine brucellosis except for Texas which is at Stage II. All states are PRV free and three transitional swine herds were indemnified for PRV using USDA funds. Dr Bigelow reviewed the PRV surveillance plan. There are significant reductions in sow/boar surveillance. All samples are being directed to USDA regional laboratories and a database tracks samples submissions. USDA will not remove sow/boar surveillance completely until other streams are brought online. USDA is bringing on line a diagnostic laboratory stream to aid in early disease detection. USDA is also looking in the future to bring online stream for high risk farms and high risk farms with documented feral swine exposure. A PRV plan implementation manual that describes the streams more in depth will be available soon.

Dr. Bigelow provided an update on the process to codify swine brucellosis and pseudorabies program standards and the Swine Disease Analysis Program concept. He also provided an update on the Swine Health Protection Act (SHPA). There are 1400 licensed premises with half of those located in Puerto Rico. There were 200 violations of the SHPA in 2009 and 104 violations at non licensed feeders. Discussion after the presentation included the need for developing a better way for breeding swine delivered direct to a packer as an identified group to be sampled for PRV and results sent to the state of origin. There was a question regarding the use of private veterinary practitioners on a fee basis to accomplish PRV surveillance when down the road testing is used. The answer given was that the Area Veterinarian in Charge (AVIC) would make that determination.

**National PRRS Eradication, Can it be done? When will it be done?**
Dr. Paul Yeske
Swine Veterinary Center

Dr. Yeske provided an overview of the history of control of porcine reproductive and respiratory syndrome (PRRS) in the U.S. swine industry
and a growing grass roots effort supportive of PRRS. It is estimated that the industry loses $1.5 million a day to the effects of PRRS on production. With the financial down turn of the industry there may be an opportunity to make inroads into PRRS eradication. The industry has been successful in eliminating PRRS at the farm level and 3 regional control efforts are underway including one in Minnesota that has been successful in eliminating PRRS on a county basis. National PRRS eradication has been discussed on a grass roots level. Those at the grass roots level are working to get widespread industry buy in for PRRS eradication which could start voluntarily but at some point need to move to a mandated regulatory program.

**Washington Watch**  
Dr. Jen Greiner  
National Pork Producers Council  

Dr. Greiner provided a policy update. This included an overview of the current priorities from the Obama administration, including the economy, banking reform, health care, climate change, and alternative energy reform. The Obama administration has been responsive to the pork industries needs regarding H1N1 especially in trade talks and would like to see a more aggressive trade policy. Dr. Greiner also outlined the priorities and accomplishments of the 111th Congress. NPPC has been very active in mitigating the U.S. pork industry economic crisis, environmental legislation, child nutrition act, food safety reform, antibiotic legislation, competitive livestock markets and trade.

**Committee Business:**  
Two resolutions were put forward by members. The first resolution put forward was regarding the failure of importing countries to follow OIE guidelines for importations of animals. There was little discussion and a motion by Greg N. Hawkins, to accept the resolution, the motion was seconded by Dr. Jen Greiner and the motion was carried unanimously.  
The second resolution put forward regarding market swine surveillance. There was some discussion to clarify USDA’s intent to fund slaughter surveillance through FY 2010. The point was made that collectors contracts will expire in the first quarter in 2010 and there is no indication that they will be replaced. Lack of collectors means no samples in the slaughter stream. There was some discussion on changes to the language to reflect the FY 2010 funding. A motion to accept was made by Jon Caspers and seconded by Sam Hines and the motion carried unanimously.
REPORT OF THE COMMITTEE ON TUBERCULOSIS

Chair: Kathleen M. Connell, WA
Vice Chair: Michael S. VanderKlok, MI

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REPORT OF THE COMMITTEE

Winegar, MI; Josh L. Winegarner, TX; David W. Winters, TX; Jill Bryar Wood, TX; John F. Wortman, Jr., NM; Ching-Ching Wu, IN; Glen L. Zebarth, MN.

The Committee met on October 13, 2009, from 8:00 a.m. to 5:30 p.m. at the Town and Country Hotel, San Diego, Calif. There were 173 members and guests in attendance. Dr. Kathleen M. Connell and Dr. Tim Hanosh presided. Dr. Hanosh served as Acting Vice Chair in Dr. Michael S. VanderKlok’s absence.

In her opening remarks, Dr. Connell reviewed the day’s agenda, welcomed members and guests and made a few housekeeping announcements. The Chair determined that a quorum was present to conduct business.

Regarding Subcommittees, five Subcommittees were established in 2007 to address specific issues. These Subcommittees included the Diagnostic Test Review Subcommittee, chaired by Dr. Tyler Thacker; the Elephant Tuberculosis (TB) Guidelines Subcommittee, chaired by Dr. Janet Payeur; the TB Test-and-Remove Assessment Subcommittee, chaired by Mr. Phil Durst; the Eventing Cattle Subcommittee, chaired by Dr. Chuck Massengill; and the Education and Communication Subcommittee, chaired by Dr. John Maulsby. The Subcommittees accomplished their assigned tasks in 2008 and have been inactivated, so there are no reports forthcoming from any of the five Subcommittee Chairs.

Formal presentations began with Dr. John Clifford, Deputy Administrator, U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), who gave brief remarks. Dr. Clifford was followed by Dr. Alecia Larew Naugle, National TB Program Manager, National Center for Animal Health Programs, USDA-APHIS-VS, who gave a presentation entitled “A New Approach to the National Tuberculosis Program.” The full text of Dr. Naugle's report is included in these proceedings.

A Time Specific Paper was presented, entitled “Response of Sensitized Elk to Single Cervical Tuberculin (SCT) and Comparative Cervical Tuberculin (CCT) Tests”. The paper was presented by Ms. Shylo R. Johnson, Biologist, USDA APHIS Wildlife Services (WS), National Wildlife Research Center, Fort Collins, Colorado. This paper’s abstract is included in its entirety in these proceedings.
Report on the National TB Symposium
Kathleen Connell, Committee Chair

USAHA hosted its topic-specific symposium July 20-21, 2009, in Denver, Colorado. The goal was to have a forum for animal health leaders and experts to gather to discuss the direction of the National TB Program and provide input to assist in changes to better meet the needs of beef and dairy production today. The written report of the symposium is available on USAHA’s website, http://www.usaha.org/.

A Discussion Guide was provided prior to the symposium. It contained questions and proposed solutions on six key topics to spark discussion among the participants. The six Breakout Sessions held during the symposium included:

I. Importation of Infected Cattle
II. Wildlife Associated Disease Transmission
III. Diagnostic Testing Limitations and Needs
IV. Surveillance, Traceability and Investigation Deficiencies
V. Modernizing Regulations
VI. Disease Control Approach

Key recommendations that resulted for each Breakout Session and the pertinent pages in the symposium’s written report:

I. Importation of Infected Cattle, pages 13-15
   a. Requiring official electronic ID is not warranted at this time. Penalties should be increased if existing ID is removed.
   b. Require feedlot registration and implement restrictions on breeding cattle if feedlots are feeding Mexican cattle.
   c. A Federal-State-Industry outreach program is needed.
   d. Develop specific rules for rodeo and other timed-event cattle imported from Mexico.
   e. Requiring an additional port of entry TB test is only feasible with advent of a rapid test.

II. Wildlife Associated Disease Transmission, pages 17-20
   a. Mitigate risks to/from wildlife based on cost-benefit assessments.
   b. Targeted, active wildlife surveillance is necessary in areas where TB has been identified in livestock.
   c. Disengage state status from wildlife disease prevalence/risk.
   d. Direct research funding and resources towards vaccination and diagnostic tools.
   e. Review and adapt other countries’ control strategies.

III. Diagnostic Testing Limitations and Needs, pages 21-24
   a. Prioritize existing funding to expedite validation and approval of new tests and vaccines.
   b. Immediately acquire a serum bank of known TB-positive and TB-negative cattle.
   c. Establish one dedicated CVB reviewer for new TB tests.
   d. Consider using conditional licensing to decrease time to
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market for TB tests.

e. TB Epi staff need to be budgeted for and prioritized for Phase III field trials.

f. Consider the feasibility of milk tests for TB surveillance on dairies.

g. USAHA TB Scientific Advisory Subcommittee (SAS) or other TB Committee members can assist with test review processes.

IV. Surveillance, Traceability and Investigation Deficiencies, pages 25 to 28

a. Dedicated TB-Surveillance Coordinators should work directly with FSIS vets.

b. Implement event cattle movement test requirement.

c. Continue surveillance of farmed Cervidae.

d. Federal regulation of interstate movement of farmed Cervidae.

e. No consensus could be reached on testing cattle for interstate movement.

f. Feedlots that feed adult cattle should maintain records of origin/ID.

g. Identify all adult breeding cattle when moved into commerce.

h. Establish flexibility on tracing/testing from new herds based on risk.

i. Identify dairy cattle to birth premises for movement.

j. Set national standards for veterinarians administering TB test, with review for reaccreditation.

V. Modernizing Regulations, pages 29 to 31

a. The current state classification system is outdated and should be eliminated, but not before an acceptable replacement plan is in place.

b. Allow state and federal officials flexibility to address TB at the local level.

c. Provide for official state and federal review teams.

d. Continue indemnity at fair market value and correlate with herd plan adherence.

VI. Disease Control Approach, pages 33 to 34

a. Status should not be affected if test-and-remove option is chosen, evaluation of requirements for test-and-remove is needed.

b. Prevalence rate should not be used for determining depopulation with limited funding.

c. Zoning areas should be based on a risk assessment.

d. Address human/cattle TB through a working group in collaboration with the CDC.

Appendices in the symposium include Planning Committee, Breakout Session Facilitators and other Volunteers; List of Participants; Pertinent

State perspectives on the National TB Program were given by State Veterinarians from Michigan, Minnesota, California and Nebraska.

Michigan Report
Steven L. Halstead, DVM, MS, State Veterinarian, Michigan Department of Agriculture, Animal Industry Division, gave Michigan’s report.

Dr. Halstead stated that Michigan is the only state with a confirmed and well-established wildlife reservoir and is known to have on-going disease transmission between wildlife and livestock. The M. bovis in Michigan is a unique strain, and to date the measures in place have prevented the spread of this strain from the endemic area to other areas of Michigan or the U.S. Over $100 million of state and federal dollars have been spent over the past 10 years, keeping the disease contained through a combination of mandatory testing, electronic identification (EID) of cattle, movement permitting and controls and aggressive and positive animal management. Stakeholder patience with the program, however is wearing thin. The cash, lead time, productivity and marketability costs of testing, EID, movement restrictions and on-going wildlife-associated disease risk have made producers more fearful of the program than of the disease itself. In view of this, Michigan’s response, in partnership with stakeholders and with USDA, APHIS, Veterinary Services (VS), is to uncouple disease in wildlife from impacts on livestock by focusing on and rewarding on-farm wildlife disease risk mitigation. Additional effort is necessary to develop this risk-based, stakeholder-driven philosophy and to institutionalize it in the National TB Program.

Minnesota Report
William Hartmann, DVM, MS, Minnesota State Veterinarian and Board of Animal Health Executive Director.

Dr. Hartmann presented a unique perspective from Minnesota, a state that had been TB-free for 30 years prior to detection of the disease in a beef cattle herd in 2005. In Minnesota’s four year battle with the disease, it became apparent that the current program rules were more useful in the initial eradication effort than they were for reintroductions of the disease. Of particular note is the state status system which is outdated, cumbersome and leads to waste of valuable resources. Minnesota has made significant progress in its effort to eradicate this disease by focusing efforts where the disease is known to exist. There needs to be greater flexibility in the program rules so that limited resources are allowed to be used in this manner.

Dr. Hartmann concluded by recommending unregulated cattle movement between all states. When a TB-infected herd is detected there should be a rapid response with aggressive deadlines for herd quarantines.
and tracing exposed cattle. A risk assessment should be completed
to determine whether wildlife surveillance is necessary. If wildlife are
found infected, a risk assessment should be done to determine zoning. If
deadlines are not met, then interstate movement restrictions should be put
in place.

California: A Review of Recent California TB Cases
Richard E. Breitmeyer, DVM, MPVM, State Veterinarian, California
Department of Food and Agriculture.

In 2008-2009 four TB-affected dairy herds were detected in California.
Three were located in Fresno County and one in San Bernardino County.
These four herds totaled about 20,000 head of cattle, and all had very low
prevalence rates – three with only a single reactor detected. Of particular
interest was that three separate genotypes were detected, meaning three
unique sources of infection.

Despite investigation of 660 traces representing 21,000 animals,
and testing more than 400,000 cattle in 300 herd tests, the sources of
infection were not identified. However, all three genotypes matched
previously detected strains in Southwest Mexican feeder cattle. Two of
the herds were depopulated and two are testing out. To date, more than
$21 million has been spent on this eradication effort and many state and
federal personnel were mobilized to assist with the large testing effort.

Lessons Learned. Rigorous slaughter surveillance for bovine TB is
effective for detecting affected dairy herds. Test and removal protocols
can be effective in eliminating TB from herds, especially if prevalence
is low. Providing indemnity at fair market value is necessary for rapidly
evaluating test-positive animals and high-risk exposed animals that have
moved from an affected herd. Lack of identification and record keeping
added greatly to workloads and in some cases resulted in the inability to
complete a trace; and if not already in place, most owners of dairy herds
that required testing were very willing to utilize electronic ID. Despite low
prevalence in all herds with little or no evidence of disease transmission,
traces and associated testing were conducted in most cases per uniform
methods and rules (UMR); and of the 660 traces, only one led to a new
animal/herd associated with an affected herd – an adult cull cow sold
through a market to a different dairy (a very high-risk animal). Much of
the work load involved tracing movements of low-risk bulls from a low-
risk herd. With scarce resources, these traces need to be prioritized.

Impact of Losing “Free Status”. Despite the beef sector in
California not being linked epidemiologically to these cases, movement
restrictions caused significant economic impact. While USDA “delayed"
interstate movement testing requirements, some states had statutes in
place that required testing of cattle, and in some cases, feeder cattle as
well. Companies that sell semen and embryos to international markets
were also negatively impacted.

Recommendations for the Future National TB Program. The
current national program has had tremendous success in eliminating bovine TB from the U.S. However, now that every state has previously achieved “free” status, it is time to change the program to address risks of reintroduction and provide flexibility to States. The following are key topic areas and recommendations presented for consideration and further discussion.

**The current state status system should be eliminated.** Unless there is a regional risk of continued transmission – such as wildlife reservoir – quarantines and movement restrictions should apply only to individual herds associated epidemiologically with the known affected herd. However, each state should be required to meet national surveillance standards as well as be held accountable to investigate and respond appropriately to any new disease introduction. National oversight by federal, state and industry cooperators should be required; and regional or state-wide movement restrictions of other penalties only be implemented if a state is not meeting program standards.

**Allow program flexibility that considers risk and available national resources.** It is clear that adequate staffing and funding may not be available to depopulate every affected herd nor to conduct every possible trace or test, irrespective of risk. Therefore, under the direction of state and federal epidemiologists, the program must allow for utilization of resources in the most cost-effective manner – for example – to identify and address the highest risk movements and potential for transmission, and not be held accountable for very rigid and prescriptive requirements that may not be warranted.

**Imported Mexican feeder cattle continue to present a risk for introduction of bovine TB and must be addressed.** Rules are necessary to prohibit comingling of native breeding cattle with Mexican feeder cattle. Feedlots should not be allowed to feed Mexican-origin cattle and dairy replacement heifers on the same premises. While enforcement is generally not feasible in grazing situations, industry awareness and management practices should also be enhanced to assure separation of breeding and feeding classes of cattle. The Texas tiered system for feedlots is a good proposal from which to begin a national discussion on risks and mitigation requirements (Appendix D, *The Future of the National TB Program*, USAHA, July 20-21, 2009). Rodeo/timed-event cattle from Mexico pose additional risk and may require specific rules – such as additional testing requirements annually or for interstate movement.

**Expedite and enhance investment in new diagnostic tests for bovine TB.** We commend USDA for providing funding to expedite establishment of a serum bank of known TB-positive and TB-negative cattle. This is desperately needed by companies attempting to develop new tests. All stakeholders should work with USDA to assure that funding, personnel and resources are available to “fast-track” approval of new tests.
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Apply “One Medicine” concepts to bovine TB. More work needs to be done with Centers for Disease Control (CDC) and our public health partners to determine the risk of transmitting bovine TB from humans to cattle. While the public health officials did not believe it likely, we could not rule out this potential mode of transmission. The genotype of one of our strains matched three human cases from Mexican immigrants in California, but none were associated with dairies or the affected counties.

Nebraska
Dennis A. Hughes, DVM, State Veterinarian, Bureau of Animal Industry, Nebraska Department of Agriculture.

In February 2009, a domesticated herd of elk and fallow deer in Knox County was discovered with TB. In spite of previous accredited herd status, the herd had a high infection rate. The initial diagnosis was made when an adult elk was found with TB lesions at slaughter. Obviously, the single cervical test had low sensitivity for this herd. The herd was depopulated in June 2009.

In April 2009, a cull cow from Rock County was found at slaughter with TB. The two cases are unrelated epidemiologically and are different strains. The herd of 800 adult beef cattle was tested and another infected cow found. Since then, the Nebraska Bureau of Animal Industry has focused a majority of our resources and manpower towards testing of herds that are epidemiologically linked to the infected herd. The testing of cattle herds involved in the epidemiology of our TB-infected beef herd continues. As of October 2009, just over 14,500 head of cattle from over 40 herds have been tested negative. There are still approximately 3,000 head of cattle that were fenceline contacts to the infected herd yet to be tested.

Testing of trace-ins into the infected herd will be Phase 2 of testing herds that are epidemiologically linked to the infected herd. At the present time, it appears that fenceline contact testing and trace-in testing should be concluded by the end of November 2009. The tracing process has been cumbersome and frustrating. Testing of epidemiologically linked herds has been a massive project by state and federal personnel.

Challenges to Nebraska’s efforts:
• Lack of funding for depopulation of beef herd.
• Inability to trace epidemiological links in a timely manner without the National Animal Identification System (NAIS).
• Slaughter plants do not want to purchase TB-exposed/quarantined animals moving on a VS-127 or TB branded animals.
• Inadequate testing procedures (caudal fold tuberculin test or single cervical tuberculin test)
• Possible loss of state status because of two 13-year-old animals with lesions (14,500 others in 45 epidemiologically linked herds tested so far are negative).
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- Test and removal procedures for release of quarantine currently outlined in the 2005 UM&R require eight negative whole herd tests and approximately five years. This protocol is economically devastating to producers as well as to the state attempting to regain status.

A question and answer and discussion period followed the four state reports.

Dr. Connell completed the morning session with an overview of resolution format, the 2008 Resolutions and the proposed 2009 resolutions submitted so far.

There were four 2008 Resolutions:

- Resolution 47, Fund expanded collection of well-characterized serum from cattle and cervids routinely tested to support the evaluation of new rapid tests for Tuberculosis in cattle and cervids to enhance the Bovine Tuberculosis Eradication Program
- Resolution 48, Change in how test-and-removal herds affect the calculation of the number of Tuberculosis-affected herds with respect to determining state/zone status
- Resolution 49, Elephant Tuberculosis Guidelines
- Resolution 50, Restricting imported feeder cattle

Dr. Connell read each Resolution, followed by the response from USDA. Resolutions can be accessed at USAHA's website by selecting “Committee”, then “Tuberculosis.”

The Committee took a lunch break and the meeting recommenced at 1:00 p.m. The afternoon sessions began with a second Time Specific Paper. Ms. Ailam Lim, graduate student with the Department of Pathobiology and Diagnostic Investigation, Michigan State University, Lansing, Michigan, presented the paper, entitled “Differential gene expression study of bTB-positive cattle and bTB test-false positive cattle in Michigan”. This paper's abstract is included in its entirety in these proceedings.

The next presentation was provided by Doug Corey, DVM, Chair of the Professional Rodeo Cowboys Association's Animal Welfare Committee and Past President of the American Association of Equine Practitioners, Adams, Oregon. Dr. Corey’s presentation was entitled “Use of Mexican Cattle in Rodeos in the United States”. The full text of this report is included in these proceedings.

The report of the USAHA Committee on Tuberculosis's TB Scientific Advisory Subcommittee (SAS) followed, provided by Mitch Palmer, DVM, PhD, TB SAS Chair. The TB SAS met Monday, October 12, 2009,
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from 1:00 to 6:00 p.m. The full text of this report is included in these proceedings.

After the TB SAS report, there was a continuation of state perspectives on the National TB Program.

Indiana Report
Bret D. Marsh, DVM, State Veterinarian, Indiana State Board of Animal Health

In November 2008, Indiana received tuberculosis trace information on a beef cow sold from an Indiana farm and slaughtered at a Pennsylvania packing plant. The cow was determined to be a suspect on ante-mortem inspection because of an eye lesion, and tissues collected from suspicious lesions in the cow later cultured positive for *Mycobacterium bovis*. After successfully tracing the animal to an Indiana beef herd, two complete herd tests of the 15 cow herd did not reveal any infection. An adjacent herd of goats was also tested and all of the animals were determined to be negative for tuberculosis.

Within months of conducting the two herd tests in the beef herd, a captive cervid herd, a half-mile from the trace beef herd, sold some red deer for slaughter. The animals were presented to an Indiana meat plant under state inspection, and personnel from the Indiana State Board of Animal Health discovered extensive lesions in the animals consistent with bovine tuberculosis. Culture results later confirmed the diagnosis. This index herd has since been completely depopulated, and an exhaustive epidemiological investigation has found two other infected cervid sites in Indiana. The investigation at these two sites revealed that the only positive animals were those that were recently purchased from the index herd. One of the two sites has been depopulated, and the third site is scheduled to be empty by the end of October 2009.

During the depopulation of the index herd, a few small wild mammals were harvested within the fenced area and examined for lesions. Additionally, thirty head of wild white-tailed deer were harvested in the area immediately outside the fenced area, and each was examined. Although there were no lesions in any of these animals consistent with tuberculosis, tissues were submitted for culture and all of the results were negative.

Hunter-harvested deer in a five-mile area around each of the three infected sites are scheduled to be sampled during the 2009 hunting season. Additionally, all cattle herds within approximately three miles of the index farm are being tested. The testing of cattle herds is underway, and the wild white-tailed deer samples will be collected during the opening weekend of gun season in mid-November.

The DNA typing of the tuberculosis cultured from the beef cow is similar to elk isolates identified in several areas of the United States and Canada over the last 15 years. Further, the typing of the tuberculosis cultured from the cervids on the index herd is also similar to these elk isolates.
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Although to this point, Indiana has not been in jeopardy of losing the tuberculosis-free status it attained in 1983, the concept paper prepared by USDA titled, A New Approach for Managing Bovine Tuberculosis offers a unique perspective. Indiana offers at least the following comments to this initiative:

1. **Imported Cattle** Although there has been significant progress in the reduction of tuberculosis in cattle imported into the United States, most of the diagnosed cases of bovine tuberculosis in the country still are traced to imported cattle. Clearly, if the United States is to be successful in the eradication of tuberculosis, there must be more definitive action taken to protect the native cattle herd. These additional steps must include enhanced testing requirements of imported cattle, specified destinations for imported cattle, and restricting imported cattle to sites that will not allow them to become commingled with breeding cattle.

2. **Diagnostics** A high priority must be placed on the rapid development of effective diagnostic tests. The national tuberculosis program cannot be successful without the infusion of new science and technology. Every effort must be made to support research initiatives that may include multiple nations, the further development of serum banks to support the validation of new diagnostic tools, and providing an environment for investigating innovative approaches through scientific discovery.

3. **Status** The state status classifications have been effectively used for many years, and while there is a proposal to abandon this system, there must be a very clear vision of what will replace it. The current situation seems to suggest that it is not simply the title of the classification, but rather the conditions with each classification that are so onerous. Therefore, simply eliminating the classification system will not address all of the challenges with the system, but rather an alternative may be to modernize each classification. For example, it seems that the current “Free” classification could be redefined to include new performance metrics that must be attained by each state to maintain status.

4. **Engagement** As the program transitions, there must be an entity established that will engage federal, state and industry partners for the purpose of reviewing and acting upon the reported tuberculosis activity of the states. For example, for many years the National Pseudorabies Eradication Program utilized the input of the Pseudorabies Control Board to determine the status levels of states. This body decided when a state was not meeting the standards and communicated to that state the specific steps it must take.
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to attain or maintain a status. Through this approach there was much broader acceptance of the program standards and a better appreciation of the importance of performance metrics. A similar approach to the tuberculosis program will greatly enhance it.

Indiana congratulates the USAHA on a very successful tuberculosis meeting in July 2009 and further appreciates the opportunity to offer these comments.

New Mexico Report
Dave Fly, DVM, State Veterinarian, New Mexico Livestock Board

The current TB status of New Mexico is split. The majority of the state is TB Accredited Free with two counties in east central New Mexico, Roosevelt and Curry Counties, Modified Accredited Advanced. New Mexico welcomes the opportunity to comment on the National TB Program.

- The word “flexibility” has been used extensively when describing the future National TB program. Flexibility is a good option as long as it is based on solid science and risk.
- The shift from depopulation to test and remove programs is a double edged sword. New Mexico has proven that a well planned and managed test and remove program is a valid, fiscally responsible option in dairies (Mitchell Dairy). However, there is concern that a test and remove program in an average size beef operation in New Mexico will not be acceptable to the producer nor the State. Most of the beef ranches in New Mexico are tens of thousands of acres in size with stocking rates of 50 acres per unit (cow/calf pair) to over 200 acres per unit. It is not practical to expect a rancher to gather his cattle from such a large area as often as is required in a test and remove program and maintain the possibility of profitability. Also, the question of how the rancher will market calves has to be addressed. Where will the ranch be able to sell its calves without experiencing a significant reduction in price. Quarantined pastures and feedlots sound like a reasonable option but the reality is that there are a limited number of quarantined feedlots and few, if any, quarantined pastures. Wildlife must also be addressed. The possibility of establishing a wildlife component due to exposure to a TB affected beef herd must be considered. Finally, fence to fence contact with neighboring cattle is an unavoidable reality in ranches located in the southwest, again increasing the risk of spreading TB.
- Indemnity for TB exposed trace cattle is a must. These cattle need to be considered as potential TB time bombs scattered throughout the country. They must be removed from the cattle.
population and undergo enhanced inspection to determine the possibility of further TB exposure.

- The need for an improved test is obvious. New Mexico supports all reasonable efforts in development of such tests along with the continued improvement of the TB serum bank.
- Industry must become more involved if TB eradication is to be accomplished. Producers must avoid high risk situations such as co-mingling potential breeding replacement animals with all animals that may pose a higher risk for TB.
- The possibility of human to bovine spread of TB, although rare, should be further explored. The delicacy of such an investigation is appreciated, however, as bovine TB continues to “pop up”, all aspects of the disease should be explored.
- A nationwide sport cattle TB surveillance program needs to be developed and implemented.

Texas Report
Bob Hillman, DVM, State Veterinarian and Executive Director of the Texas Animal Health Division.

The infected Texas herd had approximately 3,000 animals. The herd was found when tested by practitioners for a herd dispersal. There were 50 caudal fold tuberculin test responders and subsequently, five lesioned animals were found at slaughter. These were culture positive with one histo compatible. On the second test, more than 120 caudal fold responders were found, with two more culture positive animals identified.

Disposition of the herd is via test and removal. The owner has reduced the herd size to approximately 1,100 head (700 cows and 400 heifers and bulls).

The epidemiological work on this herd revealed four trace-ins from three states, over 5,100 head traced out to at least 12 states. In Texas, at least 23 dairies are being tested and wildlife sampling is being conducted.

- Risky business included the continued importation of TB-exposed Mexican-origin cattle, less than optimum application of tuberculin tests, insufficient funding to effectively apply the Bovine TB Program and ineffective ID and traceability.
- Risky practices include pasturing and grazing of Mexican-origin cattle with native breeding and replacement cattle; feeding of breeding and replacement cattle in feedlots containing high risk cattle, with subsequent removal of breeding and replacement cattle; commingling or other exposure of Mexican-origin performance cattle with native breeding, replacement and dairy cattle; and acquisition from many sources and extensive commingling of dairy replacement cattle.

Issues include:

- State status – current provisions for removal of state status inequitable and not based on sound science, loss of status
very costly to portion of industry that does not have evidence of disease, and elimination of status provisions may have the unintended consequence of removing incentive for cattle producers to support the TB program.

- Zoning.
- Designation of risk areas.
- Dairy commuter herds – calves from multiple dairies, often from multiple states commingled at one location; how we address identification of exposed or test positive and lesioned animals on the calf-raising facility.
- Tiered feedlot system – unrestricted, restricted to slaughter only and approved/quarantined feedlots.

A question and answer and discussion period followed the afternoon’s state presentations.

Committee Business

At the conclusion of formal presentations, Dr. Connell reported on the 2008 Resolutions, Numbers 47-50, and USDA’s responses. VS-APHIS-USDA responded promptly in writing to the 2008 Resolutions.

Four resolutions were approved and forwarded to the Committee on Nominations and Resolutions. Topics included expedited Center for Veterinary Biologics approval of new bovine TB antibody tests and the National bovine TB Eradication Program.

Due to time constraints, updates and summary reports were not presented during the meeting on the National TB Programs for the United States and Canada. The full text of those reports is included in these proceedings.
During the Tuberculosis (TB) Scientific Advisory Subcommittee (SAS) meeting on Monday, Oct. 12, the following presentations were made:

1. An overview of TB test approval process was given by Drs. Larry Elskin of CVB, Alecia Naugle of the APHIS TB Program staff and Mitchell Palmer of the USAHA TB SAS.

2. Dr. Jeff Nelson, APHIS, NVSL gave an update of activities of the NVSL TB serum bank. Six companies are currently known to be developing serologic tests to detect bovine TB in animal species. Most of these companies have been in contact with the TB serum bank to obtain samples. The companies include:

- Chembio - Stat-Pak, MAPIA, Dual Path Platform (DPP)
- Diachemix - FPA
- Enfer Group - Two-step ELISA
- IDEXX - IDEXX M. bovis Antibody ELISA
- Modern Veterinary Therapeutics, LLC - Not disclosed
- PriTest - SeraLyte-Mbv

Funding for an enhanced serum bank collection effort was provided by USDA, Veterinary Services (VS) in April of 2009. Most of the samples in the TB serum bank contain only 1-3 mls of serum and will not meet of the demands of the industry partners currently developing tests for repeatability and reproducibility studies. It was determined that a minimum of 10mls of serum from each animal would be adequate to meet the demands of multiple test developers. The goal of the enhanced serum bank effort is to collect:

- 1,600 negative TB samples from cattle and white tail
- 893 TB negative cattle samples and 103 white tail deer samples collected using the enhanced serum bank effort protocols
- 250 TB positive samples from cattle and white tail
- 5 TB positive cattle samples

Numbers of samples to collect in the enhanced serum bank effort were determined from the Criteria for Evaluating Experimental Tuberculosis Test Performance for Official Test Status document that was...
REPORT OF THE COMMITTEE

approved by the TB committee last year.

Protocols for the enhanced serum bank effort were developed and have been sent out to all AVICs and State Veterinarians.

International collaboration with Mexico, Canada, and the United Kingdom has occurred to submit serum samples from TB positive cattle to the TB serum bank at NVSL.

Total numbers of samples received in FY2009:

<table>
<thead>
<tr>
<th>Species</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Tail</td>
<td>108</td>
</tr>
<tr>
<td>Elk</td>
<td>62</td>
</tr>
<tr>
<td>Fallow</td>
<td>54</td>
</tr>
<tr>
<td>Reindeer</td>
<td>16</td>
</tr>
<tr>
<td>Red</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>256</td>
</tr>
<tr>
<td>Cattle</td>
<td>1259</td>
</tr>
</tbody>
</table>

Total number of all serum samples submissions to the TB serum bank that have been characterized include:

- Cattle - 1687
- Cervid - 2713

The TB serum bank is in the process of developing a user fee to access samples in the bank. This is being established to recover the cost of:

- Supplies
- Shipping
- Time for collection of samples
- Making aliquots
- Serum panel creation

Any questions regarding the serum bank effort can be answered by Dr. Jeff Nelson at NVSL by contacting him at 515-337-7966 or Jeffrey.T.Nelson@aphis.usda.gov.

3. Chris Rathe of PriTest presented a cost effective serology assay for identification of M. bovis infected cattle.

PriTest made a presentation to the Scientific Advisory Subcommittee of their SeraLyte-Mbv™ test with performance evaluation of their test in a number of confirmed positive and presumed negative sample sets. The performance data of the PriTest assay demonstrated that this their test method meets or exceeds the required performance characteristic on the required number of positive and negative samples to move to Phase II in the new TB test Guidelines that were updated at last year’s TB Committee meeting as guidelines for TB SAS.
From various sources, 95 confirmed positive Bovine samples were tested, 81 were positive with the SeraLyte-Mbv test, showing an overall Sensitivity of 85.3 %. Presumed negative Bovine samples were sourced from ten Accredited Free states that have been accredited-free (TB) for at least 15 years as of 2007. Of the 1,394 samples tested, 1,358 were negative, showing an overall Specificity of 97.4 %.

4. John C. Lawrence of IDEXX Laboratories presented a performance update of the IDEXX *M. bovis* antibody test a prototype antibody ELISA developed for cattle and cervid applications
   - Sensitivity of 82%-88% confirmed positive sets (cattle, n=81)
   - Detection of antibody starting as early as 42 days post experimental challenge with more consistent response by 3-4 months
   - ELISA detects positive samples missed by other methods
   - Specificity of 98% on samples from TB-free states (cattle, n=5101)
   - Defined cross-reactivity with other mycobacteria
   - Promising results on limited set of cervid samples (SN=63%, SP=96%)
   - 3 hour test protocol, familiar laboratory format
   - Utilizes serum samples - no special handling or shipping routines

5. Dr. William Davis of Washington State University presented Diagnosis and Control of Tuberculosis.

6. Dr. Maria Koller-Jones of the Canadian Food Inspection Agency presented Comparison of Mycobacterium bovis PPD Tuberculins from Canada, Mexico, New Zealand, and the United States.
   A bovine PPD tuberculin study was carried out as part of a larger body of work dealing with the harmonization of North American tuberculins under the Security & Prosperity Partnership (SPP) initiative. The data from this study will be given to the SPP TB Working Group to further the work of harmonizing TB diagnostic tests used in North America.
   The objective of this study was to compare the performance of the *M. bovis* PPD tuberculins of
   Canada, Mexico, New Zealand & United States on a large number of known TB infected cattle and known negative cattle using side-by-side intradermal cervical testing. Tissues were collected to confirm each animal’s true infection status for comparison to the skin test results. Sera were also collected for future blood tests. The study was carried out in 2007-2008.
   The positive cohort comprised of 199 cattle from two known infected herds in Mexico, and the negative cohort consisted of 52 cattle from herds in a TB-free area in the United States. Field issue Mycobacterium bovis
PPD tuberculins from Canada, Mexico, New Zealand, and the United States were re-bottled into identical bottles and labelled: A, B, C, and D (not in this order). Each animal in the positive and negative cohorts was skin tested with each of the four tuberculins in a Latin Square design (two PPDs on each side of the neck), with PPDs blinded to the testing veterinarians and randomly assigned.

Skin thickness measurements of each injection site were taken at before injection and 72 hours post-injection. For each animal and each PPD, a skin test value was determined by subtracting the pre-injection measurement from the post-injection measurement. The cattle in the positive cohort were then slaughtered in Mexico, where samples for histopathology and culture were collected and shipped to NVSL for testing. The cattle in the negative cohort were immediately slaughtered in the United States for similar tissue collection and testing.

In the positive cohort, the following mean skin test values were obtained: A: 7.5 mm; B: 7.77 mm; C: 6.94 mm; D: 5.22 mm. For the negative cohort, mean skin test values were: A: 0.40 mm; B: 0.85 mm; C: 0.44 mm; D: 0.40 mm. This study found that each of the four tuberculins produced a significant difference in the skin test values of the positive cohort as compared to the negative cohort. This indicates that each PPD can be used to screen cattle for bovine TB, subject to the limitations of this study. The measure of the performance (sensitivity and specificity) of an individual tuberculin depends on the cut-off skin test value established for that PPD.

Analysis of the skin test values obtained from this study was used to calculate estimated sensitivity and specificity at various cut-off values. This study confirmed that any of the four tuberculins can give a low or nil skin test value in an individual _M. bovis_ infected animal. However, at the herd level, all four tuberculins would have correctly classified the herds as infected. The low skin test values obtained for all four tuberculins in the negative cohort indicate that these PPDs will be able to indicate non-infected animals with a high confidence level, within the limitations of this study.

During 2009, the TB committee chair, TB SAS, and APHIS TB Program Staff met with officials at the USDA, Center for Veterinary Biologics (CVB) to review the process of licensing and approval of novel diagnostic tests for bovine tuberculosis.

It was clear from review of CVB directives, memos and regulations associated with the licensing/approval process, that diagnostic companies should engage CVB involvement very early in the licensing/approval process. This critical and early involvement with CVB is not explicitly emphasized in the current “Criteria for Evaluating Experimental Tuberculosis Test Performance for Official Test Status” as published in the 2008 USAHA Proceedings.

Most importantly, it was noted that in order to accomplish certain elements of Phase II, approval from CVB is required. Specifically, in
accordance with CFR 10.3, a letter of approval to ship experimental biological products must be obtained.

**Recommendation:** The TB SAS recommends to the USAHA Committee on Tuberculosis that the current 2008 version of “Criteria for Evaluating Experimental Tuberculosis Test Performance for Official Test Status” be amended to require CVB approval to ship experimental biological products (CFR 10.3) before proceeding to Phase II.

It was also noted that in some cases, the first contact a diagnostic test manufacturer may have with USDA, is with CVB. The TB SAS further recommends that, upon submission of the license application and supporting data to CVB, that CVB in turn notify APHIS, TB Program Staff that such an application has been received and that CVB strongly encourage the submitting manufacturer to make direct contact with TB Program Staff.

In this way, coordination of the license/approval process is directed by CVB in accordance with APHIS Directive 6910.1. The TB Program Staff, with input from USAHA, will work in cooperation with CVB in field evaluations necessary for use of the assay as an approved test in the TB eradication program.

TB SAS was asked to evaluate data submitted by diagnostic test manufacturers on two different serologic assays for bovine tuberculosis.

PriTest of Redmond, Washington submitted data with the specific request that Phase II trials begin (as described in “Criteria for evaluating experimental tuberculosis test performance for official test status.”) and that their SeraLyte-Mbv assay be considered as a replacement for tuberculin skin testing of cattle.

IDEXX Laboratories of Westbrook, Maine submitted data on the IDEXX *M. bovis* antibody test kit, with the request that the assay be considered as a supplemental test, to be used in series or in parallel with currently approved skin testing and gamma interferon assays.

The development of new means of diagnosis of bovine tuberculosis that are faster, less subjective, and require a single animal handling event is of extreme importance to APHIS TB Program Staff, USAHA and the future of the bovine tuberculosis eradication campaign. The work of private manufacturers in development of novel diagnostics is greatly appreciated. CVB, APHIS TB Program Staff and USAHA should continue to work cooperatively to assist, as appropriate, with assay development, evaluation, licensing, and approval of promising tests.

To evaluate test sensitivity, both manufacturers have evaluated naturally and experimentally *M. bovis* infected cattle from both domestic and non-domestic sources. The assays use different platforms to detect antibodies to specific *M. bovis* proteins. Sensitivity estimates for the SeraLyte Mbv range from 78-92%, depending on the sample set analyzed, with an overall sensitivity of 85.3%. Sensitivity estimates for the IDEXX *M. bovis* antibody assay ranged from 82-88% on domestic cattle samples.
For unknown reasons, much lower sensitivities were seen in sample sets from Mexico.

To evaluate test specificity, large numbers of cattle from TB free sources have been evaluated by both manufacturers. Little cross reactivity with non-tuberculosis mycobacteria has been noted. SeraLyte Mbv specificity is reported to be 97.4%. Specificity of IDEXX M. bovis assay is reported to be 97.9%. To further evaluate these assays as potential replacements or supplements to existing approved tests, evaluations such as those described in Phase II trials are needed.

**Recommendation:** In context of the recommendation to amend “The Criteria for Evaluating Experimental Tuberculosis Test Performance for Official Test Status,” the TB SAS recommends that both PriTest and IDEXX, with their respective assays, move from Phase I to Phase II testing once CVB approval to ship experimental biological products is obtained.
Elk, *Cervus elaphus*, are subject to the regulations concerning intradermal tuberculin testing under the USDA's uniform methods and rules for the eradication of bovine tuberculosis. Though the single cervical tuberculin (SCT) and comparative cervical tuberculin (CCT) tests are approved methods of anti-mortem detection of *Mycobacterium bovis* infection, few studies quantify the response of elk to these tests. Furthermore, results are acquired after the injection sites are palpated and measured at 72 hours post injection requiring rehandling of the animals. Infrared thermography, the remote measure of surface temperature, may be able to reduce the time to results and eliminate the second handling of the animals by measuring temperature changes associated with inflammation at injection sites. Our objective was to examine the response of sensitized and non-sensitized elk to the tests by palpation, skin thickness measurement and infrared thermography (IRT).

To this end, ten elk were sensitized to *M. bovis*, nine elk were sensitized to *M. avium* and 19 elk were not sensitized. The sensitized elk were tested 9 or 20 days after injection of 0.1 ml derivatives of the selected bacterium. The animals from the three different groups were randomly divided into two blocks; block one received 0.1 ml of 2 mg/ml of the purified protein derivative (PPD) and block two received 0.1 ml of 1 mg/ml of the PPD for the SCT test. Testing of block one was offset by one day from block two testing. The SCT and the CCT were conducted concurrently on each animal on the right side and left side of the neck, respectively. In addition to the PPD injections sites which were measured for skin thickness and palpated, two additional sites for the SCT and CCT were measured and palpated, a saline injection site and a control site. IRT images were taken at 0, 0, 24, 48, and 72 ± 3 hrs post injection of all sites.

No significant difference \( (x^2=1.09, P=0.78) \) for detecting a response occurred between the two different concentrations of the PPD for the SCT. Increase in skin thickness for the SCT ranged from 0.0 mm to 8.5 mm and the mean for sensitized animals at the PPD injection site was 3.0 mm (± 0.5 SE). Based on palpation results, 78.9% of the sensitized elk and 6.8% of the control elk had a response to the PPD injection on
REPORT OF THE COMMITTEE

The SCT. For the CCT, skin thickness increased from 0.0 mm up to 10.0 mm. The mean at the bovine PPD site was 4.1 mm (± 0.9 SE) for *M. bovis* sensitized, 1.8 mm (± 0.4 SE) for *M. avium* sensitized, and 0.9 mm (± 0.1 SE) for the control elk. Ninety percent (9 of 10) of *M. bovis* sensitized were suspects or reactors. Of the nine elk that had *M. avium* sensitogen and of the 19 elk that were controls, 26 plotted in the negative zone for *M. bovis* and two of the control elk plotted in the suspect zone for 92.9% specificity. Preliminary IRT analysis has not indicated any significant temperature changes associated with the different sites.

The changes due to the PPD injections are often small and changes in the concentration of the PPD for the SCT did not result in significant changes in detecting a response. The small changes, however, may mean less inflammation that could be masked by ambient conditions making IRT difficult to use on elk.
Bovine Tuberculosis (bTB) is a disease caused by *Mycobacterium bovis* infection. Under current federal regulations, cattle that test as reactors on two successive federally approved diagnostic tests are examined post mortem for bTB. Currently, in Michigan, <1% of cattle that test as reactors on two successive tests are confirmed as positive for bTB. We are in need for an alternative test that can differentiate the test-false positive reactors from true bTB infected animals.

We conducted a microarray-based comparative genomic hybridization study to examine the altered gene expression patterns in three groups of cattle. Those groups included cattle that had bTB (bTB+), cattle that did not have bTB but tested positive for bTB by two successive tests (double reactors), and cattle that did not have bTB but tested positive for bTB by the caudal fold skin test only (single reactors). Cellular RNA from peripheral blood mononuclear cells (PBMCs) was harvested at four hours or overnight post-stimulation with purified protein derivative made from *Mycobacterium bovis* (bovine PPD). The RNA from individual cattle was co-hybridized with a pooled control RNA from healthy cattle that were non-reactors on both the CFT and on the whole blood gamma interferon assay for bTB.

Hybridization for the four hour study was done using a mononuclear leukocyte derived bovine cDNA microarray (BOTL5) with duplicated spot features representing 1,391 genes. At a 1.5 fold or greater change in expression level compared with healthy cattle (*p* ≤ 0.01), we detected eight genes differentially expressed in single reactor cattle, 38 genes in double reactor cattle, and 13 genes in the true bTB positive cattle. All except one of these genes are unique to each of the groups of cattle; one gene is significant for both the reactor groups. Gene expression level was further compared among each of the three groups of cattle. Expression level of 17 genes were significantly different (*p* ≤ 0.01) in bTB+ group compared with single reactor group, and 14 genes in bTB+ group compared with double reactor group. We detected nine genes that significantly differentiate (*p* ≤ 0.01) bTB+ group from the composite of all reactors at greater than 1.5 fold in expression level.

A bovine long-oligo microarray (BLO Plus) representing 10,219 bovine genes was used for hybridization of the overnight stimulation study. Comparing gene expression level with healthy cattle at adjusted *p*-value cut off of 0.01 (adjusted for multiple testing); we detected 146 genes differentially expressed in single reactor cattle, 154 genes in
double reactor cattle, and 151 genes in the true bTB positive cattle. At a 1.5 fold or greater change in expression level compared among each animal group, 36 genes were found significantly different in bTB+ group compared with double reactor group ($p \leq 0.01$, false discovery rate [fdr] = 0.3826) and 75 genes different in bTB+ group from reactor group ($p \leq 0.01$, fdr = 0.4405); of which only four genes differentiate bTB+ group from both reactor groups. Analysis of bTB+ group compared with the composite of all false-positive reactors uncovered an additional 18 genes that differentiate bTB+ group from both reactor groups by 1.5 fold or greater change in expression level ($p \leq 0.01$, fdr = 0.3787).

Preliminary data from these experiments supports the hypothesis that differential gene expression patterns will provide a sufficient number of uniquely regulated genes to develop a real-time quantitative PCR assay that can be used to differentiate false test-positive cattle from cattle that have bTB. This test will help to reduce the expense of indemnification and needles slaughter of healthy cattle.
TUBERCULOSIS

Status of the State and Federal Cooperative
Bovine Tuberculosis Eradication Program, Fiscal Year 2009

U.S. Department of Agriculture, Animal and Plant Health
Inspection Service, Veterinary Services
Tuberculosis Eradication Program

The cooperative State-Federal-industry effort to eradicate bovine tuberculosis (TB) from the United States has made significant progress, markedly decreasing the prevalence of the disease. However, the goal of eradication remains elusive as animal health officials continue to detect TB sporadically in U.S. livestock herds. Several challenges continue to hinder our efforts to eradicate the disease:

- Infected cattle imported from other countries
- Infected wildlife as a reservoir
- Changes in the dairy and beef cattle industries
- The limitations of available diagnostic tests
- Inability to trace some infected animals identified at slaughter to a herd
- Outdated regulations
- Antiquated approaches to disease control
- Flat or decreasing Federal budgets

These factors demand a new approach to managing this disease. The Animal and Plant Health Inspection Service (APHIS) is evaluating the existing bovine TB program, gathering input from stakeholders, and developing regulations to craft a TB program that protects the health of U.S. livestock and is responsive, timely, and cost-effective.

TB Public Meetings and Concept Paper

APHIS held a series of public meetings for external and internal stakeholders during fiscal year (FY) 2009. These meetings were formatted as listening sessions so that stakeholders could discuss challenges and new approaches for TB eradication and control. Summaries of these public meetings are posted on the APHIS Web site at www.aphis.usda.gov/newsroom/hot_issues/bovine_tuberculosis/tb_lst.shtml.

Based on input received from these meetings, APHIS’ Veterinary Services (VS) developed a concept paper titled, “A New Approach for Managing Bovine Tuberculosis: Veterinary Services’ Proposed Action Plan.” This document presents VS’ current thinking about changes being considered for the TB program. This concept paper was published October 5 in the Federal Register, and we are accepting comments through December 4. To submit comments, go to www.regulations.gov and enter APHIS-2009-0073 in the keyword search.

TB-Affected Herds Identified in FY 2009

In FY 2009 (October 2008 to September 2009), a total of 12 TB-
affected herds have been identified: three beef herds, two dairy herds, and seven captive cervid herds. While the total number of TB-affected herds identified in FY 2009 is comparable to the 11 herds identified during FY 2008, the identification of seven TB-affected captive cervid herds is unprecedented. Only four affected captive cervid herds were identified between FY 1998 and FY 2008.

Slaughter surveillance for bovine TB exceeded our national goal in FY 2009. Four of the TB-affected herds identified this year (two cattle and two cervid) were detected as a result of slaughter surveillance and subsequent epidemiologic investigations to trace the slaughter cases to their herd of origin. This demonstrates the integral role of slaughter surveillance in our program.

Of the TB-affected herds found during FY 2009, two beef herds and four captive cervid herds were depopulated with Federal indemnity. The disposition of one beef herd and one captive cervid herd is pending. Two captive cervid herds in Michigan identified as “shooter” herds were not depopulated. These herds are in an area where TB is endemic; also, they pose no risk of disease spread because no live animals leave the facilities.

Four dairy herds are under test-and-remove herd plans. Two of these herds were identified in FY 2009; two herds continue under test-and-remove herd plans from previous years. One dairy in Michigan identified a TB-infected cow at the last herd test for quarantine release and continues under quarantine as an affected herd. In Texas, a dairy was identified through dispersal sale testing, and it remains under quarantine and a test-and-remove herd plan. Two dairies in California remain under quarantine and test-and-remove herd plans. All four herds continue to undergo regular herd testing as part of their herd plans. Michigan herd plans also include requirements for mitigating the risk of infection from wildlife.

Bovine State Status
At the end of FY 2009, 46 States and Territories and two zones were TB accredited-free (AF), including Puerto Rico and the U.S. Virgin Islands. California was modified accredited advanced (MAA), and three States had split-State status. Michigan has AF, MAA and modified accredited (MA) status. Minnesota was recognized as having MAA and MA status in October 2009. New Mexico again gained split-State status as AF and MAA. Of the AF States and zones, 20 States and the U.S. Virgin Islands have maintained AF status for over 25 years; 20 States have been AF for 15 or more years; five States have been AF for 10 or more years; one State and Puerto Rico have been AF for 5 or more years; and one State and one zone have had AF status for less than 5 years.

Captive Cervid State Status
All States and territories have MA status.

Policy on the Use of Federal Funding for Whole-Herd Depopulation
During the summer of 2009, APHIS adopted a new policy where
the use of Federal funding to depopulate entire TB-affected herds and indemnify herd owners would no longer be recommended as the primary management option. Rather, whole-herd depopulation will be implemented when the data indicate that other options will not mitigate disease spread, an imminent public or animal health risk exists, or it is cost-beneficial to do so. APHIS will determine the best course of action for each TB-affected herd by evaluating several factors, including the prevalence of disease within the herd, risk of disease transmission, effectiveness of management practices, and cost-effectiveness. When appropriate, VS is proposing to manage specific TB-affected herds under a test-and-remove policy in conjunction with quarantines and restricted movement of animals to limit the spread of TB from these herds.

Collaborations with Mexico

APHIS continues to work with Mexico to ensure equivalency between the two countries’ requirements. To accomplish this, reviews of the State of Coahuila, the MA zone of Veracruz, and the Mexican National TB Eradication Program were completed in FY 2009. The review teams examined TB program integrity, progress, and the level of prevalence. Eleven reviewers were VS or International Services employees, and one worked for the State of California. We recognize and appreciate the contributions of these reviewers.

TB Serum Bank

In FY 2009, APHIS approved $250,000 to expand its TB serum bank. The serum bank will provide well-characterized serum samples with skin test results for samples from uninfected animals, and skin test, histopathology, and TB culture results for samples from infected animals. The serum bank samples will be available to researchers and diagnostic companies as they develop and evaluate serologic tests for bovine TB using the criteria recommended by the U.S. Animal Health Association. Our goal is to obtain blood from 250 TB-infected and 1,600 uninfected cattle and 1,600 uninfected white-tailed deer. Because of the limited availability of naturally infected white-tailed deer, APHIS expects to obtain samples from only 20 to 30 infected animals.

The majority of serum samples will be collected from uninfected animals in the United States during routine TB skin testing events. Samples from infected cattle are being sought through collaborations with countries that have endemic TB. We are collaborating with Mexico, Canada, and the United Kingdom (UK) to collect and receive serum and tissue samples from TB-infected cattle. Sampling in the UK for our serum bank will begin this fall. Participation by Mexico is pending. So far we have collected serum samples from approximately 50 cervids (including 6 TB-infected animals) and 700 cattle (including five that are TB-infected).
REPORT OF THE COMMITTEE

Updates for Selected States and Additional Details Concerning TB-Affected Herds

California Update: One affected dairy herd was identified in FY 2009 during continuing epidemiological investigations from affected dairy herds identified during FY 2008. This herd is under a test-and-remove herd plan.

Molecular epidemiology conducted on the four affected dairy herds recently identified in California has revealed three different DNA types, indicating three different outbreaks. The strain of Mycobacterium bovis identified during the 2003 outbreak has not been found in any of the recent detections, indicating that the current outbreaks are not related to the 2003 outbreak.

VS initiated a TB Task Force in FY 2008 to assist the California Department of Food and Agriculture in responding to the TB outbreak. This task force continued through February 2009, assisting with the epidemiological case development and on-farm herd testing of 246 herds and approximately 377,000 head of cattle. In addition, 24 more herds containing nearly 20,000 cattle have been tested subsequently as part of the epidemiologic investigation of the infected dairy discovered during FY 2009.

Indiana Update: A captive cervid herd was identified through targeted slaughter surveillance. This herd was located in close proximity to a cattle herd implicated in a routine slaughter inspection finding of M. bovis. Regulatory personnel, who were present when several animals from this herd were routinely slaughtered, collected lesions consistent with M. bovis infection from several carcasses. After M. bovis was isolated, the herd was declared affected and an epidemiological investigation initiated.

Two additional affected captive cervid herds were located through tracing animals sold out of the herd. The index herd and one traceout herd have been depopulated with Federal indemnity. The disposition of the second affected traceout herd is pending. Other captive cervid herds identified during the epidemiological investigation remain under quarantine until they can be tested during the winter season.

Michigan Update: One beef herd and two captive cervid herds were detected in FY 2009. All three herds are located in northern Lower Michigan in the bovine MA zone. The affected beef herd was detected through annual surveillance testing while the two captive cervid herds were identified through combined TB and chronic wasting disease slaughter surveillance. The beef herd has been depopulated with Federal indemnity. The two captive cervid herds remain under quarantine. They are “shooter” herds and represent a low risk for disease spread because no live animals leave the premises; also, the herds are in an area known to have endemic TB infection.

One dairy in Michigan’s MA region continues under a test-and-remove herd plan. This dairy was identified as affected a second time in 2004, the first infection being found in 2000. During the last herd test for release of quarantine an M. bovis-infected cow was identified. As a result
of this finding, the quarantine was not released and the dairy herd is still considered affected. Under the terms of the herd plan, testing will revert to the disease removal phase of the test-and-remove protocol and continue until the freedom-from-disease phase is successfully concluded and all requirements for quarantine release have been achieved.

**Minnesota Update:** Minnesota was reclassified to a split-State status of MAA and MA in October 2008. One beef herd was identified as affected in Minnesota in FY 2009 through routine slaughter surveillance. This herd was participating in the Minnesota State-sponsored buyout program for cattle herds in the core area of the MA region. To date, all affected cattle herds have been found in a small geographic area in northwest Minnesota. All affected herds in Minnesota identified to date have been depopulated with Federal indemnity. Surveillance of free-ranging white-tailed deer continues through hunter-harvested and targeted culling sample collection. Twenty-five infected free-ranging white-tailed deer have been identified to date.

**Nebraska Update:** One beef herd was identified as affected following an epidemiological investigation of a routine slaughter surveillance detection of *M. bovis*. Testing of the herd of origin confirmed infection in the herd. The herd remains under quarantine and disposition is pending at this time. The epidemiologic investigation associated with this herd has involved testing 33 Nebraska herds and over 13,000 cattle through mid-September 2009. No evidence of spread of the disease has been discovered to date.

A captive cervid herd was identified as affected through slaughter inspection. This herd has been depopulated with Federal indemnity. Wildlife surveillance has been conducted in the area surrounding the herd, and no signs of infection in free-ranging deer have been found.

**New York Update:** One captive cervid herd was identified through routine testing for sale purposes. One aged fallow deer was identified as a test responder and taken to necropsy. *M. bovis* infection in this animal was confirmed and the herd depopulated with Federal indemnity.

**New Mexico Update:** New Mexico applied for split-State status, which it received in March 2009 after two program reviews and the implementation of a memorandum of understanding. No affected cattle herds were identified in New Mexico in FY 2009. One affected dairy herd that had been under quarantine since 2002 completed a test-and-remove herd plan and was released from quarantine in July 2009.

**Texas Update:** One dairy was identified as affected through testing for sale purposes. This dairy has been placed under a test-and-remove herd plan. Epidemiological investigations continue. As of September 17, at least 15 States have received over 5,000 exposed heifers believed to have left this dairy over the past several years. In Texas alone, testing has been completed for over 21,000 cattle in 19 herds as part of this epidemiological investigation. A wildlife survey surrounding the infected dairy is also in progress.
Surveillance for bovine tuberculosis (TB) in the United States consists of slaughter surveillance in cattle and live animal testing in cattle and captive cervids. Twelve affected herds were detected during Federal fiscal year (FY) 2009, including three beef, two dairy, and seven captive cervid herds. During FY 1998 to 2009, 92 affected herds were found. Bovine herds included 53 beef, 26 dairy, and two mixed use, comprising 58 percent, 28 percent, and two percent of the total, respectively. Eleven captive cervid herds were detected in that time period, comprising 12 percent of the total.

The seven captive cervid herds detected in FY 2009 represented an unprecedented number: only four affected captive cervid herds had been detected from FY 1998 to 2008. Throughout the 1990s, TB-affected captive cervid herds were detected in at least 14 States. The cervid species involved in these outbreaks included axis deer, elk, fallow deer, red deer, and Sitka deer; in some cases, affected premises also had infected cattle and bison. TB isolates from two FY 2009 TB cattle cases were determined through genotyping to match strains isolated from captive cervid cases from the 1990s.

Slaughter Surveillance

For the period October 1, 2008, through June 30, 2009, 7,683 granulomas identified during postmortem slaughter inspection were submitted for diagnostic testing. These lesions originated from 162 U.S. establishments that slaughtered 21.4 million cattle, including 4.9 million adult cattle. The minimum standard for slaughter surveillance is 5 granulomas submitted per 10,000 adult cattle slaughtered annually. This standard is applied to each slaughter establishment. Many establishments substantially exceeded the minimum submission rate in FY 2009. Of the 40 highest volume adult cattle slaughter establishments, 34 (85 percent) met or exceeded the submission standard, and 6 (15 percent) establishments did not. To date, 15.2 granulomas were submitted per 10,000 adult cattle slaughtered nationally.

A critical component of the granuloma submission program is diagnostic laboratory support. A total of 5,351 granulomas (or 70 percent of the total obtained) were submitted to the National Veterinary Services Laboratories (NVSL); another 1,215 (16 percent) were submitted to the Food Safety Inspection Service (FSIS) Pathology Laboratory in Athens, GA; and 1,117 (14 percent) were evaluated at the California State Diagnostic Laboratory in Tulare, CA. Of the 7,683 granulomas submitted
by slaughter establishments through the third quarter of FY 2009, 25 (0.3 percent) had histology consistent with mycobacteriosis. Of these 25 cases, TB was confirmed in 14 cattle and two captive cervids. TB is confirmed by a combination of polymerase chain reaction (PCR) testing of formalin-fixed tissue and culture of fresh tissue.

Slaughter Cases and Affected Herds: Cervids

Slaughter inspection detected a lesioned elk from a Nebraska elk and fallow deer herd. The second slaughter case occurred in a red deer from an Indiana cervid herd consisting of elk, red deer, Sitka deer, and fallow deer. The subsequent investigation led to the detection of two additional affected captive cervid herds in Indiana. The Nebraska herd, two of the three captive Indiana cervid herds, and a small captive cervid herd in New York, were depopulated with Federal indemnity in FY 2009. The disposition of one captive cervid herd in Indiana is pending. An additional two captive cervid herds in Michigan, identified as “shooter” herds, were not depopulated. They are in a TB-endemic area and do not represent a risk of disease spread because no live animals leave the facilities.

Slaughter Cases: Cattle

Of the 13 TB cases detected in cattle at slaughter during FY 2009, seven cases occurred in adult cattle over two years of age, and six cases occurred in feeder cattle. The seven adult cattle cases include six cases in beef cows and one cow of an unidentified type that was slaughtered in Pennsylvania. Investigations related to these cases identified two TB-affected cattle herds.

Of the seven TB cases in adult cattle, three were in adult beef cows from a single herd located in the modified accredited (MA) zone of northwestern Minnesota. The herd was depopulated through the State-funded herd buyout program, resulting in the identification of the lesioned cows during slaughter inspection. Additionally, nine yearling calves originating from the same herd were later confirmed infected with TB.

The fourth TB case in an adult cow was traced back to a beef herd in Nebraska, where infection was confirmed in an additional cow from the herd. The herd was then classified as a TB-affected herd. The decision to depopulate this herd is pending. Genotyping of *Mycobacterium bovis* isolates from the affected Nebraska beef herd and elk/fallow deer herd indicate these herds were infected with different TB strains.

TB-affected herds were not found for the remaining three adult slaughter cases found in FY 2009. One case in an adult cow was traced back to a North Dakota beef herd, which was tested twice without confirming TB. Another adult cattle TB case occurred in a cow slaughtered in a Pennsylvania establishment. Individual animal identification was not collected at the time of slaughter and, as a result, an epidemiologic investigation was required for each of six cattle that had been in a pen together at the establishment. One of the six animals was traced to a small
beef herd in Indiana. Initial testing of this herd did not find any additional infected animals, and additional herd testing is planned. Genotyping results indicated that the isolate from this slaughtered cow was similar to strains isolated from cervids during the 1990s. Because of this finding, Indiana officials conducted surveillance on a nearby captive cervid herd and TB was confirmed in that herd as referenced above.

The most recent case occurred in a beef cow from South Dakota. The epidemiologic investigation for this case is ongoing.

Six TB cases were detected in fed cattle at slaughter during FY 2009. These cattle were all beef-type cattle and were from Texas (three cases), Kansas, South Dakota, and Florida (one case each). Two of these cattle (one each from Texas and Kansas) had official Mexican ear tags collected at slaughter. The tags indicated that one animal had been exported from Chihuahua and one from Veracruz. Culture is pending on a seventh slaughter feeder animal from Texas with Coahuila ear tags that had tissues compatible with mycobacteriosis.

The Florida case occurred in an aged roping steer that had been moved throughout the southeastern United States. The resulting epidemiologic investigation in this case did not identify other infected cattle. The *M. bovis* isolate obtained from a heifer from South Dakota was similar to strains isolated from captive cervids during the 1990s. Individual animal identification was not available for this animal and multiple consignors contributed to the feedlot where the animal originated. The epidemiologic investigation is ongoing. Epidemiologic investigations are also ongoing for two Texas TB cases that did not have Mexican-origin ear tags.

**Mexican-Origin Slaughter Cases**

As described above, only two Mexican-origin fed cattle cases were detected through slaughter surveillance in FY 2009. This represents a substantial decrease compared to FY 2006 through FY 2008, when there were 26, 17, and 11 Mexican-origin TB cases, respectively. During FY 1998 to FY 2008, the rate of TB cases in Mexican-origin cattle ranged from 0.7 to 5.4 infected cattle per 100,000 imported animals. As only two TB cases occurred in FY 2009 and approximately 828,000 cattle were imported into the United States from Mexico during the 2008–2009 export cycle (September 1 to August 31), the overall rate of TB in Mexican-origin cattle for FY 2009 is 0.2 cases per 100,000 imported cattle. Notably, 2008 cattle imports from Mexico substantially decreased from earlier years. There were 1.4 million cattle imported from Mexico in 2004 and 1 million in both 2006 and 2007. However, the recent decrease in the number of Mexican-origin cattle imported into the United States does not fully explain the decrease in the observed rate of TB cases in Mexican-origin cattle; other factors may be contributing to the decrease.
Live Animal Testing

Tuberculin skin testing in live animals also is part of our national TB surveillance. In FY 2009, 1,164,967 caudal fold tuberculin tests of cattle and bison were reported, with 19,164 responders (1.6 percent, 46 States and Puerto Rico reporting). The response fraction by State, for States testing more than 300 animals, ranged from zero to 4.5 percent (median, 1.0 percent). Caudal fold test performance appears to be improving, because 24 States had a response fraction of 1 percent or greater in FY 2009, compared to 13 States in FY 2008 and 16 States in FY 2007. The number of States having a response fraction of less than 0.25 percent was 12, 13, and 12 in FY 2007 through FY 2009, respectively.

The gamma interferon test has been available as an official supplemental test in the TB program since 2005. Five laboratories are approved to conduct gamma interferon testing: California, Michigan, Nevada, Texas, and NVSL. Data were available from four of these laboratories (all but Nevada) that conducted a total of 17,972 tests in cattle from 24 States in FY 2009. A total of 97 percent of these tests, or 17,523, were conducted on cattle from California, Georgia, Idaho, Nebraska, New Mexico, Oklahoma, Oregon, and Texas.

During FY 2009, 21,472 single-cervical tests were conducted in captive cervid species with

381 suspects (1.6 percent) reported toAPHIS. There are no standards for granuloma submissions for establishments that slaughter cervids, so tuberculin testing is the primary means of surveillance for TB in captive cervids. The number of captive cervids tested annually has ranged from 25,000 in FY 2006 to just over 10,000 in FY 2007.
Bovine tuberculosis (TB) is a serious disease with animal health, public health, and international trade consequences. The cooperative Federal-State-industry effort to eradicate bovine TB from cattle in the United States has made significant progress since the program’s inception in 1917. However, the goal of eradication remains elusive. This proposed action plan presents Veterinary Services’ (VS’) current thinking about changes we are considering for the TB program to address our current challenges.

This action plan will:
1. Reduce the introduction of TB into the U.S. national herd from imported animals and wildlife by:
   • Applying additional requirements to cattle imports from Mexico
   • Enhancing efforts to mitigate risks from wildlife
2. Enhance TB surveillance by:
   • Crafting a comprehensive national surveillance plan
   • Accelerating diagnostic test development to support surveillance
3. Increase options for managing TB-affected herds by:
   • Conducting epidemiological investigations and assessing individual herd risk
   • Applying whole-herd depopulation judiciously and developing alternative control strategies
   • Applying animal identification (ID) standards to meet animal ID needs
4. Modernize the regulatory framework to allow VS to focus resources where the disease exists
5. Transition the TB program from a State classification system to a science-based zoning approach to address disease risk

To succeed, this new approach will require VS’ continued partnership with State animal health and wildlife officials, other Federal agencies, industry, international partners, academia, and other stakeholders. Successful partnerships will allow us to use available resources efficiently to achieve program objectives and protect our nation’s herd.

Implementation of the VS proposed action plan will benefit Federal and State animal health officials, the regulated industries, and producers by allowing a more rapid response that employs up-to-date science and
can adapt rapidly to changing situations.

Introduction: The Need for Change

Bovine TB is a serious disease with animal health, public health, and international trade consequences. The cooperative Federal-State-industry effort to eradicate bovine TB from cattle in the United States has made significant progress. Since the program’s inception in 1917, the disease prevalence rate in cattle herds dropped from five percent to less than 0.001 percent. Many consider this one of the great animal and public health achievements in the United States. However, our ultimate goal of eradication remains elusive as animal health officials continue to detect TB sporadically in livestock herds.

Numerous challenges hinder our efforts to eradicate the disease:

• Epidemiological investigations conducted by VS and the States indicate that most TB-infected cattle detected at slaughter were imported. Most of these cases originated from Mexico despite significant reductions in the prevalence of TB in all Mexican States.

• In 1995, animal health officials found an endemic focus of TB infection in free-ranging white-tailed deer in the northeastern lower peninsula of Michigan. More recently, TB has been confirmed in free-ranging white-tailed deer in Minnesota. This wildlife TB reservoir continues to impact the program.

• Today’s cattle industries feature fewer herds of increased size. Producers are more specialized and often transport animals long distances. This frequent movement of some classes of cattle among multiple premises and herds has led to increased risks of TB transmission.

• The absence of a fully implemented national animal ID system negatively impacts the ability to identify affected herds.

• The primary diagnostic tool for TB, tuberculin skin testing, requires multiple veterinary visits to administer the test and interpret results. The tuberculin skin test and all other available diagnostic tests for TB fail to detect all infected cattle, especially in populations with low-disease prevalence.

The TB program is primarily supported with Federal funds, including appropriated funding and emergency funding. The Federal annual appropriation for the TB line item has grown substantially since fiscal year (FY) 2000, but reached its plateau at approximately $15 million since FY 2003. Approximately $207 million of emergency funding has been infused into the TB program since 2001. The Animal and Plant Health Inspection Service (APHIS) obtained these emergency funds through Commodity Credit Corporation requests or APHIS contingency funds when the costs of investigation, control, and eradication activities exceeded the appropriated program budget. However, Federal budget deficits are forecast to continue. We expect federally appropriated funds to remain
constant or decrease and do not anticipate having emergency funds available.

Compounding these challenges is a lack of flexibility in the regulations. The current bovine TB regulations in title nine of the Code of Federal Regulations (9 CFR), parts 50 and 77, the 1999 Uniform Methods and Rules (UM&R) incorporated by reference, and other related regulations (e.g., 9 CFR 71) contain detailed standards and requirements. This means that additional rulemaking is necessary every time we must change any details. VS, like other regulatory agencies, faces a complex, lengthy process to implement changes or develop new regulations. This results in rigid, outdated requirements that cannot adapt to a changing agricultural landscape.

It is time for a new approach. This document presents VS’ current thinking about changes we are considering for the TB program. We hope it will stimulate critical feedback from our partners and stakeholders.

The Proposed Action Plan: A New Approach for Managing Bovine TB
This action plan will:
1. Mitigate the introduction of TB into the U.S. national herd from imported animals and wildlife
2. Enhance surveillance for TB
3. Increase options for managing TB-affected herds
4. Modernize the regulatory framework to allow VS to focus resources where the disease exists
5. Transition the TB program from a State classification system to a science-based zoning approach to address disease risk

1. Mitigate Disease Introduction
Apply Additional Requirements to Cattle Imports from Mexico
Each year, the United States imports approximately 1 million cattle from Mexico. The prevalence of TB-affected herds in virtually all Mexican States and the number of TB cases in imported Mexican cattle have declined substantially from the late 1990s. However, epidemiological investigations indicate that the majority of TB-infected cattle detected at slaughter in the United States originated in Mexico. Exposing U.S. cattle not intended for immediate slaughter to Mexican TB-infected cattle poses a significant risk.

Working with our stakeholders, VS will develop new standards to supplement existing import requirements that will further mitigate this risk. VS will continue to collaborate with the Mexican Government to provide technical support to their TB program.

The alternatives VS is considering include:
- Requiring additional testing of livestock prior to entry into the United States (including tests conducted at the port of entry)
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- Requiring certain classes of imported cattle be sent to quarantined feedlots or terminal feedlots where animals are only destined for slaughter
- Prohibiting the exposure of domestic cattle not destined for slaughter with high-risk imported cattle in feedlots
- Requiring risk evaluations, herd plans, or additional testing requirements for herds exposed to imported animals
- Conducting supplemental surveillance in geographic areas that have an increased risk for exposure to imported cattle
- Requiring annual TB testing for interstate movement of cattle used for rodeo events, regardless of origin

Enhance Efforts to Mitigate Risks from Wildlife

The discovery of an endemic TB infection in free-ranging white-tailed deer in the northeastern lower peninsula of Michigan in 1995 was the first report of self-sustaining bovine TB in wild, free-ranging U.S. cervids. More recently, TB has been confirmed in free-ranging white-tailed deer in Minnesota. TB in wildlife can be transmitted to domestic livestock. VS believes TB in wildlife is the primary reason we continue to find affected cattle and captive cervid herds in Michigan. Identifying TB in wildlife has impacted the direction and success of the TB program for the last decade and will continue to be a significant challenge in the future.

VS will partner with wildlife agencies and other entities to enhance our TB control and elimination efforts. We must establish measures to detect TB in wildlife, reduce the prevalence of the disease in wildlife, and mitigate the risks for transmission of TB between livestock and wildlife.

The alternatives VS is considering include:
- Conducting supplemental surveillance in wildlife in geographic areas where TB has been identified in livestock
- Establishing minimum requirements for targeted surveillance in wildlife as part of a comprehensive, national surveillance plan
- Developing on-farm mitigations to control the risk of disease transmission between wildlife and livestock and evaluate the effectiveness of these mitigations
- Supporting research to identify tools (e.g., vaccination) and strategies (e.g., bait delivery strategies) to reduce the prevalence of TB in wildlife and instituting those strategies as appropriate

2. Enhance Surveillance

Crafting a Comprehensive National Surveillance Plan

Since its inception, the TB program has shifted from a “down-the-road,” systematic testing approach, where all cattle herds were individually tested using tuberculin skin testing, to the designation of entire geographic areas as TB free with slaughter surveillance as our major case-finding tool. Current Federal regulations require States to conduct routine surveillance to maintain their TB status for cattle and domestic bison.
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(i.e., permanently captive and privately owned free-range animals). The Bovine TB Eradication UM&R, dated January 1, 2005, includes guidelines for surveillance, and the World Organization for Animal Health (OIE) has established international guidelines for declaring a country free from bovine TB. Surveillance has been and will continue to be an integral component of the TB program.

A cornerstone of VS’ future TB program will involve enhancing our existing surveillance to create a comprehensive national surveillance plan that includes ongoing surveillance in cattle, domestic bison, and captive cervid herds (both in live animals and at slaughter) as well as targeted surveillance in wildlife. As a first step, VS is evaluating its current system to determine how well we can detect TB and demonstrate freedom from the disease in individual States.

An enhanced comprehensive national plan will integrate slaughter surveillance, herd testing, and other possibly novel surveillance streams to establish minimum requirements necessary to detect infected cattle, domestic bison, and captive cervid herds nationally. Additionally, VS will improve existing practices to enhance the overall efficiency and effectiveness of our surveillance system.

We envision components of this comprehensive national surveillance plan to include:

- Slaughter surveillance as our primary case-finding tool. VS plans to continue our collaboration with the Food Safety and Inspection Service to ensure slaughter surveillance remains a priority so we may achieve surveillance standards at the national, State, and slaughter establishment levels.
- Live animal testing in cattle, domestic bison, and captive cervid herds. VS may require a minimum level of herd surveillance in areas without documented cases of TB. This testing may be conducted for herd accreditation, movement testing, or to meet requirements of the Grade “A” Pasteurized Milk Ordinance.
- Minimum requirements for surveillance in wildlife. Similarly, VS may incorporate ongoing surveillance in wildlife populations to monitor the risk of TB exposure for domestic livestock. This type of surveillance will require developing and implementing alternative surveillance streams such as testing in sentinel species (e.g., coyote), integrating with existing surveillance for other diseases of hunter-killed cervids (e.g., chronic wasting disease), or other novel approaches.
- Supplemental surveillance in areas with TB-affected livestock or wildlife. Increased sampling rates or “targeted” testing in nearby cattle, domestic bison, and captive cervid herds and surveillance in wildlife will ensure rapid disease detection and prevent further spread. The perceived risk of exposure resulting from observed herd management and biosecurity practices may also be used to “target” cattle, domestic bison, and captive cervid herds for...
supplemental surveillance testing.

- Surveillance standards that integrate sampling from these streams. VS will establish Federal surveillance standards necessary to support claims about the TB status of the United States, or zones within the United States, consistent with OIE guidelines. While we will no longer certify and publish the TB status of individual States, State and Federal animal health officials will still be expected to meet established surveillance standards, including reporting deadlines, to substantiate the national TB status claim.

- A national standardized, integrated, electronic data collection system for TB surveillance and case management. As with any surveillance effort, collecting, validating, and reporting accurate surveillance data demonstrate effectiveness and enable rapid response. We will use existing data collection and management systems, including the Mobile Information Management System, the Animal Health Surveillance and Monitoring System, and animal ID standards, to enhance future surveillance capabilities.

**Accelerating Diagnostic Test Development to Support Surveillance**

Tuberculin skin testing was first recognized as a useful diagnostic tool in the late 1800s and continues to be the primary diagnostic tool in both human and animal medicine. However, this test has limitations. Aside from the need for multiple veterinary visits to administer the test and interpret the results, tuberculin skin testing fails to detect all infected cattle, especially those tested too early or too late in the course of infection, while as many as 15 percent of infected cattle will test negative. At the same time, approximately three percent of uninfected cattle may test positive. Because of these limitations, APHIS evaluates an individual animal’s infection status using a combination of tests requiring multiple visits to the farm.

Despite the considerable need for improved diagnostic methods for bovine TB, significant breakthroughs in developing new tests are not likely in the immediate future. While several technologies are being developed, these methods still require further testing and evaluation.

To partially address this need, VS established a serum bank in 2006 to support research and validation of new technologies for TB testing. In 2009, VS provided additional funding to collect a large number of high volume serum samples from both infected and uninfected cattle and white-tailed deer. The objective of the serum bank is to provide well-characterized samples that are linked with skin test results for samples from uninfected animals, and skin test, histopathology, and TB culture results from infected animals. We hope this bank will assist stakeholders in the research, development, and timely validation of bovine TB serologic tests.

In addition to the expansion of the serum bank, VS will continue to
collaborate with other U.S. Department of Agriculture (USDA) agencies such as the Agricultural Research Service (ARS) and the Cooperative State Research, Education, and Extension Service (CSREES) to identify priorities and conduct critical research to develop and validate diagnostic methods and tests. VS will clearly describe the process to obtain licensure and approval as an official test for the TB program and identify approaches to expedite this process.

VS is considering other possibilities to accelerate the development of diagnostic tests, including:

- Identifying alternative sources of funding within the Federal Government to support test development and validation
- Expanding existing partnerships with international animal health agencies to further support diagnostic test development
- Exploring new partnerships with public health agencies and human health companies to better leverage the limited funding and personnel available to support this process
- Investigating novel detection methods that do not rely on organism or antibody detection

3. Manage TB-affected Animals and Herds
   Conducting Epidemiological Investigations and Assessing Individual Herd Risk

VS will continue to require epidemiological investigations of affected herds. Upon the disclosure of a TB-affected herd, VS will continue to rely on State animal health agencies to issue an immediate quarantine of the herd and will collaborate with these entities to initiate an epidemiological investigation. Epidemiologically linked herds (i.e., herds that have supplied or received cattle from the affected herd) will be quarantined and tested as appropriate.

VS is proposing to modify certain practices and to implement additional actions in conjunction with these epidemiological investigations. These alternatives include:

- Revising program definitions, such as those for “herd” and “feedlot,” to reflect current industry practices
- Developing a standardized tool to evaluate and classify the risk of TB transmission associated with individual herds under investigation based on producer-identified risks (e.g., wildlife exposure), management practices, and biosecurity
- Using observations from these assessments to establish supplemental surveillance requirements in nearby cattle, domestic bison, and captive cervid herds and wildlife

Applying Whole Herd Depopulation and Developing Alternative Strategies

Traditionally, VS has encouraged producers to voluntarily depopulate TB-affected herds as the only approach certain to eliminate infection. VS
continues to offer indemnity (depending on the availability of funding) to compensate producers considering depopulation. However, as herd size continues to increase, it becomes difficult for VS to justify depopulating herds that often exceed 1,000 animals when only one or two animals are diagnosed with TB. In addition, the public perceives whole-herd depopulation as a less acceptable approach for disease control. Changing social values concerning the care and well-being of livestock, the recognition of the environmental consequences of animal disposal, and the value of proteins derived from livestock also drive the need to develop new approaches to disease control. Finally, the costs of depopulation have increased with herd sizes at a time when we expect future indemnity funds to be limited and emergency funding to be unavailable.

VS is considering these alternatives:

- Revising our regulations to include a performance standard for eliminating TB from affected herds and identifying options to achieve this standard. This could include multiple test-and-removal protocols to control disease spread, whole-herd depopulation, and other options.
- Developing objective criteria to determine if whole-herd depopulation is economically viable and to prioritize how limited indemnity funds should be used either to remove specific animals or depopulate entire herds.
- Providing incentives for producers to remove exposed animals from the herd through early culling.
- Reducing the maximum amount of Federal indemnity paid per individual animal.
- Linking Federal indemnity payments to the implementation of specific risk mitigation and biosecurity practices within a herd.
- Identifying alternative or supplemental sources for indemnity funding and exploring the feasibility of these options. These may include cost sharing with the industry or State or developing industry-funded “insurance” programs.

Applying Animal ID Standards to Meet Animal ID Needs

While slaughter surveillance has proven to be effective, traceback to herds-of-origin has been limited by lack of information. The lack of ID for a particular animal and incomplete documentation kept by owners, dealers, or brokers continue to hamper successful tracebacks and epidemiological investigations. These limitations and the frequent movement of some classes of cattle among multiple premises and herds prolong the time required to complete traces and require additional resources. Therefore, rapid and effective response to TB occurrences will depend on full implementation of an animal ID system.

VS is proposing that official animal ID and electronic movement certificates be used for animals leaving affected herds or zones to ensure
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compliance with necessary testing requirements. This would provide assurance that the risk of disease spread is minimal and would ensure that animal health officials can perform effective trace investigations. Individual State authorities will be responsible for applying and enforcing these movement controls to ensure that only low-risk cattle are moving outside affected herds or zones and that high-risk cattle are moving only to slaughter or terminal feeding operations where the risk of spread can be controlled.

4. Modernize the Regulatory Framework

The mission of VS is to prevent, control, and eliminate animal diseases and to monitor and promote animal health and productivity. These activities are vital to the health of the U.S. cattle and livestock industries and to the safety of the U.S. food supply. VS’ regulatory activities are authorized by the Animal Health Protection Act, which consolidates laws related to animal health and quarantine and includes key provisions for VS animal health programs and services.

VS’ regulations, including the bovine TB regulations, are largely written as design standards (also sometimes called prescriptive or “command-and-control” standards). Design standards contain details that regulated entities must follow. Having such details in the regulations means additional rulemaking is necessary every time a detail must change. This tendency to include design standards, coupled with the lengthy regulatory process, means that VS’ animal health regulations become outdated quickly and cannot adapt to a changing agricultural landscape.

VS is proposing to revamp the regulatory framework underlying several of its animal disease programs, including the TB program. We must structure underlying regulations to allow us to respond quickly, employ up-to-date science, and be flexible to changing situations. These proposed changes are consistent with the VS 205 Vision to place greater emphasis on disease prevention, create a more agile national veterinary strike force to direct emergency response activities, and increase cooperation between animal and public health organizations.

VS envisions the characteristics of these proposed regulatory changes to include:

- Developing regulations that use performance standards to describe a regulatory goal or desired outcome rather than including prescriptive, inflexible design standards
- Stating specific guidelines or approaches for meeting the regulatory goal in program standard documents, surveillance plans, and other policy documents rather than in the regulations
- Using a science-based zoning approach that addresses disease risk more appropriately than a geopolitical State-based approach
- Maintaining a description of zones on our Web site, rather than in the regulations
- Notifying the public of changes through notices published in the
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Federal Register, rather than through rulemaking, making the process more timely and flexible

5. Transition to a Zoning Approach

Historically, VS has classified States according to a multi-level system based on TB prevalence. A State’s status is the primary determinant for requirements for interstate movement of livestock. A lower rank requires controls that are more restrictive. As a result, there is considerable economic incentive for a State to have the highest status level possible.

This State status approach was successful in managing TB when the prevalence of TB was high. Enforcement of interstate movement and testing requirements assisted animal health officials to identify infected animals and affected herds. Requirements associated with State status encouraged States to investigate cases promptly and mitigate the spread of disease.

Given the current low prevalence of TB in the United States, reclassifying the status of an entire State when a disease is present only in a small geographic area may not be necessary to contain the disease and can be costly for the industry. When a State’s status is downgraded, every producer in the State incurs additional costs to meet restrictive movement and testing requirements.

To minimize the impact on industry during these outbreaks, our current regulations allow States to create zones within the State, commonly referred to as establishing split-State status.

This means one or more zones have a separate disease classification from the rest of the State.

One benefit of split-State status is that zones considered free of disease are able to ship livestock interstate and internationally with minimal restrictions. However, the application process for split-State status can take over a year to complete. Implementing the zone requires regulatory changes at both State and Federal levels, further prolonging the time required to increase or decrease the size of the zone.

The system also fails to consider factors that may either contribute to or limit the risk of further disease transmission such as clustering of affected herds in a defined geographic area, geographic barriers, or even industry practices. Many States find the current system rigid, prescriptive, and unable to adapt to changing conditions.

Therefore, VS is proposing to replace the current State status system. Instead, VS envisions a risk-based approach that imposes testing requirements and movement restrictions that associate with a zone rather than an entire State. Such zoning is consistent with OIE standards. Adopting this approach will enable us to move quickly to protect animal health and focus limited resources on geographic areas where the disease exists, while simultaneously adapting to changes in agricultural practices and minimizing the economic impact on industry. VS envisions the elements of this proposed approach will include:

- Promulgating performance-based regulations that allow VS to
establish and dissolve TB elimination or containment zones around clusters of affected herds or other high-risk areas.

- Defining testing requirements and movement restrictions associated with these zones that States will apply and enforce.
- Identifying conditions that would initiate establishing a TB elimination or containment zone.
- Developing criteria to define or redefine boundaries to increase or decrease zone size and eventually dissolve the zones. These boundaries would be unique for each situation and may cross State lines.
- Establishing requirements within the zone for supplemental surveillance in areas with TB-affected livestock herds or wildlife.

Implementation, Oversight, and Monitoring of the New Approach

VS’ proposed action plan represents a dramatic change for one of VS’ longstanding disease eradication programs. Modernizing the Federal regulatory framework by implementing performance-based regulations, including those needed to officially establish TB elimination or containment zones according to internationally accepted guidelines, will take time. State-level regulatory changes may also be required. Once promulgated, however, these new rules will benefit Federal and State animal health officials, the regulated industries, and producers by allowing a more rapid response that employs up-to-date science and is flexible to changing situations.

VS is aware that these proposed changes will impact the regulated industries and our stakeholders. Prior to publishing the proposed rule to establish these regulations, VS intends to work closely with our stakeholders to obtain input on these proposed strategies, program standards, surveillance plans, and other policy concepts. VS has already initiated these discussions with various stakeholders.

Resources

VS assumes the Federal annual appropriation for the bovine TB program will remain at $5. million, with potential decreases and without additional Federal emergency funds. State resources face similar limitations. This fiscal scenario will require careful prioritization of program activities that focus on affected or high-risk geographic areas to ensure that we achieve program objectives within this limited budget. Coordination and collaboration among various Federal, State, and industry partners will be essential. Finally, we may need to consider broader cost sharing or other new alternative sources of funding.

Roles and Responsibilities

The success of this new approach will depend on the longstanding cooperation among Federal and State animal health officials, regulated industries, and producers. Each cooperator will have specific roles and
In addition to rulemaking, Federal animal health officials will be responsible for:

- Developing program standards, surveillance plans, and other policy documents that describe specific guidelines and approaches for meeting the performance standards stated in the regulations
- Establishing the national program objective and priorities
- Designing and implementing a national standardized, integrated, electronic data collection system for TB surveillance and case management
- Monitoring data and supplemental documentation regularly to verify that minimum standards and national program objectives are met
- Providing States with timely feedback, guidance, and technical expertise as we implement regulations and policies
- Collaborating with other Federal agencies, stakeholders, and industry to leverage resources and ensure integrated planning

State animal health officials will be responsible for:

- Revising State regulations where necessary to be consistent with Federal regulations
- Implementing program standards, surveillance plans, and other policies to achieve the performance standards in the regulations
- Overseeing, monitoring, and enforcing testing requirements and movement controls associated with established zones
- Monitoring data on a regular basis to document progress and submitting data and additional documentation as required
- Collaborating with other State agencies, Federal agencies, and industry to leverage resources and ensure integrated planning
- Serving as a liaison with individual producers

In this new approach, producers and industry will also have responsibilities:

- Advancing their knowledge about bovine TB and risk factors for introducing TB into their herds
- Evaluating their management practices to identify if any of these risk factors are present and implementing mitigations to reduce these risks
- Developing industry- and producer-driven components of the TB program and generating the funds necessary to support these activities
- Continuing to engage in discussions with State and Federal animal health officials concerning the TB program

Potential Obstacles to Implementing this New Approach

VS recognizes that our partners, stakeholders, and regulated industries may have reservations about these new concepts. While there
will likely be others, we can address three reservations already expressed to VS through stakeholder dialog. 

**Replacing the current State status system may reduce or eliminate incentives for States to promptly investigate cases and mitigate the continued spread of TB.**

Under the proposed approach, movement restrictions and testing requirements would be limited to zones where the disease exists, rather than applying these restrictions statewide. However, VS believes that the costs of the restrictions and testing applied to an affected zone will provide the same market incentive for producers and States managing such zones to implement the necessary disease control measures. Furthermore, VS will continue to cooperate with and provide financial support to States to implement minimum TB surveillance and program standards.

*The described zoning approach may be inappropriate to manage a chronic disease such as TB and cannot be applied consistently across the country.*

VS only proposes to establish TB elimination or containment zones in distinct geographic areas that present a high risk for TB exposure or transmission to domestic livestock herds. For example, zones may be established when multiple affected herds are identified or when infected wildlife exists in a geographic area. Otherwise, we expect States to quarantine and manage individual affected herds, including implementing movement restrictions and herd testing, within the guidelines of the program.

Furthermore, to ensure transparency and consistency, VS will clearly describe in our regulations the risk criteria that will initiate the establishment of a zone and define zone boundaries. These criteria will use a risk evaluation that incorporates epidemiology, disease dynamics, and ecological factors related to livestock and wildlife; information from investigations of TB outbreaks in livestock; surveillance data from both domestic livestock and wildlife populations; livestock marketing practices; and wildlife movement patterns. Our goal will be to define zones with distinct and identifiable boundaries that will contain the potential risk for TB exposure and transmission, while allowing herds at low risk to operate without increased requirements or restrictions.

*It will not be possible to enforce program requirements without specifically including them in the text of the regulations contained within the CFR.* 

While developing official rules establishing these concepts, VS intends to work closely with USDA’s Office of the General Counsel to ensure our regulations include well-designed performance standards that can be enforced.

For example, standards in 9 CFR 77.17(a) include specific instructions that regulated entities must follow precisely for identifying TB reactor cattle. These include the type and method of applying eartags; the
dimensions and locations of branding; and the type, location, and color of tattoos. Alternatively, these standards could be written as performance-based regulations that only require that TB reactor cattle must be individually identified and visibly marked as a reactor in a manner approved by the Administrator. Various methods for meeting this performance standard would be defined in program standard documents that can be revised readily and updated as technology and market practices change.

Such standards will provide greater regulatory flexibility while still ensuring that the core requirements of the regulation remain enforceable.

Conclusion
There are numerous challenges that hinder our efforts to eradicate bovine TB. VS recognizes that it is time for a new approach to managing this disease. Our proposed action plan will:

1. Reduce the introduction of TB into U.S. livestock from imported animals and wildlife
2. Enhance nationwide TB surveillance
3. Increase options for managing TB-affected herds
4. Modernize the regulatory framework to allow VS to focus resources where disease exists
5. Transition the TB program from a State classification system to a science-based zoning approach to address disease risk that will enable us to respond quickly to changing conditions

To succeed, this new approach will require VS’ continued partnership with State animal health and wildlife officials, other Federal agencies, industry, international partners, academia, and other stakeholders. Successful partnerships will allow us to use available resources efficiently to achieve program objectives and protect our nation’s herd.
REPORT OF THE COMMITTEE

Use of Mexican Cattle in Rodeos in the United States

Doug Corey, DVM, Chair
Professional Rodeo Cowboys Association’s Animal Welfare Committee
Adams, Oregon

What is the PRCA?

The Professional Rodeo Cowboys Association (PRCA) is the largest sanctioning body of professional rodeos in the world. It has 7,000 members, with 600 sanctioned rodeos in 41 states and 4 Canadian provinces, attended by 25 million fans attend annually.

Cowboys competed for more than $40 million in prize money each year. The PRCA’s premier event is the Wrangler National Finals Rodeo held in December each year selling more than 170,000 tickets and offering more than $5 million in prize money. The PRCA headquarters in Colorado Springs, Colorado, employs nearly 100 people.

Regarding livestock welfare, the PRCA has 60 rules to protect the livestock. For example, horn wraps must be used on team roping and steer roping steers. Rules are enforced by on-site rodeo judges. Rules require a veterinarian to be present at all rodeo competitions. Judges inspect animals before all competitions to insure only healthy animals compete. Livestock welfare surveys to show the rate of injury to rodeo livestock to be less than five hundredths of one percent.

It is estimated that there are at least 5,000 rodeos annually in the US. This does not include the number of team roping and timed event jackpots. The United States Team Roping Championships (USTRC) alone has 35,000 members and conducts thousands of events each year across the US.

Why use Mexican cattle?

The Mexican bred Corriente has been found to be the most suitable to rodeo events. There have been some breeding of American Corrientes and these are being approved for use in PRCA rodeos, but there are currently not enough being bred in the US to supply the rodeo and team roping industries.

Steer wrestling, team roping and single steer roping all use Mexican cattle. PRCA stock contractors import approximately 5,000 Mexican Corrientes yearly. The USTRC imports approximately 20,000 yearly.

Issues that affect rodeo include:

- Ease of obtaining Mexican cattle
- Ease of crossing border
- Animal ID
- Annual TB tests
- Education of PRCA membership on commingling of Mexican cattle and domestic cattle
- Disposition of Mexican rodeo steers
TUBERCULOSIS

- Bucking bulls/interstate transport
- State regulations/test requirements

The PRCA takes the health of the US’s livestock herd very seriously and is committed to working with regulatory officials to take the necessary steps to combat any and all diseases.
REPORT OF THE COMMITTEE

An update on the current status of the Canadian bovine TB eradication program

Maria Koller-Jones
Animal Health and Production Division,
Canadian Food Inspection Agency

Overview of Bovine Tuberculosis (TB) Eradication Program in Canada
To September 30, 2009

CATTLE AND FARMED BISON

Eradication: Canada continues to near the complete eradication of bovine tuberculosis (TB) from cattle and farmed bison. During the six-year period from September 2003 through September 2009, M. bovis was confirmed in three (3) herds of cattle in Canada. The last finding of bovine TB in farmed bovines in Canada occurred in May 2008. The last finding of bovine TB in farmed bison in Canada occurred in 2001.

Two of the three infected cattle herds detected in Canada during the past six years were located in the province of Manitoba: one was found in 2004 and the other was found in May 2008. Both herds are believed to have acquired bovine TB from contact with diseased wild elk or deer in or around Riding Mountain National Park (RMNP). In both herds, the infection was found in a single animal in the herd. Investigations using molecular techniques determined that both isolates were identical to the unique strain of M. bovis found in wildlife in and around RMNP. The infected herd found in 2008 was detected during area surveillance testing; the one in 2004 through routine slaughter inspection.

One infected cattle herd was detected in the province of British Columbia in September 2007. The infection was found in a single animal in the herd and was detected during routine slaughter surveillance inspection in Canada. Tracing activities found no spread of the infection to other herds. Molecular characteristics of the M. bovis organism isolated from this herd indicate it was an isolate not previously reported in Canada, but one commonly isolated from cattle in the United States, Mexico, Great Britain and South America. The epidemiological evidence supports a conclusion that the source of the infection found in this herd was latent M. bovis infection of North American origin.

These findings indicate that, with sustained aggressive surveillance and eradication strategies, excellent progress continues to be made in eradicating the residual latent bovine TB infection that may still be present in Canadian livestock herds. The remaining challenge are the sporadic new infections that occur in livestock as a result of direct or indirect contact with diseased wildlife.

Since 1983, all cattle and farmed bison herd in which M. bovis infection has been found have been subjected to strict stamping out procedures. All animals found to have been exposed to the infection, both those on the infected farm and those on trace-out or other contact premises, are ordered destroyed. This is followed by the testing of livestock in a surveillance zone around the infected farm, the application of appropriate cleaning and disinfection procedures on the infected farm, and
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comprehensive investigations to trace and identify the source of the infection. Compensation is paid for all animals that are ordered destroyed during the investigation of suspect or confirmed cases of bovine TB.

Refer to Table 1 for a summary of findings of bovine TB in farmed bovines (cattle and farmed bison) during the past 10 years.

**Surveillance:** General surveillance of cattle and farmed bison herds is based on routine inspection at slaughter and the collection of granulomatous lesions for laboratory examination, with trace-back investigation and testing for all histopathological diagnoses of mycobacteriosis. In 2008, a total of 556 granulomatous lesions observed at routine slaughter inspection of cattle and farmed bison were submitted to the laboratory for testing. Histopathological and culture examinations of these tissues identified 27 animals infected with a Mycobacteria species that was found not to be *M. bovis*. These included *M. avium* complex, *M. avium paratuberculosis*, *M. terrae* complex, *M. flavescens*, *M. gordonae*, and *M. nonchromogenicum*. No *M. bovis* infection was detected during the slaughter surveillance of farmed bovines in 2008 and to 30 September 2009.

Targeted on-farm area testing is used to supplement slaughter surveillance: Area surveillance testing continued around RMNP in Manitoba in 2008 and 2009, an area where 51 bovine TB-infected wild cervids (41 elk & 10 white-tailed deer) have been found since 1997. Since October 2002, surveillance testing has required the periodic testing of cattle and farmed bison in a special eradication established around the park. The Riding Mountain TB Eradication Area (RMEA) consists of two provincial game hunting areas, encompasses approximately 50,000 breeding cattle on 650 farms, and represents approximately 10% of Manitoba’s cattle herds and 1% of Canadian cattle herds. All cattle and farmed bison herds in the RMEA undergo periodic testing for bovine TB, with the interval determined by the risk of exposure to diseased wild cervids. From October 2002 through September 2009, approximately 182,000 tuberculin tests of livestock were carried out in the RMEA.

Area surveillance testing in the RMEA involves the screening of animals 12 months of age and older using the intradermal tuberculin test and re-testing of all reactors using a gamma interferon (gIFN) assay. All animals classified as positive on the gIFN assay are required to be slaughtered and tissues are submitted for confirmatory laboratory tests. Animals classified as suspect on the gIFN assay may be retested or slaughtered. However, if the owner elects to retest the animal and it is negative on the gIFN retest, the herd is scheduled for a herd test in the following year. If the animal is classified as suspect on the gIFN retest, it is required to be destroyed and tissues are submitted for confirmatory laboratory testing.

In 2008, a total of 95,167 bovines (89,073 cattle and 6,094 farmed bison) were tuberculin tested in Canada. Surveillance testing of cattle and farmed bison in Canada during 2008 and to September 30 of 2009 detected bovine TB in one beef breed cow located on one farm in the RMEA in Manitoba.
REPORT OF THE COMMITTEE

FARMED/CAPTIVE CERVIDS

Eradication: Canada continues to near the complete eradication of bovine TB from farmed/captive cervids, which consist mainly of commercially farmed elk, red deer, elk/red hybrids, fallow deer and white-tail deer. During the first 14 years (1989 through 2002) following extension of the National Bovine TB Eradication Program to include farmed/captive cervids, a total of 37 infected herds were found in five provinces. During the last six years (2003 through September 2009), *M. bovis* infection was confirmed in one (1) herd of farmed cervids, detected in Ontario in 2006.

This infected herd, consisting of farmed elk and red deer, was detected during routine slaughter inspection in Canada. While significant intra-herd spread had occurred, tracing activities found no spread of the infection to other herds. Molecular characteristics of the *M. bovis* organism isolated from this herd indicated that it was an isolate not previously reported in Canada, but one commonly isolated from cervids in New Zealand. The infected herd had been established using elk and red deer imported from New Zealand in 1991. The epidemiological evidence supports a conclusion that the source of the infection found in this herd was latent *M. bovis* infection in one or more elk or red deer, most likely in an animal imported from New Zealand in 1991. This was the first and only finding of bovine TB in the farmed cervid sector in Canada since 1999.

All infected farmed/captive cervid herds detected in Canada since 1990, except one, have undergone complete depopulation of all exposed susceptible animal species. Compensation, quarantine, investigation, trace-out and trace-in, contact and perimeter premises, cleaning and disinfection, and restocking were all carried out in the same manner as for infected cattle and farmed bison herds. The single exception, which occurred in 1993, involved a zoological collection that underwent partial depopulation followed by a 10-year period of quarantine of exposed primates and several endangered species. This was followed by implementation of a further five-year management plan of on-going surveillance, all with no findings of disease.

Refer to Table 2. for a summary of findings of bovine TB in farmed/captive cervids during the past 10 years.

Surveillance: Because relatively few adult farmed/captive cervids are routinely slaughtered, surveillance for bovine TB in this sector has been based on the testing (every three years until 2006 and every five years since January 2006) of all cervid herds involved in the commercial trade of these species. In 2008, a total of 11,613 farmed cervids were tuberculin tested in Canada. No cases of bovine TB were detected in farmed cervids in Canada during this surveillance testing in 2008 and to 30 September 2009.

During 2008, a total of 29 granulomatous lesions observed during routine slaughter surveillance inspection of 10,144 farmed cervids were submitted to the laboratory. Histopathological and culture examinations of these tissues did not identify any cases of *M. bovis* infection. No cases of bovine TB
were detected in farmed cervids in Canada during routine slaughter surveillance of farmed cervids in 2008 and to 30 September 2009.

**BOVINE TB ACCREDITATION STATUS**

**Cattle & Farmed Bison:** Under legislated program standards set out in the *Health of Animals Regulations*, all provinces in Canada, except Manitoba, are classified as bovine TB-free areas for farmed bovines. Under the regulations, the province of Manitoba was assigned split status in January 2003, with the RMEA classified as bovine TB-accredited-advanced and the rest of Manitoba classified as bovine TB-free. In September 2006, the status of the RMEA portion of Manitoba was upgraded to bovine TB-free, resulting in all areas of Canada being classified as bovine TB-free since that time.

All areas of Canada, including the province of Manitoba, are officially free from bovine TB in accordance with Article 2.3.3.2 of the Terrestrial Animal Health Code of the World Organization for Animal Health (OIE).

Table 3. lists the last year in which bovine TB was detected in farmed bovines for each province in Canada.

**Farmed Cervids:** Under legislated program standards set out in the *Health of Animals Regulations*, all provinces in Canada are classified as bovine TB-free areas for farmed cervids. Since 1991, all movements of farmed cervids in Canada, including those in the RMEA, have required a movement permit.

Table 3. lists the last year in which bovine TB was detected in farmed cervids for each province in Canada.

**M. BOVIS IN WILDLIFE**

**Wood Buffalo National Park Area:** Bovine TB (and bovine brucellosis) are endemic in free-roaming herds of approximately 4,500 wood bison in and around Wood Buffalo National Park which straddles the northern boundary between Alberta and the Northwest Territories. Due to their remote location distant from areas of agricultural production, these bison poses the greatest threat to adjacent disease-free wild bison herds. An interim bison management plan includes: no-bison buffer zones; controlled access of livestock to risk areas; the killing of stray bison; and other measures to minimize the risk of disease spread to other wild bison, farmed bison, or cattle.

**Riding Mountain National Park Area:** Since 1998, bovine TB has been known to be present in a free-roaming herd of approximately 2,000 elk in and around Riding Mountain National Park (RMNP), located in the southwestern part of the province of Manitoba. A similar number of elk in Duck
Mountain Provincial Park & Forest to the north of RMNP are believed to be free of the disease; however, surveillance continues in this population. The Riding Mountain ecosystem in also home to approximately 7,500 white-tailed deer.

To 30 September 2009, bovine TB has been confirmed in 51 wild cervids (41 elk and 10 white-tailed deer) in and around RMNP. The seven cattle herds in Manitoba in which bovine TB has been found since 1997 were all located close to the RMNP boundary or associated with a herd close to the park, with five of these herds located within two kilometres of a positive wild elk or deer.

Of these 51 cases, 18 cases (11 elk and 7 deer) were detected through a hunter-harvest surveillance program targeting animals outside the park, which has screened more than 9,000 animals since 1997.

Thirty (30) cases (28 elk and 2 deer) were detected through a capture, test and removal program that targets animals inside the park and is used to augment hunter-harvest samples as well as to validate blood tests. Under this program, which began in 2003 and has tested more than 900 animals, wild elk and deer are captured, blood samples collected, and a radio-tracking collar attached before the animal is released. Samples are tested using a number of blood tests, including the lymphocyte stimulation test (LST) and a fluorescent polarization assay (FPA). Animals that are positive on one or more tests are tracked using the radio-collar, humanely destroyed and necropsied, and tissues are collected for confirmatory laboratory testing.

A wildlife culling program was commenced in the winter/spring of 2009, wherein wild elk and deer are killed and removed from the western part of RMNP in the area where the vast majority of positive wildlife cases have occurred. This program was responsible for finding the remaining three case (2 elk and 1 deer) of bovine TB.

In response to the identification of bovine TB in wild cervids in the Riding Mountain area, a comprehensive management strategy was implemented in 2000. Its objectives are: surveillance to determine the distribution (geographic and species) and prevalence of the disease in wildlife; prevention of the spread of the infection from wildlife to livestock; and elimination of the disease in wild cervids. The major elements of the program include:

- On-going surveillance sampling of wild cervids inside and outside both parks using: regular hunter-harvest samples; passive surveillance of road-kills; special land-owner hunts to augment samples from selected areas; and use of the capture, collar & test program inside both parks, incorporating new diagnostic methods as they become available;

- Separation of wild cervids from livestock through: the barrier fencing of forage/feed storage yards to discourage elk and deer from coming onto the farm and to prevent infected elk and deer from contaminating stored forage/feed (by the end of 2009, more than 95% of farms located within 5 kilometres of the RMNP boundary [a total of 160 feed/forage storage yards]
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will have been fenced); prohibitions on the feeding and baiting of elk or deer; changes to crop insurance programs for hay depredation to encourage owners to remove hay from their fields into fenced areas; the use of livestock guardian dogs to deter wild cervids from interacting with cattle herds; and the barrier fencing of cattle feeding yards on farms where risk assessment findings support doing so.

• Elk population management through: increased hunting opportunities outside RMNP, including inside Duck Mountain Provincial Park & Forest; habitat improvement inside RMNP; the selective removal of infected animals through the capture, collar & test program; and the culling of elk and deer from the western part of RMNP to further reduce the number of infected and potentially infected animals in the area where positive cases have continued to occur.

Prepared By: Dr. Maria A. Koller-Jones
Senior Staff Veterinarian
Animal Health Directorate
Canadian Food Inspection Agency
### Table 1: Summary of Findings of Bovine TB in Farmed Bovines: January 1999 through Sept. 2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Province</th>
<th>No. of Infected Herds</th>
<th>Species/Type</th>
<th>Description</th>
<th>Most Likely Source of Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>Saskatchewan (SK)</td>
<td>1</td>
<td>cattle/bison</td>
<td>detected during routine slaughter in Canada; single lesion in 15-year old cow from closed herd that was born &amp; continually resided in herd; no intra- or inter-herd spread detected; infected herd &amp; exposed trace-outs depopulated;</td>
<td>residual long-standing latent infection</td>
</tr>
<tr>
<td>2000</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>no infected herds detected</td>
<td>N/A</td>
</tr>
<tr>
<td>2001</td>
<td>Manitoba (MB)</td>
<td>1</td>
<td>cattle/bison/cervids</td>
<td>detected during area surveillance testing initiated around Riding Mtn National Park following finding of bovine TB in a wild elk; no intra- or inter-herd spread detected; infected herd &amp; exposed trace-outs depopulated; molecular typing of isolate identical to isolates from surrounding wild cervids;</td>
<td>exposure to infected wild elk/deer</td>
</tr>
<tr>
<td>2002</td>
<td>Ontario (ON)</td>
<td>1</td>
<td>cattle/PB dairy</td>
<td>detected during investigation of clinical disease in 7-month old Jersey calf born in infected herd which had been closed herd for at least 10 years; significant intra-herd spread observed; no inter-herd spread found; infected herd &amp; exposed trace-outs depopulated; also partial depopulation of 1exposed herd in ON;</td>
<td>residual long-standing latent infection</td>
</tr>
<tr>
<td>2003</td>
<td>Manitoba (MB)</td>
<td>3</td>
<td>cattle/bison/bison</td>
<td>detected during area surveillance testing of newly established Riding Mtn TB Eradication Area; no inter-herd spread detected; all 3 infected herds &amp; exposed trace-outs depopulated; partial depopulation of 1exposed herd in MB; molecular typing of all isolates identical to isolates from surrounding wild cervids;</td>
<td>exposure to infected wild elk/deer; each of 3 cattle herds appear to have been independently infected</td>
</tr>
<tr>
<td>Year</td>
<td>Province</td>
<td>No. of Infected Herds</td>
<td>Specie s/Type</td>
<td>Description</td>
<td>Most Likely Source of Infection</td>
</tr>
<tr>
<td>----------</td>
<td>-------------------</td>
<td>-----------------------</td>
<td>---------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>2004</td>
<td>Manitoba (MB)</td>
<td>1</td>
<td>cattle-dairy</td>
<td>detected during routine slaughter inspection in Canada; no inter or intra-herd spread detected; infected herd depopulated &amp; exposed trace-outs depopulated; herd established in 2002 from several sources including large number of animals from dispersal of dairy herd located in vicinity of Riding Mtn National Park; molecular typing of isolate supported epidemiological findings that dispersed herd was source of infection;</td>
<td>exposure to infected cattle or infected wild elk/deer in Riding Mtn area</td>
</tr>
<tr>
<td>2005</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>no infected herds detected</td>
<td>N/A</td>
</tr>
<tr>
<td>2006</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>no infected herds detected</td>
<td>N/A</td>
</tr>
<tr>
<td>2007</td>
<td>British Columbia (BC)</td>
<td>1</td>
<td>cattle-beef</td>
<td>detected during routine slaughter in Canada; single lesion in 4-year old bull; no intra- or inter-herd spread detected; infected herd &amp; exposed trace-outs depopulated; birth herd of index bull, from which animal was sold at one year of age, underwent extensive testing with no evidence of infection found; tracing &amp; testing of possible source herds continues; molecular typing of isolate indicates infection did NOT originate from any known wildlife reservoir in Canada;</td>
<td>residual long-standing latent infection</td>
</tr>
<tr>
<td>2008</td>
<td>Manitoba (MB)</td>
<td>1</td>
<td>cattle-beef</td>
<td>detected during area surveillance testing of Riding Mtn TB Eradication Area; no intra- or inter-herd spread detected; infected herd &amp; exposed trace-outs depopulated; molecular typing of isolate identical to isolates from surrounding wild cervids;</td>
<td>exposure to infected cattle or infected wild elk/deer in Riding Mtn area</td>
</tr>
<tr>
<td>2009 to 30 Sept</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>no infected herds detected</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### Table 2:

**Summary of Findings of Bovine TB in Farmed Cervids: January 1999 through Sept. 2009**

<table>
<thead>
<tr>
<th>Year</th>
<th>Province</th>
<th>No. of Infected Herds</th>
<th>Specie(s)/Type</th>
<th>Description</th>
<th>Most Likely Source of Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>Ontario (ON)</td>
<td>1 elk</td>
<td>detected during diagnostic investigation of cervid that died; intra-herd spread observed; infected herd &amp; exposed trace-outs depopulated; no inter-herd spread detected; molecular typing of isolate indicated it is same as 1996-97 isolates from farmed cervids in Quebec &amp; 1993 isolate from zoological collection in Quebec;</td>
<td>latent infection in one or more farmed cervids;</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>Quebec (QC)</td>
<td>1 elk, red deer, hybrids</td>
<td>detected during routine slaughter inspection in Canada; intra-herd spread observed; infected herd &amp; exposed trace-outs depopulated; no inter-herd spread detected; molecular typing of isolate indicated it is same as isolates found in outbreak that occurred in farmed cervids in Ontario from 1990-94;</td>
<td>latent infection in one or more farmed cervids;</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Ontario (ON)</td>
<td>1 elk, red deer, hybrids</td>
<td>detected during routine slaughter inspection in Canada; intra-herd spread observed; infected herd &amp; exposed trace-outs depopulated; one exposed herd also depopulated, with no evidence of inter-herd spread detected; molecular typing of isolate indicate it is an isolate not previously reported from any farmed species in Canada; herd established in part with elk &amp; red deer imported from New Zealand in 1991;</td>
<td>latent infection in one or more farmed cervids, most likely in cervids imported into North America from New Zealand in 1991</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2009 to 30 Sept</td>
<td>N/A</td>
<td>0</td>
<td>no infected herds detected</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Table 3:

Bovine TB Status of Canadian Provinces and Year Last Case Detected in Livestock

<table>
<thead>
<tr>
<th>Province or Part of Province</th>
<th>TB Status 1: Farmed Bosines</th>
<th>Last Case Detected: Farmed Bosines</th>
<th>TB Status 1: Farmed Cervids</th>
<th>Last Case Detected: Farmed Cervids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newfoundland</td>
<td>TB-free</td>
<td>1978 (cattle)</td>
<td>TB-free</td>
<td>never detected</td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>TB-free</td>
<td>1973 (cattle)</td>
<td>TB-free</td>
<td>never detected</td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>TB-free</td>
<td>1987 (cattle)</td>
<td>TB-free</td>
<td>never detected</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>TB-free</td>
<td>1985 (farmed bison)</td>
<td>TB-free</td>
<td>never detected</td>
</tr>
<tr>
<td>Quebec</td>
<td>TB-free</td>
<td>1994 (farmed bison)</td>
<td>TB-free</td>
<td>1999</td>
</tr>
<tr>
<td>Ontario</td>
<td>TB-free</td>
<td>2002 (cattle)</td>
<td>TB-free</td>
<td>2006</td>
</tr>
<tr>
<td>Rest of Manitoba*</td>
<td>TB-free</td>
<td>2004 (cattle)</td>
<td>TB-free</td>
<td>never detected</td>
</tr>
<tr>
<td>RMEA*</td>
<td>TB-free</td>
<td>2008 (cattle)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>TB-free</td>
<td>1999 (cattle)</td>
<td>TB-free</td>
<td>1991</td>
</tr>
<tr>
<td>Alberta</td>
<td>TB-free</td>
<td>2001 (farmed bison)</td>
<td>TB-free</td>
<td>1993</td>
</tr>
<tr>
<td>British Columbia</td>
<td>TB-free</td>
<td>2007 (cattle)</td>
<td>TB-free</td>
<td>1990</td>
</tr>
</tbody>
</table>

1 tuberculosis status according to the requirements set out in the Health of Animals Regulations

* In January 2003, for the purpose of conducting surveillance and ascribing area status, the province of Manitoba was split into two eradication areas: the Riding Mountain TB Eradication Area (RMEA) which surrounds Riding Mountain National Park, and the rest of Manitoba.
The Committee met on October 13, 2009 at the Town and Country Hotel, San Diego, Calif., from 8:00 a.m. to 12:00 p.m. There were 36 members and 32 guests present.

USAHA Joint Working Group Committee of Wildlife Diseases and Committee on Sheep and Goats

Recommendations on Best Management Practices for Domestic Sheep Grazing on Public Land Ranges Shared with Bighorn Sheep

Walt Cook
Wyoming Livestock Board

In October 2007, the United States Animal Health Association (USAHA) Committee on Wildlife Diseases and Committee on Sheep and
Goats established a working group comprised of staff or members of state and federal animal health agencies, wildlife and public land management agencies, the American Sheep Industry and Wild Sheep Foundation (formerly Foundation for North American Wild Sheep (FNAWS)). The working group was charged with developing best management practices for grazing domestic sheep (and goats) on public lands where contact between domestic sheep and bighorn sheep may occur. This working group concept was subsequently endorsed by USAHA as part of a broader resolution on “Cooperative Research and Management of Wildlife/Livestock Disease Interactions” approved in October 2007. The task of this subcommittee was limited to one specific aspect of domestic sheep management, the interaction of bighorn sheep and domestic sheep on public lands. Consistent with USAHA direction, this document primarily focuses on the domestic sheep portion of best management practices in these situations. A comprehensive list of best management practices for bighorn sheep can be found in the Western Association of Fish and Wildlife Agencies (WAFWA), Bighorn Sheep Working Group Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat (1).

Although public lands grazing is a privilege and agencies are not required to offer alternative allotments for domestic sheep grazing, work group members recognize the historical role that public land grazing has played in sustaining viable working landscapes and rural communities, and that domestic sheep and goats, as well as bighorn sheep, are important to the cultural and ecological heritage of most western states. The work group also recognizes that domestic livestock grazing can be a useful tool for habitat management. The working group, co-chaired by Drs. Walt Cook and Michael Miller, assembled relevant background information and met via multiple teleconferences, email and in person at the 2008 USAHA meeting to develop and discuss recommended best management practices. As per the group’s charge, the recommendations that were developed focus on practices intended to minimize opportunities for interspecies contact on shared range that could lead to transmission of respiratory pathogens. In some recent pneumonia epidemics in bighorn sheep, the cause has been attributed to endemic respiratory pathogens, and in other epidemics, the cause has been attributed to pathogens introduced via interactions with domestic sheep (2). These recommendations do not presume to estimate the probability or risk of contact. Quantifying the risk of interspecies disease transmission between bighorn sheep and domestic sheep in a natural setting is problematic (2). Further research is needed to better understand and estimate the magnitude of potential risk to bighorn sheep arising from interactions with domestic sheep and other wild ruminant species, as well as the risks of endemic disease and potential influences of seasonal and environmental factors on these risks. Indeed, the original USAHA resolution that led to this working group directed federal agencies to fund research on epidemiology and pathogenesis of bighorn/domestic sheep disease interactions.
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The report attached at the conclusion of this Committee Report presents the recommended best management practices intended to serve as one element of more comprehensive approaches for managing the health of bighorn sheep populations. We recognize that all of the management practices listed may not be incorporated into some management plans, but offer them as a complete list for consideration. Hopefully these recommendations will complement or emphasize risk reduction practices already in place, and encourage their development elsewhere. Although national in scope, these recommendations do not mandate programs at the state, local, or tribal level. Local primacy dictates that management occurs at the state or regional level whenever possible. The work group members believe that these recommended best management practices represent a viable alternative to terminating domestic sheep grazing on public lands where goals include minimizing the risk of epidemics in bighorn sheep that may result from interspecies contact. However, there are cases where these practices have been considered and mutually judged to be infeasible by responsible agencies and permittees or their representatives in the course of negotiations via established processes for timely conflict resolution. When this occurs, the work group members encourage timely identification of alternative grazing allotments or arrangements to minimize impacts on permittees and interruption of ongoing domestic sheep operations.

[See full report following this Committee report.]

Bovine Tuberculosis in Minnesota
Bill Hartmann
Minnesota Board of Animal Health

Minnesota was free of bovine tuberculosis (TB) for thirty years until a beef cattle herd in northern Minnesota was found positive in the summer of 2005. In the last four years, an additional 11 beef cattle herds were found TB-positive in the same area. Twenty six infected free-ranging white tailed deer were harvested during the hunting seasons by USDA, Animal and Plant Heath Inspection Service (APHIS), Wildlife Services (WS) sharpshooters in this area during that time. The Minnesota Board of Animal Health and its partner agencies contained the infection and are hopeful that it has been eradicated. We focused our financial and personnel resources on the area where the disease is known to exist and conducted aggressive depopulation of both livestock and wildlife in the area. Deer exclusionary fencing was constructed to mitigate livestock and wildlife interaction. Movement controls on cattle and additional wildlife surveillance will ensure that the disease is no longer in the area and is not reintroduced.

Minnesota currently has Split State Status for TB, with a majority of the state being Modified Accredited Advanced (MAA) and a small 2,600 square mile zone being Modified Accredited (MA). A third, smaller area where we have found the infected deer is known as the Management
Zone. A majority of our work, such as the cattle herd buyout and fencing program, has taken place within the Management Zone. No new livestock is allowed to be brought into the area. All of the herds in the MA Zone, which includes the Management Zone, must have an annual TB test and undergo a wildlife risk assessment to identify potential weak points in premises biosecurity. Animal Movement Certificates, official ID and a 60-day TB test are required for all cattle moving into, out of, or within the MA Zone. Local law enforcement is assisting the Board by stopping vehicles hauling livestock to ensure that the animals are being moved lawfully. Surveillance testing is ongoing in the MAA Zone. Almost 600,000 cattle have been tested in Minnesota since 2005. There have not been any TB-positive animals found in the MAA Zone.

Managing Bovine TB in Minnesota’s Wildlife
Erica Butler
Minnesota Department of Natural Resources

In response to the disease being detected in cattle, the Minnesota Department of Natural Resources (MNDNR) began surveillance efforts in free-ranging white-tailed deer (Odocoileus virginianus) within a 15-mile radius of the infected farms in fall 2005. To date, 26 deer have been found infected with Bovine TB. All infected deer were sampled within a 164mi² area, called the Bovine TB Core, which is centered in Skime, Minnesota, and encompasses 8 of the 12 previously infected cattle farms. In fall 2008, Minnesota was granted a Split-State Status for Bovine TB by the United States Department of Agriculture (USDA) that resulted in a lessening of testing requirements for cattle in the majority of the state (status level is Modified Accredited Advanced), with a small area in northwestern Minnesota remaining more restrictive (status level is Modified Accredited). Also in 2008, the Minnesota State Legislature passed an initiative that allocated funds to buy-out cattle herds located in the Bovine TB Management Zone, spending $3 million to remove 6,200 cattle from 46 farms by January 2009; resulting in the discovery of the 12th infected cattle herd. The remaining cattle farms in the Bovine TB Management Zone (n = 27) were required to erect deer-exclusion fencing to protect stored forage and winter feeding areas, costing an additional $690,000 in state funds. In November 2008, the MNDNR conducted Bovine TB surveillance of hunter-harvested white-tailed deer within the newly created Modified Accredited Zone, and results indicated that none of the 1,246 deer tested were positive for the disease. This marked the first large scale surveillance effort that failed to detect the disease in hunter-harvested deer since sampling efforts began in 2005. MNDNR also conducted targeted removal operations in the Bovine TB Core Area, using both aerial and ground sharpshooting, during winters 2007, 2008 and 2009. These intensive winter deer removal operations removed a combined total of 2,163 deer and detected 14 (54%) of the TB-positive deer discovered to date. Further, a recreational feeding ban,
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covering 4,000mi² in northwestern MN, was instituted in November 2006 to help reduce the risk of deer to deer transmission of the disease and enforcement officers have been working to stop illegal feeding activities. The MNDNR will continue to conduct hunter-harvested surveillance for the next five years to monitor infection in the local deer population, and consider the continuation of aggressive management actions (e.g., sharpshooting deer in key locations) to address concerns of deer becoming a potential disease reservoir.

Chronic Wasting Disease Update
Dean Goeldner
USDA-APHIS-Veterinary Services.

In FY 2009 APHIS received approximately $17 million in appropriated chronic wasting disease (CWD) funding, including $1.5 million in congressional earmarks. CWD rule update: The proposed supplemental rule for CWD was published for comment in the Federal Register on March 31, 2009. The proposed rule preserved the principle of federal pre-emption regarding interstate movement restrictions for CWD but did not affect state movement restrictions for other reasons. It also increased the surveillance requirement for interstate movement to 5 years, or certified status in the program. Finally, it proposed to create a 25 mi/40 km proximity standard to occurrences of CWD in wild cervids for those states seeking additional risk mitigation. Other issues such as inventory, quarantine, DNA comparison and wildlife surveillance requirements were also addressed.

APHIS is drafting responses to the comments received and is discussing internally what direction the revised final rule will take. Issues that may impact the revised final rule include the president’s memo on federal preemption dated May 20, 2009; budgetary constraints; the 2015 vision for Veterinary Services; and the need to create a truly cooperative state-industry-federal program that works for all stakeholders.

APHIS intends to publish and implement the revised final CWD rule in 2010.

In FY 2009, 23,652 farmed and captive cervids were tested for CWD using immunohistochemistry. This continues an increasing trend that is likely the result of industry growth and stricter enforcement of state regulatory programs.

Five positive farmed cervid herds were detected in FY 2009: Two white-tailed deer herds in Wisconsin, one elk herd in Minnesota, and two elk herds in Colorado. The Wisconsin and Minnesota facilities have been depopulated. This brings to 47 the number of positive herds that have been identified since 1997. At this time, six positive elk herds remain in Colorado. Veterinary Services (VS) continues to offer indemnity and cover depopulation, disposal and testing costs for CWD-positive and exposed herds and trace animals.

In FY 2009, $4.65 million in CWD cooperative agreement funding was
made available to the state wildlife agencies. The funding levels in the tier system developed in consultation with Association of Fish and Wildlife Agencies (AFWA) were reduced slightly from FY 2008 due to budgetary constraints. Forty-nine states requested and received funding. VS provided $560,000 to support tribal CWD activities in FY 2009. In addition to the ongoing cooperative agreement with the Native American Fish and Wildlife Society, 27 individual tribes received CWD assistance.

In the face of increasingly tight state and federal budgets and fatigue with resource-intensive hunter-killed surveillance activities, new surveillance strategies are needed to monitor geographic distribution and prevalence of CWD. The agriculture appropriations bill/conference report for FY 2010 contains $16.875 million for CWD, including a $1.024 million earmark. After overall agency needs are determined, VS will continue to work with AFWA to assure an equitable distribution of cooperative agreement funding.

VS 2015 is an initiative to provide a new vision and direction for VS programs. The emphasis will be away from traditional, large scale eradication activities and toward a focus on prevention, preparedness, detection and response. This initiative will have implications for the future of the CWD program.

Concept Paper for a New Direction for the Bovine Brucellosis Program
Brian McCluskey
USDA-APHIS-Veterinary Services

Bovine brucellosis is a serious disease of livestock that has significant animal health, public health and international trade consequences. The cooperative Federal-State-Industry effort to eradicate the disease from cattle in the U.S. has been successful.

The concept paper, recently published in the federal register for public comment, presents APHIS, Veterinary Services’ current thinking about changes we are planning to address these challenges. The concept paper provides an action plan that:

1. Effectively demonstrates the disease-free status of the United States through a national status-based program supported by a national surveillance strategy.
2. Enhance efforts to mitigate disease transmission from wildlife.
3. Enhances disease response and control measures.
4. Modernizes the regulatory framework to allow Veterinary Services to address risks quickly and sensibly.
5. Implements a risk-based disease management area concept.

To succeed, this new approach will require Veterinary Services’ continued partnership with State animal health and wildlife officials, other federal agencies, industry, international partners, academia, and other stakeholders. Successful partnerships will allow us to use available resources efficiently to achieve program objectives and protect our
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national livestock herd.

The action plan will benefit Federal and State animal health officials, the regulated industries, and producers by allowing a more adaptable science-based response that is both effective and timely and that addresses the unique challenges facing the program today.

Montana Perspective on Brucellosis Plan
Martin Zaluski
Montana State Veterinarian

In July 2009, Montana was Classified Brucellosis Free, and consequently all 50 states in the nation have been declared free of brucellosis in livestock. Montana will continue the Brucellosis Action Plan through January 10, 2010 (six months following reclassification to Class Free), at which time the area for livestock surveillance and risk mitigation activities will be adjusted. The 2008 elk surveillance (mostly hunter harvest) yielded 880 usable samples. Of the 880 samples, 62 (7%) were seropositive on standard serologic tests, and 13 (1.5%) were determined to be positive on western blot. Western blot positive elk were found in five hunting districts (HD) in the 2008 surveillance and in four HD in 2007 surveillance. The road ahead includes continuation of wildlife surveillance, adjustment of the livestock surveillance area, continuation of risk mitigation activities in livestock, and development of objective tools to assess risk of transmission and risk mitigation.

Wyoming Brucellosis Update
Terry Kreeger
Wyoming Game and Fish Department (WGFD)

Terry Kreeger reported on Brucellosis wildlife risk mitigation authorities in Wyoming. Surveillance activity includes testing of samples submitted by hunters from elk killed in specific hunt areas each year as well as sampling elk trapped or killed in the Designated Surveillance Area annually. This testing has identified increased seroprevalence in Western Park County (east of YNP) which is an area where there are no elk feedgrounds. The test and removal pilot project on three elk feedgrounds in Sublette County is in the fifth and final year. This project has shown a decrease in seroprevalence in elk in each of the past three years and test and removal will remain a tool for future use in strategic locations. Prevention activities include vaccination with strain 9 or 2 of the 23 elk feedgrounds. Elk feeding is one mechanism used to attract elk away from cattle feedlines and to prevent co-mingling. WGFD is shortening the feeding season as weather allows and is experimenting with feeding techniques to attempt to reduce the contamination of elk and to spread them out of the feedground to avoid exposure. Research efforts include Brucella/Yersinia diagnostic chute side test development and vaginal implant transmitter studies. The Wyoming Livestock Board
and the WGFD are also working with the U.S. Fish and Wildlife Service (USFWS) and the Wind River Indian Reservation to conduct surveillance activities on elk on the reservation which is adjacent to Wyoming’s Designated Surveillance Area.

**Epizootic Hemorrhagic Disease**

David Stallknecht  
University of Georgia

Dr. Stallknecht gave an update on bluetongue and epizootic hemorrhagic virus (EHDV) isolations during 2008 and 2009. In 2008, isolations were made from wild and captive white-tailed deer in Arkansas (BTV-3), Indiana (EHDV-2), Kansas (EHDV-2, EHDV-6), and Texas ((EHDV-1, EHDV-2, EHDV-6, BTV-12, BTV-17). As of October 9, 2009, viruses have been isolated from white-tailed deer in Florida (EHDV-2), Kansas (EHDV-2), Louisiana (EHDV-2), Michigan (EHDV-6), Missouri (EHDV-2), Tennessee (EHDV-2), and Texas (BTV-17). BTV-3, BTV-12, and EHDV-6 all represent viruses that were not known to occur in the United States prior to 1999 (BTV-), 2006 (EHDV-6), and 2008 (BTV-12). There have been multiple isolations of BTV-3 and EHDV-6 suggesting that these viruses are established.

**A Tale of Two Lice: “Hair-loss Syndrome” in Western Deer Populations**

Colin Gillin  
Oregon Department of Fish and Wildlife

Exotic species enter the U.S. each year, with the majority of these intruders small enough in size to escape detection by focused state and federal surveillance. In the past three decades, USDA has collected over 70 different species of arthropods at entry ports, most encompassing tick species (*Amblyomma* spp.) and screwworm (*Cochliomyia* spp.). The greatest threat of introduced species may be to livestock health and threats to the nation’s food source and economy, but also native wild species and habitats (Zebra mussels) or human health (West Nile virus). Equally at risk are native species of wildlife (West Nile virus on corvids and sage grouse and potentially the fungus that causes White Nose syndrome in bats of the northeastern U.S.).

Arguably, the consequences of introduced species on those considered endemic is that the effected populations may serve as a naive host, which may have a more severe reaction to introduced pathogens or parasites due to a lack of developed immune response defenses. Since 1996, the effects of apparent exotic louse species on western deer populations has wildlife managers increasing efforts in surveillance, management and research to understand, combat, and develop strategies. A condition causing what appeared to be alopecia or hair-loss in black-tailed deer (*Odocoileus hemionus columbianus*) was first described
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in western Washington in 1996. During the initial evaluations, heavy infestations of a chewing louse from the genus *Damalinia* spp. was observed. Preliminary diagnoses determined the species to be a more common species found throughout North America (*Damalinia* (Subgenus *Tricholipeurus*) *lipeuroides* and *parallelus*). Within a year, the louse was further characterized and determined to be an Old World species *Damalinia* (Cervicola) spp, a common louse of fallow deer from southeast Asia. Affected deer develop a hypersensitivity reaction, causing excessive grooming and eventual loss of hair.

The geographical distribution of this condition termed hair-loss syndrome (HLS) continued expansion into Oregon in 1998 and is now present in black-tailed deer populations west of the Cascades from the Canadian border to northern California. Many deer have been observed in poor condition in the winter with evidence of mortalities from complications of pneumonia and hypothermia. This severe reaction of a parasite on its macrovertebrate host is not typically witnessed over such a large scale. Theories as to why deer were affected include cofactors of immunosuppression from viral infections, parasite burdens, environmental contaminations or toxins, or stress from poor nutrition and changes in habitat. Changing climate patterns were also evaluated along with the potential of introduced intermediate hosts.

Initial necropsy results showed deer with severe emaciation and alopecia, verminous pneumonia from *Dictyocaulus* spp. and *Protostrongylus* sp., with pediculosis involving heavy infestations of chewing lice, peripheral lymphadenopathy from stimulation of the immune system and other high internal parasite burdens (*Parelaphostrongylus odocoilei*).

With little known about the specific mechanisms related to this condition, research was conducted at Oregon State University during 2002-2005 J. Robison and B. Coburn. Some of their results showed that *D. cervicola* could be transmitted to mule deer and that lice are able to live off their host for several days in cool temperatures and up to a week at room temperature. They also found that deer that were severely affected but survived were able to grow a normal hair coat following seasonal shedding and hair regrowth. Lice numbers were highest from December through May and lowest June through November. During peak periods, lice numbers could exceed 20-30 times the number per square cm versus the summer months. Other research showed that prevalence of HLS does not appear to affect winter fawn survival (Bender and Hall 2004).

Despite mortalities attributed to HLS, and the opinions of some wildlife managers that HLS has contributed to localized declines in black-tailed deer, studies conducted to date have not demonstrated significant population impacts on black-tailed deer.

In 2003, the Washington Department of Fish and Wildlife (WDFW) began receiving reports of HLS in deer east of the Cascades, at the black-tailed deer - mule deer (*Odocoileus hemionus hemionus*) intergrade
zone. Lice were collected from deer and identified as Bovicola tibialis, the chewing louse of fallow deer (*Dama dama*). This species of louse has been reported in the US since 1941 in British Columbia and California in 1973. It is thought that exotic lice have potentially been in North America for at least 100 years or since shipments of foreign species of cervids were introduced into this continent. In 2006, numerous reports were received of dead deer (particularly fawns) with hair loss in south central Washington, and these carcasses were heavily infested with *Bovicola tibialis*. The number and geographical distribution of reports of HLS in eastern Washington deer have increased steadily over the past six years, with reports in Idaho, Wyoming, Nebraska, California and Canada. Deer surveys and harvest data suggest mule deer populations in some affected areas have declined by an estimated 50% since 2004. It is unknown if *Bovicola tibialis* infestations are the sole reason for the decline, but they are suspected to be a factor.

The question remains whether invasive and foreign insects such as *Damalina cervicola* and *bovicola tibialis* were simply unknowingly introduced into the North American continent on the backs of Asian cervids or if the parasite has been on this continent for much longer. Broader question involves determining the impacts to populations of endemic North American cervid species and why this parasite suddenly seems to cause such increasing and unexpected pathological ramifications on its host to the potential detriment of cervid populations.

**Anthrax in a Large Semi-free Ranging Bison Herd**

Dave Hunter
Turner Endangered Species Fund

During period from July 27 through August 17, 2008 anthrax was diagnosed in a bison herd in Southwestern Montana. The outbreak was the first recorded anthrax outbreak in that region. The death loss started following a period of severe thunderstorms and hail followed by several days of temperatures exceeding ninety degrees Fahrenheit. There were 5,000 bison on an 18,000 acre pasture and the bison were in the middle of rutting behavior. The working and handling facility was not accessible during the outbreak due to distance from the quarantine pasture and behaviors of the animals. Several different strategies were used to remove carcasses, curtail additional deaths and to prevent bioaccumulation of spores. Due to the extremely dangerous fire conditions on the ranch, the State of Montana provided a curtain incinerator for carcass disposal. The incinerator could only handle 8-9 bison per day and the death losses were climbing to thirty animals per 24 hour period. Foam developed for military anthrax decontamination (EasyDecon DF 200 Manufactured by Intelagard) was then incorporated into a burial protocol. The remaining carcasses were buried to a depth of six feet after foaming and sprayed with a 10% bleach solution. The death loss was approximately 5% or 298 bison from the herd of 5,000. Males suffered a higher death loss as 39% of breeding
males were lost during the outbreak. Elk death lost during the disease was confined to males only. Thirty five to forty adult bulls were found dead with antlers in velvet around the quarantine area. Elk do not elicit fighting behavior when the antler is in velvet, eliminating aggression as a cause of spread of the organism. One hundred and twenty nursing calves were orphaned during the outbreak. No scavengers fed on any carcass that died during the outbreak. Biting flies were not trapped during the first year. In 2009 a team from Environmental Protection Agency (EPA) sampled grids around burial sites and riparian areas attempting to recover spores to test our burial protocols. Flights to monitor elk populations this year did not reveal losses during the anthrax season. A vaccine trial was initiated to identify vaccine dosage that would offer protection for animals for 10-12 months. The standard vaccine protocol is two doses two weeks apart. Since the vaccine is usually given prior to the anthrax season it is labeled for six months protection. Using a double dose of the standard vaccine using pneumatic injectors (MIT Technologies) appeared to offer additional protection with one injection.

Is There a Role for Serologic Testing in Wild Bird Avian Influenza Surveillance?
David Stallknecht
Southeastern Cooperative Wildlife Disease Study, University of Georgia

Dave reported on research evaluating the efficacy and potential applications of serologic testing as a diagnostic tool in wild bird avian influenza (AI) surveillance. Since the emergence of H5N1 highly pathogenic AI virus, there has been an increased effort put into wild bird AI surveillance, globally. While a large part of this surveillance effort has been devoted to detecting the introduction of H5N1 highly pathogenic AI viruses, there has also been a movement toward better understanding the natural history of these viruses and further defining the epidemiology of AI in wild birds. Currently, AI surveillance in wild birds is largely dependent on diagnostic assays that detect viral shedding, including virus isolation and reverse transcriptase polymerase chain reaction (RT-PCR). This surveillance approach has successfully isolated AI virus from over 100 taxonomically diverse avian species and identified two groups of wild bird reservoir hosts; species in the Orders Anseriformes and Charadriiformes. Testing for antibodies to AI virus is a common surveillance strategy utilized in domestic poultry to screen for infection on a population level. This approach has been underutilized in wild bird AI surveillance because serologic assays developed and utilized for domestic galliforms lack sensitivity in some wild bird species, particularly waterfowl. A sensitive and specific assay to detect AI antibodies in wild birds would represent a valuable complement to existing virus isolation- and RT-PCR-based surveillance. Serologic data could help interpret virus isolation and RT-PCR results and also serve as an economical method to help identify species or populations involved in AI epidemiology. The goal of this
research was to evaluate the ability of a commercial blocking enzyme-linked immunosorbent assay (bELISA) and the agar-gel immunodiffusion (AGID) test to detect antibodies to AI viruses in field and experimental serum samples collected from a large diversity of wild avian species. The commercial bELISA utilized in these studies was the IDEXX Flockchek AI MultiS-Screen Ab ELISA (IDEXX Laboratories, Westbrook, ME).

We first tested 281 serum samples collected from 28 taxonomically diverse wild avian species that were experimentally infected with AI viruses with both assays. These samples included 178 from birds with confirmed AI infections (122 infected with low pathogenic AI viruses and 56 with highly pathogenic AI viruses) and 103 from uninfected negative control birds. The sensitivities of the bELISA and AGID tests were 0.820 (95% CI: 0.756-0.874) and 0.674 (0.600-0.742), respectively. Both tests had an estimated specificity of 1.00 (95% CI: 0.965-1.00). The bELISA was significantly more sensitive than the AGID for both LPAI- and HPAI-infected birds and yielded a higher sensitivity estimate that the AGID for all 28 species.

To further evaluate the performance of the bELISA and AGID, we tested 2,249 field serum samples collected from 62 wild bird species, representing ten taxonomic orders, with both assays. The bELISA detected 25.4 % positives from these samples, while the AGID test detected 14.8%. As with the experimental samples, the bELISA detected as many or more positive samples than the AGID test in all 62 species. The serologic results yielded by both assays were consistent with the known epidemiology of AI virus and previously published virus detection data (virus isolation and RT-PCR). Most positive samples were from aquatic birds and the highest prevalences were from species in the Orders Anseriformes and Charadriiformes. Positive serum samples were rarely detected in terrestrial avian species.

Taken together, the experimental and field serology data from these studies suggest the evaluated commercial bELISA is a more sensitive serologic assay than the AGID test for detecting antibodies to AI virus in wild birds. Based on these results, the bELISA is a reliable species-independent serologic assay. Specific examples of potential field-relevant applications will be discussed.

Wildlife Disease Activities Report
Seth Swafford
USDA-APHIS-Wildlife Services

Wildlife Services (WS) National Wildlife Disease Program continued to partner with State Agriculture Departments, State Wildlife Agencies, Veterinary Services, and others to implement its Surveillance and Emergency Response System. Through the surveillance component, comprehensive feral swine disease sero-surveillance was implemented by sampling approximately 2,500 feral swine in 32 states during federal fiscal year 2009. Diseases of most interest and concern were swine brucellosis,
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pseudorabies, classical swine fever, toxoplasmosis, and trichinae; preliminary results were provided. Twenty-nine states actively participated in collecting samples for plague, tularemia, or both during federal fiscal year 2009. A total of approximately 5,000 animals were sampled (2 samples/animal) using the Nobuto strip blood collection technique. All of the collected samples were sent to the Centers for Disease Control and Prevention (CDC) for diagnostic testing. Bovine tuberculosis (bTB) issues involving wildlife have become increasingly more important during the past fiscal year. For example, WS worked with State Agriculture Departments and State Wildlife Agencies in Minnesota, Nebraska, Michigan and Indiana to conduct surveillance in captive and wild cervids as well as other species of wildlife. Surveillance for highly pathogenic avian influenza (HPAI) continued as another area of emphasis for WS. Biological year 2008 (BY08) represented the third year of surveillance coordinated at a national and flyway level. During BY08, WS and State Wildlife Agencies collected 64,741 wild bird samples from 50 U.S. States and 25,976 environmental samples for the early detection of highly pathogenic avian influenza (HPAI). Coordination with Mexico and Canada provided a continental approach regarding wild bird surveillance. Samples from the U.S. were screened at National Animal Health Laboratory Network facilities and forwarded to the National Veterinary Services Laboratories (NVSL) for confirmation. Five-hundred seventy-six samples from 42 states were confirmed low pathogenic avian influenza (LPAI) H5 positive by NVSL. One-hundred seventeen samples from 31 states (out of 259 sent for confirmation from 34 states) were confirmed by NVSL as H7 positive. Of the 25,976 fecal samples collected during BY08, there were 246 matrix positive pools. Of the matrix positive pools, four pools from two states screened H5 positive and were sent to NVSL for confirmation. One of the four pools was confirmed positive. The national surveillance effort has not detected any HPAI in the United States during the three years of surveillance.

Results from the Department of the Interior Avian Influenza Surveillance Program

Scott Wright
National Wildlife Health Center

This is a presentation on the activities of the Department of the Interior (DOI) toward the National Surveillance Plan for the Early Detection of Highly Pathogenic Avian Influenza in the United States. The DOI, through the cooperation of the Flyway Councils, Department Bureaus, State and Tribal wildlife management agencies and NGOs, has sampled over 84 thousand birds in Alaska, the lower 48 states, Hawaii and the Pacific Islands since April 2006. To date, highly pathogenic H5N1 avian influenza Asian strain, has not been detected. However, low pathogenicity avian influenza viruses have been detected via the PCR test in 2,132 birds (2.5%). Virus isolation (VI) in live chicken eggs has been conducted.
on 32,906 birds which resulted in the isolation of 1,185 viruses (3.6%). All HA subtypes except H14 and H15 have been detected and all nine neuraminidase subtypes have been detected. The Northern Shoveler has the highest percentage of both PCR and VI positive samples of all 257 species sampled. Throughout the geographic sampling area, 106 sample sites (9%) of a total of 1,140 sample sites account for 66% of PCR positive birds. Strategic sampling early in the avian influenza season in Alaska yields a spike in virus prevalence as a result of birds arriving into the area. A comparison of sample types (oral, cloacal, laboratory combined and field combined swabs) revealed that the field combined swab sample is more often PCR positive and yields more viruses than the other three sample types.

White-Nose Syndrome: An Emerging Fungal Pathogen
Scott Wright
National Wildlife Health Center

This presentation describes a novel pathogen that is affecting wild bats. We also report some of the early findings discovered over the last year. White-nose syndrome (WNS) is a recently described fungal disease that is occurring in at least six species of insectivorous cave hibernating bats in the Northeast. This event is unprecedented in bats. At no time in recorded history has there been a disease this destructive to bats anywhere on earth. First detected in New York, WNS is now known to exist in another eight states and there is considerable concern that WNS is spreading. The novel fungus of WNS is a newly described species *Geomyces destructans*. The fungus flourishes on the muzzle and wings of bats resulting in fuzzy white noses. *Geomyces destructans* is psychrophilic growing best in cold temperatures. The fungus also invades intact skin as a primary pathogen. Lesions on the wings of bats compromise normal wing function which includes, flight, heat dissipation, water control, gas exchange and blood pressure regulation. Affected bats often roost abnormally at cave entrances, fly outside caves during winter months and die in very large numbers. Estimates of cave populations indicate losses of up to 90% and overall losses are over 1 million bats in three years. Fungal infection may take more than one year to adversely affect bats. There are several theories about the affects of fungal infection including infection disrupts torpor causing bats to abnormally arouse and use stored energy resulting in wasting. Affected bats are often emaciated. Ecologically bats are important predators of insects, consuming vast quantities during foraging flights at night. Although the popular press has suggested that human disease will increase because there are fewer bats to eat mosquitoes, in fact, bats do not eat mosquitoes, they feed instead on moths. The greatest economic and ecologic affect from reduced insectivorous bat populations is destruction of forests by tree eating caterpillars.

There is evidence that WNS may also occur in several countries
in Europe as far back as the early 1980s. Bats affected with WNS-like fungus have been reported in Germany, France, Czech Republic, Hungary, Switzerland, Romania, and the Netherlands. In contrast to North America, the occurrence of WNS in bats in Europe has not resulted in massive die-off events. However, bat colonies in Europe are considerably smaller. Europe and North America do not share bat species and the possibility of transoceanic movement of bats is not known. Work is underway to compare fungal isolates from the two continents by genetic sequencing.

Federal and state agencies, non-governmental organizations, and universities have collaborated to investigate the occurrence of WNS in the Northeast. As the disease is detected in new areas, more states ramp up their cave surveillance to try to detect WNS as soon as possible. Control measures are under development and a National Plan is being written to better coordinate activities related to WNS.

Committee Business

The Committee reviewed the USAHA Joint Working Group Committee on Wildlife Diseases and Committee on Sheep and Goats Recommendations on best management practices for domestic sheep grazing on public land ranges shared with bighorn sheep. The Committee approved the recommendations in their entirety.

The Committee reviewed a resolution on wildlife immunocontraception using Gonacon, a USDA Wildlife Services product. The resolution was tabled until next year.

The Committee reviewed three other resolutions titled 1) Investigation of Risk Posed by Emerging Pestiviruses; 2) Research and Management of Bighorn Sheep/Domestic Sheep Disease; and 3) Enhanced Development of Risk Assessment Models by Determination of United States Wildlife to Rift Valley Fever Virus. All three resolutions were approved and forwarded to the Committee on Nominations and Resolutions.
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RECOMMENDATIONS ON BEST MANAGEMENT PRACTICES FOR DOMESTIC SHEEP GRAZING ON PUBLIC LAND RANGES SHARED WITH BIGHORN SHEEP

USAHA Joint Working Group
Committee of Wildlife Diseases and Committee on Sheep and Goats
October 2009

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Introduction

In October 2007, the United States Animal Health Association (USAHA) Committees on Wildlife Diseases and Sheep and Goats established a working group comprised of staff or members of state and federal animal health agencies, wildlife and public land management agencies, the American Sheep Industry and Wild Sheep Foundation (formerly Foundation for North American Wild Sheep (FNAWS)). The working group was charged with developing best management practices for grazing domestic sheep (and goats) on public lands where contact between domestic sheep and bighorn sheep may occur. This working group concept was subsequently endorsed by USAHA as part of a broader resolution on “Cooperative Research and Management of Wildlife/Livestock Disease Interactions” approved in October 2007. The task of this subcommittee was limited to one specific aspect of domestic sheep management, the interaction of bighorn sheep and domestic sheep on public lands. Consistent with USAHA direction, this document primarily focuses on the domestic sheep portion of best management practices in these situations. A comprehensive list of best management practices for bighorn sheep can be found in the Western Association of Fish and Wildlife Agencies (WAFWA) Bighorn Sheep Working Group Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat (1).

Although public lands grazing is a privilege and agencies are not required to offer alternative allotments for domestic sheep grazing, work group members recognize the historical role that public land grazing has
played in sustaining viable working landscapes and rural communities, and that domestic sheep and goats, as well as bighorn sheep, are important to the cultural and ecological heritage of most western states. The work group also recognizes that domestic livestock grazing can be a useful tool for habitat management. The working group, co-chaired by Drs. Walt Cook and Michael Miller, assembled relevant background information and met via multiple teleconferences, email and in person at the 2008 USAHA meeting to develop and discuss recommended best management practices. As per the group’s charge, the recommendations that were developed focus on practices intended to minimize opportunities for interspecies contact on shared range that could lead to transmission of respiratory pathogens. In some recent pneumonia epidemics in bighorn sheep, the cause has been attributed to endemic respiratory pathogens, and in other epidemics the cause has been attributed to pathogens introduced via interactions with domestic sheep (2). These recommendations do not presume to estimate the probability or risk of contact. Quantifying the risk of interspecies disease transmission between bighorn sheep and domestic sheep in a natural setting is problematic (2). Further research is needed to better understand and estimate the magnitude of potential risk to bighorn sheep arising from interactions with domestic sheep and other wild ruminant species, as well as the risks of endemic disease and potential influences of seasonal and environmental factors on these risks. Indeed, the original USAHA resolution that led to this working group directed federal agencies to fund research on epidemiology and pathogenesis of bighorn/domestic sheep disease interactions.

These recommended best management practices are intended to serve as one element of more comprehensive approaches for managing the health of bighorn sheep populations. We recognize that all of the management practices listed may not be incorporated into some management plans, but offer them as a complete list for consideration. Hopefully these recommendations will complement or emphasize risk reduction practices already in place, and encourage their development elsewhere. Although national in scope, these recommendations do not mandate programs at the state, local, or tribal level. Local primacy dictates that management occurs at the state or regional level whenever possible. The work group members believe that these recommended best management practices represent a viable alternative to terminating domestic sheep grazing on public lands where goals include minimizing the risk of epidemics in bighorn sheep that may result from interspecies contact. However, there are cases where these practices have been considered and mutually judged to be infeasible by responsible agencies and permitees or their representatives in the course of negotiations via established processes for timely conflict resolution. When this occurs, the work group members encourage timely identification of alternative grazing allotments or arrangements to minimize impacts on permitees.
and interruption of ongoing domestic sheep operations.

**Recommended best management practices for grazing domestic sheep (and goats) on public lands where contact with bighorn sheep may occur:**

**Domestic sheep husbandry**

1. Select only highly gregarious breeds of sheep (e.g., Merino, Rambouillet, “Western/white-faced ewes”, fine wools and crosses thereof) for grazing on shared ranges.

2. Use pregnant domestic ewes or ewe-lamb pairs (i.e., ewes with lambs) for grazing near occupied bighorn sheep habitats; avoid grazing open ewes, yearling replacement ewes and ewes that have lost their lambs because ewes in estrus attract bighorn rams.

3. Maintain a band size of less than 900 ewes with single lambs (1,800 total) or 700-800 ewes with twin lambs (2,100 to 2,400 total), or of less than 1,500 dry ewes or yearlings.

4. Require instruction/training and supervision for ranch (i.e. camp tenders and sheepherders) and agency staff members and frequent instructions to the sheepherders concerning locations where forage and water is available for domestic sheep and monitor that the grazing standards and guidelines are being followed.

5. Require instruction/training and supervision for ranch (i.e. camp tenders and sheepherders) and agency staff members and frequent instructions to the sheepherders concerning recognizing bighorn sheep and allowable methods for preventing contact between bighorn sheep and domestic bands.

6. Place more experienced, informed, and responsible sheepherders on allotments located nearest to bighorn sheep habitats.

7. Place mature and effective guard dogs and herding dogs with domestic sheep (at least 2 of each per band). Female dogs in heat should not be placed on allotments.

8. Conduct full counts of all individual ewes when moving onto and off of each allotment.

9. Maintain an appropriate ratio of marker sheep within bands; depending on local needs and conditions, ratios should be no fewer than 1 marker for every 100 adult sheep. More markers may be required when dictated by local conditions.

10. Count marker sheep on a regular basis, immediately any time sheep scatter and more frequently (e.g., once or twice per day) if required under local grazing agreements. It is customary to count marker sheep when they are bedded and this should be encouraged. After sheep scatter, complete a full count as soon as reasonably possible.

11. Place bells on at least 1 in every 100 mature ewes to serve as
warning, and for identification and location of sheep relative to other sheep.

12. Select camp locations and bedding grounds that are acceptable to sheep and encourage sheep to remain within the bedding grounds.

13. Select herder’s camp, nighttime bedding ground, and midday (siesta) bedding ground locations that maintain communication between guard dogs and herding dogs by smell, sound (barking) and sight, and to take advantage of differences in the sleep cycles of guard dog and herding dog. If grazing federal lands, comply with established “bed ground” standards. Construct temporary electric or boundary fences in congregation areas (e.g., bed grounds) where feasible.

14. Truck in water (if needed) to prevent straying.

15. In situations where sheep are difficult to observe because of dense vegetation or difficult terrain, always count marker sheep after emerging from such conditions.

16. Increase sheepherder vigilance on bright moonlit nights because sheep may rise to graze under these conditions.

17. Truck domestic sheep through “driveway” areas that include occupied bighorn sheep habitat where interspecies contact is considered likely by the land management agency staff in consultation with the state wildlife management agency staff. It is not always possible to truck sheep into certain rugged areas; in these cases other arrangements may need to be made.

18. Do not trail more than 5 miles per day and stop trailing when sheep or lambs show signs of fatigue. Provide for a “babysitter” or removal of lagging sheep when trailing. Follow additional agency guidelines (where applicable) on federal lands.

19. Remove sick or physically disabled domestic sheep from the band.

20. Require that sheepherders use communication equipment such as cellular or satellite phones or two-way radios (when service is adequate) and location equipment such as global positioning system (GPS) receiver to report and record grazing movements and encounters with bighorn sheep. Seek cost-sharing partnerships for providing electronic and other equipment when an operator changes grazing management practices for the sole purpose of minimizing domestic sheep contact with bighorn sheep; these partnerships could include wildlife management agencies and private organizations.

21. Have sheepherders use a log book or other record keeping aids to record GPS locations, counts, losses, and other information as needed or required.

**Domestic goat husbandry**

Because domestic goats are less gregarious than domestic sheep and have a greater tendency to stray or disperse, the work group recommends...
that domestic goats are not grazed in occupied bighorn sheep habitat.

When goats are grazed near bighorn sheep for weed control or other purposes, electric fencing can be used to keep the two species apart. Pack goats used in bighorn sheep habitats should be tethered when not being trailed.

Strays and commingling responses

1. Develop a commingling detection and response protocol that includes the following:
   a. reporting bighorn sheep (including a count and GPS location) that are attempting to associate with domestic sheep bands;
   b. reporting stray or missing domestic sheep to the land management agency;
   c. immediate, two-way notification (between permittee and land management agency) of actual commingling sightings;
   d. a post turn-off stray domestic sheep removal protocol;
   e. a protocol for removing individual commingling bighorn sheep;
   f. where feasible, collect standardized diagnostic samples on stray domestic sheep and commingling bighorn sheep;
   g. instructions for domestic sheep herders to not leave sick domestic sheep behind when trailing or moving from or between allotments.

2. Develop and follow a plan for locating and reacquiring (dead or alive) stray sheep. If a domestic sheep is determined to be missing, the permittee will immediately initiate a comprehensive search and notify the land manager.

3. Allow/encourage the permittee or producer and appropriate agency representatives to remove any stray domestic sheep in areas where interspecies contact could occur.

4. Allow/encourage the permittee or producer and appropriate agency representatives to haze bighorn sheep that appear intent on commingling.

5. Allow/encourage the permittee or producer and/or appropriate agency representatives to remove commingling bighorn sheep.

6. Where not already established, develop or clarify legal authorities for removing stray domestic sheep from public lands by lethal means.

7. Encourage voluntary allotment monitoring by permittees or independent observers in conjunction with federal and state agencies; where used, independent observers should receive prior training from permittees or agency personnel.

8. Develop pilot incentive/recognition programs to foster and recognize compliance, cooperation, and cost-sharing in efforts to prevent commingling of bighorn sheep and domestic sheep on shared ranges.
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Allotment boundary and habitat manipulations
1. Review domestic sheep allotment boundaries and/or use and reconfigure where appropriate and feasible to avoid or minimize overlap with critical bighorn sheep habitat. Where feasible, use strategies and techniques including:
   a. geographic/topographic barriers that enhance species separation;
   b. seasonal or spatial separation through domestic sheep grazing management.
2. Undertake habitat enhancements that improve bighorn sheep habitats (both summer and winter range) outside allotment boundaries and/or attract bighorn sheep away from domestic sheep allotments.
3. Undertake water developments to enhance bighorn sheep distribution or to move domestic livestock away from preferred bighorn sheep foraging areas by augmenting available natural water sources.
4. Where appropriate and feasible, determine the number of domestic sheep animal unit months (AUMs) that overlap bighorn sheep habitat and negotiate among cooperators (state, federal, industry, private) to locate potentially available replacement AUMs or allotments if necessary.

Other bighorn sheep management practices
1. Manage for bighorn sheep population densities and distribution that reduce potential for interspecies contact.
2. Use hunting and/or other means to discourage bighorn sheep from using domestic sheep allotments where alternative suitable habitats are available.
3. Use hunting and/or other means to discourage bighorn sheep from staying in proximity to or approaching domestic sheep bands.
4. Remove all sick or dead bighorn sheep encountered.

The foregoing best management practices are based on current understanding about the circumstances leading to pasteurellosis epidemics in bighorn sheep after contact with domestic sheep. Improved understanding about this relationship and about controlling respiratory diseases in sheep in general should allow refinement of these practices. Research needs to be funded; federal, state and non-profit agencies and organizations are all encouraged to fund research. For example, developing methods that decrease the occurrence or severity of pneumonia and pasteurellosis in either domestic or bighorn sheep, including the development and use of vaccines, immunostimulants, or long-acting therapeutic agents, might lead to advances in managing both. Outcomes of such research could aid in decreasing risks posed by interspecies interactions, or decreasing bighorn sheep susceptibility to...
pathogens. In developing biologic and therapeutic agents as tools, future research should focus not only on safety and efficacy of the products, but also on the potential for practical use in free-ranging populations.

The work group members recognize that this issue is controversial. Indeed, many of the recommendations found here were not reached via consensus but through majority opinion. This has been an important issue throughout the western United States. Several other working groups both at the state (e.g. Wyoming, 3) and national level (Western Association of Fish and Wildlife Agencies, 1) have convened working groups to address this issue. It is our hope that the list of options provided here will assist land and wildlife managers and permittees to reduce conflicts and minimize the risk of disease transmission.

References:
II.F. OTHER REPORTS

II.F.1. ARS RESEARCH SYMPOSIUM

Current Agricultural Research Issues on One-Host Ticks and Bovine Babesiosis

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Bovine babesiosis is a tick-borne disease caused by the apicomplexan protozoans Babesia bovis and B. bigemina, which can have devastating economic effects on the livestock industry. Estimates indicate the domestic livestock industry realizes annual savings of at least 3 billion dollars at today’s currency rate since the U.S. was declared free of the disease. Clinical bovine babesiosis is currently controlled in the U.S by control of its tick vectors, Boophilus (Rhipicephalus) annulatus and B. (R.) microplus, commonly known as cattle fever ticks (CFT). These ticks were eradicated from the continental U.S. in 1943 through the successful efforts of the Cattle Fever Tick Eradication Program (CFTEP), which is an effective and ongoing partnership between the USDA Animal and Plant Health Inspection Service, the Texas Animal Health Commission, and cattle producers. CFT have enormous economic impact on livestock production in tropical and subtropical parts of the world like Mexico and Brazil where they are endemic. The annual cost of tick infestation to the cattle industry in Brazil by the cattle tick R. (B.) microplus is estimated to be greater than two billion U.S. dollars. Post-eradication outbreaks of clinical bovine babesiosis in the U.S. due to re-emerging populations of CFT is a continual issue for the livestock industry for a number of reasons. First, there has been a considerable increase in the number of CFT infestations in South Texas during the last six years; 19 infested premises were reported in fiscal year 2003 whereas in fiscal year 2009 that number was 146. Second, increasing populations of white-tailed deer and other wild ungulates in South Texas appear to assist in maintaining CFT populations in pastures vacated of cattle. Third, there is no serologic surveillance for persistent infection in cattle and the susceptibility of the U.S. cattle herd to clinical babesiosis remains unknown. Finally and importantly, the organophosphate compound coumaphos is the only acaricide approved for official use by the CFTEP in dipping vats since 1970 and acaricide resistance is prevalent in Mexico. The USDA-ARS convened a public workshop in April 2009 where state and federal regulators, federal and academic investigators, and producers met with the goal of identifying gaps in the scientific knowledge associated with babesial disease systems. Research priorities were identified in these
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major areas: 1) epidemiology and surveillance; 2) ecology and biology of tick vectors and wildlife; 3) diagnosis, treatment, and prevention, 4) integrated approaches for sustainable tick eradication, and 5) anti-tick/parasite vaccines which control tick infestation and/or block pathogen transmission. One of the collaborative research projects at the USDA-ARS ADRU in Pullman, WA focuses on the development of persistent anti-tick/anti-transmission vaccines requiring one immunization. It is hypothesized that the use of attenuated and transfected *Babesia* parasites expressing tick antigens would elicit anti-tick immunity. Preliminary findings by USDA-ARS KBUSLIRL scientists indicate that the application of satellite image analysis using normalized difference vegetation index times series data in South Texas can identify habitat preferences of white-tailed deer and therefore predict the distribution of CFT in the landscape. Additional field data is being gathered to enhance the predictability of CFT infestations associated with white-tailed deer. Practical applications of satellite imaging in support of the CFTEP include the ability to assess the risk of restocking with livestock pastures that include preferred white-tailed deer, which had been vacated of cattle for 9 months or longer. Additionally, satellite images could also be used to make evidence-based decisions for the deployment in South Texas of technologies to control CFT infesting white-tailed deer. In collaboration with Northern Arizona University scientists, USDA-ARS investigators from Pullman, WA and Kerrville, TX are researching the population structure of CFT and prevalence of *Babesia* spp. in South Texas. This research is expected to generate science-based information that the CFTEP can use to enhance the decision-making process regarding quarantined premises and strategies preventing the re-emergence of CFT and bovine babesiosis in the U.S. A collaborative research project between Texas A&M-Kingsville and USDA-ARS KBUSLIRL scientists, and USDA APHIS-VS personnel will integrate ecologically-based approaches to re-eradicate cattle fever ticks from the U.S. This project will specifically address the impediment of ungulate wildlife species with re-eradication efforts.

It is concluded that:

• Maintaining CFT eradication in the U.S. and thus keeping the national cattle herd free of bovine babesiosis is a current and critical agricultural biosecurity issue of national relevance.

• The eradication of bovine babesiosis from the U.S. represents a very successful campaign in the history of disease control efforts, but global environmental variation combined with changing domestic and wildlife animal populations, is impacting the ability of state and federal agencies to keep the national cattle herd CFT-free.

• The level of CFT infestation in the U.S. has increased to alarming levels during the last six years.

• In the absence of cattle as the preferred host, white-tailed deer and some species of non-native wild ungulates appear to fill in the ecological niche as hosts for CFT in South Texas rangeland and
• More research on epidemiology and surveillance, ecology and biology of tick vectors and wildlife, diagnosis, treatment, and prevention of bovine babesiosis, integrated approaches for tick eradication, and anti-tick vaccines is required to develop technologies that will keep the U.S. free of CFT in a sustainable manner.

• The CFT Eradication Strategic Plan developed by APHIS- VS, which was originally proposed for implementation between fiscal years 2006 and 2011, requires financial attention; full funding for the Strategic Plan is critical so the new challenges the U.S. faces to eradicate CFT can be addressed.

*Presenters
The House Fly: Synanthropic Behavior Enhances Vector Competency

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Flies are a specialized group of insects that inhabit a variety of environmental niches. Although most are beneficial, a select few are pestiferous to humans and their animals. Pest species have become adapted to living closely with humans and are termed synanthropic flies. These flies benefit from the shelter, food and developmental sites provided by humans. Sometimes these factors are contaminated with pathogens that can be transferred by the flies to uncontaminated substrates causing debilitating symptoms in humans and animals contacting these pathogens. The fly most recognized as a nuisance and vector of pathogens is the house fly, *Musca domestica* (L.). One way to avoid the potential contamination problems associated with house flies is to learn more about their biology, ecology and behavior.

House flies have a very short developmental cycle, progressing from egg to adult in 6.5 days under optimum conditions. After the eggs hatch, there are three larval stages, then the pupal stage followed by the adult stage. Adults probably live 10 to 14 days in the field, but can be maintained in the laboratory for 30 days or more. Females need to mate only once and can lay 500 or more eggs in batches of 100 to 250 at a time. This can result in tremendous house fly population explosions when proper developmental substrates are available. The quality of the substrate, i.e. contaminated or uncontaminated with pathogens, can add another important dimension to the situation. A favorite development substrate is the manure of horses mixed with hay, straw or other bedding materials. But one reason for the house fly’s success has been its ability to exploit almost any moist substrate containing organic constituents. For example, house flies can successfully develop in animal wastes in agricultural areas and garbage and improperly processed sewage in urban areas. Contamination of flies with pathogens commonly occurs when flies are attracted to contaminated substrates for feeding or egg deposition. Preventing flies from accessing contaminated substrates is paramount to elimination of pathogen transfer by flies.

Fly larvae (maggots) can withstand temperatures in habitats that are 115° F or higher by alternately moving from hot to cooler areas while they feed. They can develop 12 to 24 inches below the surface of nutrient-laden soils or other substrates as long as there is sufficient moisture and air. To drown fly larvae they must be held beneath the surface for 4 hours. Thus, fly larvae are dependent on their ability to best utilize the microclimate in their environment. As their name implies, house flies are strong fliers and can fly at speeds of 5 miles per hour without the assistance of the wind.
They can easily go 15 to 20 miles in the course of a day, but this is difficult to document because of the house fly’s tendency to stop flying after encountering a favorable shelter or food substrate.

In summary, house flies develop rapidly in many organic substrates, live closely with humans and their animals, and fly rapidly from one location to another. House flies are good potential vectors when they have access to contaminated substrates. Their primary transmission method is mechanical, i.e. transferring pathogens from one location to another on their feet or other external surfaces, or through feeding. The best way to minimize the chances for house fly transmission of pathogens is by managing fly populations, both immatures and adults, and denying them access to contaminated materials.
Salmonella enterica serovar Enteritidis (S. enteritidis) colonization of houseflies (Musca domestica) residing in a room containing S. enteritidis-infected layer hens

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Houseflies (Musca domestica) have long been implicated as possible vectors for a variety of poultry infectious agents, many of which are also potentially pathogenic for humans. The current paper details studies which investigated the kinetics of contamination of flies released into rooms containing laying hens orally challenged with a nalidixic acid resistant Salmonella Enterica serovar Enteritidis (S. enteritidis), where the S. enteritidis resided in/on the flies, and whether these contaminated flies could transfer the organism to naïve unchallenged hens. The flies rapidly became contaminated with S. enteritidis with 40-50% of the individuals found to carry S. enteritidis within 48 hours post hen challenge, increasing to 50-70% by 96 hours and then decreasing to 30% by 15 days post hen challenge. The fly interior and exterior were found to be equally contaminated although the addition of 0.5% detergent to the wash buffer was necessary to facilitate removal of the S. enteritidis from the fly surface. Culture of fly organs showed that while 100% of the fly guts contained S. enteritidis, only 10% of fly crops were positive and no S. enteritidis was found in any of the salivary glands. A percentage of hens consuming contaminated flies became infected with S. enteritidis.

1. Flies in an S. enteritidis-contaminated environment rapidly become contaminated with that organism.
2. The interaction between fly and S. enteritidis may be tighter than the organism just sitting on the fly surface.
3. The probable spread of S. enteritidis through the environment occurs via fly defecation rather than either regurgitation during the collection of a meal or simple contact.
4. Flies contaminated with S. enteritidis can directly transmit the organism to naïve poultry
Abstract. Rift Valley fever (RVF) is a mosquito-borne zoonotic disease of domestic ruminants and humans in Africa. The disease is most severe in cattle, sheep, and goats, and it causes high mortality in young animals and abortion in adults. Exotic animal breeds from areas where RVF is not endemic tend to be more susceptible. Human infection causes significant morbidity and mortality. RVF has caused serious disease in laboratory workers and must be handled with high level biosecurity. RVF was first described in 1930 in the Rift Valley of Kenya, and the disease has since occurred irregularly in Kenya every 3 to 10 years. The disease first spread outside sub-Saharan Africa into Egypt in 1997 and resulted in large losses among the domestic animal populations and caused significant human disease. Subsequently, in 1987 a large outbreak in animals and people occurred in Sahel region of Senegal and Mauritania, and then in September 2000, a RVF outbreak occurred in Saudi Arabia and Yemen along the Red Sea Coast, representing the first Rift Valley fever cases identified outside Africa. RVF generally occurs during years of unusually heavy rainfall and when localized and widespread flooding occurs. It is thought that the flooding causes transovarially infected Aedes mosquito eggs to hatch and introduce the virus into domestic animals, thus allowing the maintenance of the virus in nature during dry non-epidemic conditions. After livestock are infected, a wide variety of mosquito species may act as the vector for transmission of RVF virus to spread the disease. There are no licensed animal or human vaccines available for use in the United States. We have developed a monitoring and risk mapping system using global sea surface temperatures and normalized difference vegetation index times series data derived from the advanced very high resolution radiometer instrument on polar orbiting national oceanographic and atmospheric administration satellites to map areas at risk for a potential outbreaks in sub-Saharan Africa, the Nile River Valley, and the Arabian Peninsula. This system is now an important tool for local, national and international organizations involved in the prevention and control of animal and human disease, permitting focused and timely implementation of disease control strategies several months before an outbreak. We are currently developing a geographic information system-based remotely sensed early warning system for potential RVF vectors in the United
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States. Forecasts of the potential emergence of mosquito vectors will be disseminated throughout the United States, providing several months’ warning in advance of potentially elevated mosquito populations. This would allow timely, targeted implementation of mosquito control, animal quarantine and vaccine strategies to reduce or prevent animal and human disease. Currently above normal sea surface temperatures have developed in the equatorial eastern Pacific Ocean (~ 2ºC) and also in the equatorial (~1ºC) typical of the 1997-1998 and 2006-2007 period. This warming of the ocean’s increases the likelihood of elevated rainfall in the Horn of Africa at the end of 2009 and early 2010. Since the most recent RVF outbreak occurred in this area in 2007 and the number of RVF susceptible animals is limited the elevated rainfall is unlikely to cause significant RVF disease activity during the current season but may cause focal disease introduction into isolated populations as virus infected Aedes mosquitoes are produced subsequent to flooding. We conclude that:

• The threat from globalization of RVF, is real and ever present danger
• RVF surveillance and control preparations are critical
• Further research on RVF disease ecology, vector biology and control, genetics, vaccines, etc to is essential to react quickly and effectively control disease and limit spread
• RVF vector control, quarantine and vaccine containment strategies must continually be developed and tested
• Enhanced preparation will reduce human and animal health risk, and limit economic losses from RVF
• Much more research, operational preparation, and agency coordination is needed to either prevent or contain RVF vector borne diseases

*Presenter
Rift Valley Fever Virus Control: Integration of Virus, Host and Vector Studies

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Rift Valley fever (RVF) is a disease of animals and humans that occurs in Africa and the Arabian Peninsula. It is caused by a Phlebovirus in the family Bunyaviridae. Mosquito-borne epizootics occur during years of unusually heavy rainfall. Domestic cattle, sheep and goats are highly susceptible to infection, which can result in high mortality in young animals and increased abortion in adults. Unapparent infections are quite common in wild ruminants. Infection in humans causes influenza-like symptoms, but can lead to severe complications, including retinopathy, blindness and even death. Control of RVF in livestock requires a three-pronged approach that includes diagnosis, vaccination and vector monitoring and management. Scientists at the Arthropod-Borne Animal Disease Research Laboratory (ABADRL) conduct research to address each of these areas.

Research on vector competence of North American species of mosquitoes for RVF virus (RVFV) was conducted in collaboration with the US Army Medical Research Institute of Infectious Diseases (USAMRIID). This work showed that Culex tarsalis is highly susceptible to infection and is able to transmit the virus (competent vector). Aedes vexans from Louisiana and Florida were competent vectors of RVFV; however, Aedes vexans from California and the Rocky Mountains were only minimally competent. Other North American species of mosquitoes, such as Culex erythrothorax and Aedes dorsalis, were shown to be poor vectors for RVFV.

Collaborative research agreements for vaccine development, evaluation and validation were established with the Canadian Food Inspection Agency (Winnipeg, Canada), Onderstepoort Veterinary Institute (South Africa), Kenya Agriculture Research Institute, Colorado State University, University of North Carolina, Department of Homeland Security, and the Department of State Biosecurity Enhancement Program. Infection trials have been conducted in collaboration with the Canadian Food Inspection Agency to experimentally reproduce disease in sheep and cattle and to produce reagents for validation of diagnostic assays. In addition, experiments have been conducted at the ABADRL to examine the host immune response and to determine if competent mosquitoes can become infected from animals following vaccination with the attenuated MP-12 strain of RVFV.

Finally, ABADRL scientists are working to develop operator safe reagents and diagnostic tests for RVF. Expressed RVFV proteins and antibody reagents (rabbit, mouse and sheep) have been produced and
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incorporated into both competitive enzyme-linked immunosorbent assay (c-ELISA) tests and immunohistochemical (IHC) assays for detection of RVFV antibodies and antigens. Real-time PCR assays have been developed for rapid virus detection during RVF outbreaks. Collaborations have been established to facilitate both development and validation of the diagnostic assays.

In summary, studies have identified North American mosquito species that are competent vectors for RVFV; animal models have been developed to study RVFV infection in ruminants; the ability of mosquitoes to transmit a candidate vaccine strain of RVFV (MP-12) has been examined; the duration of immunity to the MP12 strain is being investigated; and operator safe reagents and diagnostic tests have been developed for RVF, and agreements are in place to validate these diagnostic tests.

Future research directions include evaluating the potential for genetic reassortment in North American mosquito species between wild-type strains and vaccine strains of RVFV, and between North American bunyaviruses and wild-type or vaccine strains of RVFV. They also include determining the effect of environmental temperature on the ability of Cx tarsalis to transmit RVFV; determining which mosquito cells/tissues support RVFV replication; understanding population differences in vector competence; and understanding vertical transmission of RVFV. In terms of vaccine discovery and validation, collaborations are in place to examine mosquito transmission of RVFV from challenged vaccinates to naïve hosts; and to evaluate and improve alphavirus replicon DNA vaccines. Agreements are also in place to field validate the c-ELISA, the IHC and the Real-Time PCR diagnostic tests. Finally, collaborative agreements are in place to develop novel procedures, such as On-Probe Pyrolysis Desorption Electrospray Ionization (DESI) Mass Spectrometry and Surface Enhanced Raman Scattering, for diagnosis of RVF.

*Presenter
The concept of integration is almost always seen as a positive direction for application of health systems and other services. A quick survey will show that the word “integrated” leads the title of many strategies in the formula “Integrated ‘X’ Management.” Among the many examples are Integrated Pest Management, Integrated Veterinary Management, Integrated Disease Management, Integrated Waste Management, Integrated Crop Management, Integrated Weed Management, Integrated Livestock Management, and Integrated Risk Management. The goals of the authors of these well-intentioned strategies include a variety of actions ranging from simply performing more than one tactic for the stated purpose to creation of a system of carefully balanced and inter-communicating functions.

The doorway is a good analogy for the range of integration. A simple lintel is a straight, horizontal piece of material that holds a wall above a doorway. Its strength is simply the strength of the material, which can be increased by adding more thickness. In contrast, an arch holds up a wall above a doorway by distributing the load horizontally as well as vertically on each of many individual pieces of material. Each piece can be shaped and sized for optimum strength of the arch as a whole, resulting in a structure that achieves the same strength as a lintel but with much less material. The lintel approach to integration of pest management and veterinary health would simply make sure that resources for application of both kinds of skills were distributed adequately in sufficient quantity determined by independent assessments of pest incidence and of disease incidence. The arch approach to integration would have each component of pest management and veterinary health communicating so that the right techniques were applied in the right quantities to stop disease for the lowest possible expenditure of resources.

The second component of the “Integrated ‘X’ Management” strategy is the target “X.” Our subject is veterinary health, a field that goes all the way from esoteric scientific research to farming practices of individual producers. Typically, when we think of microbiology in the animal health field, we think of animal health and we have a very large “X” if we intend to address the entire field. Dividing the problem into a series of components, each of which requires its own effort at integration, might produce a list based on the communities of people who practice those components. Unfortunately, often the problems are more complicated and the sum of the problems may be greater than adding the individual
agents. Integration of the fields is critical for addressing many of the disease problems is best served by entomologists and microbiologists working together to develop intervention strategies to manage these problem diseases. For example, research is practiced by the community of biological scientists, trained by a combination of academic and technical instructors, development by industrial experts in manufacturing and marketing, and production by farmers. The need for these components to communicate with each other has been recognized since the early days of the USDA, as shown by the grouping of research, education, and extension into a single mission area within the Department. A great deal of effort goes into meetings, committees, stakeholder groups, university classes, etc. in attempts to solve problems, but there is probably general agreement that we could do a much better job. To improve our ability to address these problems, integration is critical.

The third component is management, which might be defined as the organization and coordination of the activities of an enterprise in accordance with certain policies and for achievement of clearly defined objectives. Organization, coordination, policies, and objectives imply activities and consequences that are familiar to all of us and that form the purpose of much of the work that goes on in government, industry, and academia. Management also suggests an ongoing process, one that has no defined ending. The positive side of that continuous nature is that all contributors have long-term as well as short-term goals, but the negative side is that frequently nothing ever reaches a final solution. It is perhaps this aspect of management systems that frustrates the individual producer, who would like to see permanent closure of problems that are barriers to the producer's ultimate goal of raising food animals for profit. That frustration is likely to be worse when the management systems as they exist are inefficient.

One of the integrated management systems that enjoys a great deal of thoughtful input and application is Integrated Pest Management (IPM). Graduate students in entomology in the 1970s were carefully taught IPM concepts as a response to the failures of over-reliance on pesticides during the late 1950s and 1960s. Much has been written about the theory and application of IPM during the last 35 years, most recently spawning a new journal by the Entomological Society of America entitled Journal of Insect Pest Management established in December 2009. One way to summarize IPM is to divide it into four functions, listed in the rough order that these functions are performed. First is risk assessment. Risk assessment establishes the who, what, when, and why of the problem based on longer term studies, models, and an understanding based on the body of scientific evidence. Risk assessment defines the problem, assigns an estimate of how likely it is to occur, and implies the degree of damage that might follow. As a product, risk assessment justifies much of the scientific effort that appears uselessly basic to some. Second is surveillance, which takes measurements to quantify the problem. Measurements might be
indices of the population of pests, environmental factors correlated to pest populations, or direct measurements of damage. The information informs when and where to do something about the problem, as well as providing constant feedback on whether measures are effective. The third function of IPM is **control**, which includes all those actions that intend to manipulate the pest's behavior or population to ensure that damage is reduced below a significant level. Those actions must be safe both occupationally and environmentally, as well as effective. Ideally, actions are performed in the right order and with the right emphasis to take advantage of the pest's life cycle. Greater efficiency resulting from intelligent application of various methods increases effectiveness and reduces both costs and environmental damage. The final function of IPM is **sustainment**. Unfortunately, this function is the most difficult to achieve successfully because it depends on the continuous investment of resources even when the problem has been solved. The natural tendency of producers is to ignore the pest until it causes damage, rather than to monitor the situation carefully in order to keep pests below a significant level. The best sustainment would require cultural changes that resulted in continuous education of producers about pests that could conceivably be a problem, as well as support to maintain a reservoir of expertise and materials to deal with the problem.

Clinical and public veterinary health functions are often organized into the same four components described above for IPM. Risk assessment is just as important as for pest management, in preparing individual veterinarians and producers for the diseases in their areas, both established and new and emerging, to ensure they have the tools needed to deal with those diseases, and have an understanding of the consequences of the diseases. Careful training of practitioners in veterinary medicine contributes to their ability to undertake accurate risk assessment, as well as the epidemiological studies that provide important information to the field. Veterinarians and producers recognize surveillance as a useful function for the health of their herds or flocks. International regulation mandates certain specific tests prior to the shipment of animals, or declares entire regions either contaminated or free of a disease. Individual farmers keep a watchful eye on their animals, knowing that early detection of a problem can prevent major economic losses. In the event of an epizootic event, surveillance provides the information necessary for decisions on prioritization of resources, culling, distribution of medications, development of intervention strategies etc. Control is often used by veterinarians for what they do to prevent and treat disease, and those activities parallel the activities that a pest manager does to mitigate damage. While a pest manager might use insecticide, a veterinarian might use an antibiotic; or where a veterinarian might vaccinate, a pest manager might recommend a pest-resistant breed of animal. Infection control practiced by veterinarians and producers often involves the same activities as those required to prevent development of certain pests.
greater organization of the body of veterinary professionals and their more consistent standing capacity, sustainment of successful disease control is currently more feasible than sustainment of successful pest management. That said, sustainment of veterinary successes can be imperfect due to the inability to eradicate and organisms or as resources and interest decrease in the reduction or absence of the original problem.

Veterinary health and pest management sometimes work together closely in the performance of management functions. Examples of success in this area have been in risk assessment, where scientific input has included coordinated research involving both veterinary health and entomology researchers. Recent dramatic advances in understanding the interaction of arthropod saliva and infection are one example; documentation of transmission of enteric bacteria by house flies is another. Communication of the results of surveillance is often much less organized because there is no real medium for that communication. Entomologists in mosquito abatement districts, public health departments, universities, or government may detect unusually high levels of a pest but it is doubtful that producers and veterinarians take action until they actually see the damage. On the other hand, entomologists have often responded to the occurrence of vector-borne disease outbreaks by performing more intensive surveillance. Pest control is practiced by veterinarians and producers as well as by entomologists. The system is far from perfect, but US EPA labeling systems encourage manufacturers to produce accurate instructions on safe and effective use, making information accessible to non-specialists. Sometimes entomologists are employed specifically to advise producers, an investment likely to result in more effective and cheaper control of pests. There are some notable examples of veterinarians and entomologists working together to achieve sustainment of successful programs, including the screwworm fly (Cochliomyia hominivorax) and cattle fever tick (Rhipicephalus [Boophilus] microplus and annulatus) eradication programs. It would be a favorable development if veterinarians, producers, and entomologists worked together more closely for sustainment of smaller successful programs as well.

This symposium presented three examples of vector-borne veterinary pathogens that include cooperative efforts between veterinary medicine and entomological professionals. The examples were Rift Valley fever virus, a pathogen of ruminants and humans transmitted by a variety of mosquitoes in Africa and the Arabian peninsula; the enteric pathogenic bacteria, Salmonella enteriditis, transmitted by house flies; and Babesia bigemina and bovis, protist pathogens of cattle transmitted by one-host cattle fever ticks. These examples include successful cooperation, potential for successful cooperation, and sometimes wasteful lack of cooperation in the history of controlling the pathogens. Entomology and veterinary science have developed methods for risk assessment and surveillance, with research continuing to produce more efficient techniques. Integration of these functions across the two disciplines could
be improved by increased interaction and better communication. The operational implications of entomological surveillance for infection and the implications of infection for entomological surveillance are generally unclear. One can imagine a more integrated system in which the number and distribution of potential vector arthropods would trigger more intensive surveillance for the pathogens, with results helping prioritize application of resources. Research that works toward integration of this kind would certainly be welcome. Similarly, greater application of intelligent, targeted use of both veterinary and entomological interventions would probably improve effectiveness and lower costs. For example, quantitative estimates of the extent of vaccination required in combination with various levels of vector control could relieve both activities from the difficult and expensive attainment of the final ten or twenty percent of coverage of eradication or control. Finally, both veterinary and entomological communities have much potential for improving sustainment of their successes. Our stakeholders would appreciate improvements resulting from documentation of success, presentation of disease control as a system involving veterinary and entomological fields, and energetic work to integrate activities intelligently. Supporting each other professionally and operationally, veterinary health professionals and entomologists can form efficient systems that are analogous to the arch that takes maximum advantage of each piece rather than to the lintel that increases strength through brute force.
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II. F. 2. 5TH ANNUAL APPLIED ANIMAL AND PUBLIC HEALTH RESEARCH AND EXTENSION CONFERENCE

American Association of Extension Veterinarians

Distribution of *Salmonella* Serotypes in Broilers from Day of Hatch through Immersion Chill Tank

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This study followed 76 broiler flocks from 38 farms from the date of chick placement in the grow-out house to the final stages of the processing plant in an attempt to map the flow of specific *Salmonella* serotypes along the production continuum. *Salmonella* were isolated from 24.1% (5,217/21,671) of the samples; a total of 70 different serotypes were identified from the isolates. The greatest percentage of these isolates (19%) came from the paper liners of the chick transport trays, whole carcass rinse samples collected on arrival at the processing plant (19%), and processing plant pre-chill carcass rinse samples (17%). *Salmonella* serotype Kentucky accounted for 52% of all isolates and appeared in all but 6 of the flocks in at least one sample type. *Salmonella* serotypes Typhimurium (8.4%), Montevideo (7.8%), Thompson (4.6%), Hadar (3.4%), Senftenberg (3.1%), Heidelberg (3.0%), Braenderup (2.9%), Mbandaka (2.2%), and Enteritidis (1.7%) rounded out the top ten. The top 10 accounted for 89.5% of all isolates. The remaining 60 serotypes contributed a combined total of 10.5%. Fifteen different serotypes were isolated from the gastrointestinal tracts of day old chicks while 43 serotypes were isolated from the paper liners of chick transportation trays. The second most diverse sample type was whole carcass rinses collected from broilers upon arrival at the processing plant in which 38 different serotypes were isolated. Seventeen serotypes were isolated from post-chill tank carcass rinses.
Abortions occurred in a previously unvaccinated group of 55 commercial beef cows aged, 4-7 years, 4-8 weeks post vaccination. The 55 cows were commingled with the home herd of 170 vaccinated cows on the day of annual revaccination. No abortions occurred in the home herd of 170 cows. The home herd’s 130 original mature cows had been vaccinated with an MLV during the open period 10 years previously. Since that time, all replacement heifers are vaccinated at 60-90 DOA and at 12 months of age and one group of 15 purchased replacement heifers were vaccinated with an MLV prior to first breeding 4 years previously. All cows of the home herd, including first-calf heifers, receive an annual vaccination with a 4/5-way MLV and an 8-way clostridial and a “pour-on” parasiticide at 2-3 months pre-calving.

The vaccination program on this operation utilizes Pyramid 4 (and 5) at all vaccinations. Bulls are turned in with the cows June one and pulled in early October. While the producer does not elect to perform fall pregnancy checks, the cows are vaccinated, and administered a parasiticide, prior to moving to the winter feeding/calving pastures. Vaccination takes place in mid December and calving generally begins March 1.

The affected group of cows had one normal birth then 5 cows aborted 5-7 month fetuses at one week intervals. The first and third abortions were unavailable to testing due to predator damage. The second and fourth abortuses were IBR positive via fluorescent antibody testing and histopathologic evaluation. The 5th and 6th abortuses were twins wherein one fetus was macerated and autolytic and estimated to be 6 months gestation while the second fetus was a normal appearing and estimated to be 8 months gestation. The 6 month fetus was unsuitable for testing while the 8 month fetus was negative for IBR.

Early literature indicates that MLV vaccine induced abortions produce higher abortion percentages than occurred in this situation. Diagnostic laboratories report that they are seeing more requests for abortion diagnostics since the release of the “safe” vaccines. There has been little documentation of increased incidence of IBR abortions.

Confirming the involvement of the IBR portion of the vaccine used as the cause of these abortions may be problematic at best! It is generally agreed that whole genome sequencing of the herpesvirus portion of MLV vaccine and the virus of the abortus would be required to determine relationships. Lastly, IBR virus is rarely isolated from aborted fetuses.

Vaccine induced abortion could be unrecognized if the newer vaccines cause levels similar to that which occurred in this case although producers...
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would certainly notice a 8-10% abortion rate. Also, this case reaffirms the companies' willingness to support the veterinary profession and the producers in such circumstances.

The questions remain: Did this small abortion squall occur because of the MLV vaccine—no BVD abortions occurred—or was this a natural course of events following the introduction of a “naive” population into a vaccinated herd? Is it possible that a co-infection with vaccine virus and wild-type virus, or between vaccines strains, resulted in recombination into a pathogenic strain in a few individuals? Is this really a testimony to the safety of the modern MLV vaccines? It would appear that the current MLV vaccines, at least the one in this case, are less likely to cause the high fetal losses caused by earlier vaccines.
Calf Science: Alternatives to Antimicrobials

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Introduction: Pound for pound, neonatal calves on large dairies and calf ranches often see more antimicrobials than their adult counterparts, both for treatment and prophylaxis. Because of the potential for development of resistant bacteria due to wide scale or imprudent antimicrobial use, alternatives to drug use need evidence to support them and a comprehensive extension effort to educate and work towards a change in the industry.

Materials and Methods: Through funding from USDA: National Integrated Food Safety Initiative Program, a series of clinical trials was conducted to assess different strategies for maintaining calf health while minimizing antimicrobial use: (1) Elimination and reduction of antimicrobials, (2) Feeding a colostrum supplement for two weeks, and (3) Optimizing nutrition. The results of this research and evidence from other research on neonatal calf health formed the basis of the CalfScience (CS) extension education program. Three different audiences were targeted for CS: calf raisers, food animal veterinarians, and upper division undergraduate and veterinary students. Three different curricula were developed to focus on the creation of antibiotic resistant bacteria and research evidence to support management decisions to reduce antimicrobial use. They were delivered through classroom means (students and veterinarians) and on-line (calf-raisers and producers). A quiz and evaluation was provided to on-line course participants. Evaluation consisted of pre- post-course questions on a single survey. A quiz was provided to on-line course participants. The programs were marketed through an email list, an extension newsletter, and to a veterinary continuing education group.

Results: On-line course -- Within the first three months, over 300 people participated in the producer course. Only eight visitors completed the course evaluation. There was interest in program development for Spanish speaking dairy employees, while others viewed it as being a beneficial tool for the future. Participants were divided about whether an online program was helpful for producers to understand current antibiotic resistance research findings. The CS Veterinarian Course was presented to three different veterinarian groups. Ninety-six percent of the 27 veterinary participants rated the course good to excellent and that the material was relevant to their practice. Fifty-two percent strongly agreed, and 44% agreed they would be better able to serve their calf-raising clients after attending this course and felt confident in their ability to apply the new knowledge to their calf practice. All but 8% of the individuals felt that they gained a better understanding of the issues surrounding antimicrobial
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resistance in animal agriculture, particularly in terms of calf health. The program was described as “Outstanding”, “Great Program”, “Very Good”, and “Well Organized”, and “Very informative and cutting edge…ahead of the information that is publically available.” The *CS Student Course* was presented at seven different western state universities. From 224 completed evaluations, students could better recognize issues with antibiotic resistance in animal agriculture and could identify common factors that affected pre-weaning calf health.

**Discussion/Conclusion:** The major tenet of extension education is what is now called “translational science”; taking research to the people who can use it. The *CalfScience* program engaged producers in research and translated the research into information for decision-making for producers and practice-building for veterinarians. But, it also introduced a controversial subject matter, antimicrobial resistance from antibiotic use in food animal production, to a new audience, a population of undergraduate students who may become producers, veterinarians or scientists.
A Model of Collaborative Translational Medicine for Science Based Regulatory Change; Utah and Bovine Trichomoniasis example.

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Bruce King,
Utah Department of Agriculture and Food, Salt Lake City, Utah

Here we present concepts, actions and persons whom of which are all part of a collaborative process for the attainment of data resulting in science based legislation change for a state regulatory disease rule; utilizing Bovine Trichomoniasis in the state of Utah as an example. This model could be utilized for data acquisition for non-regulatory disease management, including intensive animal agriculture practices and other population based infectious disease management. Components of the model include: 1) identification of a need, 2) project leader, 3) funding sources, 4) collaborative participants, 5) questions to be answered by the collaborative research, and 6) actions. While these components seem intuitive, they are often fragmented or poorly defined in collaborative, multiagency projects.

Our example of successful implementation of this model is our recent labors for science based legislative change in surveillance and testing of \textit{Tritrichomonas foetus} in Utah. In discussions with producers, practitioners, diagnostic, university, and regulatory personnel, the current Utah rule did not reflect perceived advances in technology. Furthermore, data was not readily apparent to support this addition of new technology. Data from this collaborative project is presented in the AAVLD talk entitled “Field Validation of a Real-Time PCR Detection Assay for \textit{T. foetus} and Evaluation of Sample Transport and In-Pouch Pooling on Assay Sensitivity” J. Trujillo et al., 2009.

A project leader’s primary role is to design and coordinate efforts of collaborators. In our example, the project leader, B. King, following a presentation of laboratory validation of a real time PCR assay for the detection of \textit{T. foetus} by J. Trujillo, sought out extension veterinarian, K Rood for collaborative assistance in performing a field validation trial for this new molecular assay. The team members assumed greater and lesser roles as expertise dictated. As an example, J. Trujillo assumed a greater role with project design, while Drs. Rood and King took the lead in sample coordination and acquisition. B. King and K. Rood led the effort in proposing questions to be answered to support the proposed legislative change. These specific questions to be answered include determination of the practical shipping conditions for samples and the evaluation of sample pooling on assay sensitivity. Funding resources for our project included a
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USDA Agricultural Experiment Station grant to strengthen the molecular diagnostic capacity of the Utah Veterinary Diagnostic Laboratory (J. Trujillo), The Utah Science Technology and Research initiative (J. Trujillo), in-kind matching extension dollars (K. Rood) and Utah Department of Agriculture and Food (B. King). Other collaborative players include persons from Central Utah Branch of the UVDL where samples where processed for pooling and shipping studies, and locations for collection of essential biological samples were attained. A Utah cull cattle slaughter facility and bull test station were recruited for field sample collection and Biomed Diagnostics supplied pouches as reduced cost for research purposes.

Actions or outcome for these efforts include data sets which lead to proposed regulatory change in UT of which the major rule change is the addition of real time PCR as a testing option in rule. Other policy change included uniformity of sample collection, handling, and shipping.

In summary, through the employment of this model and focused translational research, all supported by essential players and sufficient financial resources, has lead to science based regulatory change for the control and management of Bovine Trichomoniasis in Utah. We suggest that this collaborative model can be employed and extended to address or otherwise be utilized for data acquisition for regulatory or non-regulatory disease management or other population based infectious disease management including those with public health concern.
Use of Infrared Thermography to Measure Body Temperature in Ponies

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Horses that attend races, livestock auctions, rodeos, county fairs and other events, which result in the congregation of animals, are at a high risk for acquiring and spreading disease. Body temperature is often a vital indicator of animal health and a quick reliable method of obtaining body temperature is important for an effective biosecurity program. A passive, remote, and noninvasive method of measuring surface temperature is infrared thermography (IRT). For IRT to measure body temperature, a surface location needs to be associated with changes in rectal temperature, which is considered the gold standard in measuring the body temperature of domestic animals. The objective of the study was to determine if temperature as determined by IRT of the eye region could be used to detect febrile ponies and to identify other factors that may influence IRT eye temperature recordings.

The study was conducted on 24 one-year-old intact male ponies undergoing a vaccine challenge study. IRT eye temperature recordings were obtained daily from each pony for three consecutive days. Daily rectal temperature, exposure to sunlight, distance of the animal from the camera, and ambient temperature were recorded to evaluate their association with the IRT eye temperatures. Statistical analysis was performed using bivariable and multivariable ‘linear regression’ with ‘generalized estimating equations’ method. Using IRT eye temperatures, sensitivity and specificity of IRT to detect febrile ponies (rectal temperature > 38.6°C) was calculated.

Two hundred and eighty two thermographic eye temperatures were measured from the ponies ranging from one to seven IRT temperatures per pony per day. Multiple IRT measurements were often taken while measuring rectal temperature. The mean IRT temperature was 38.2°C (range 34.7°C-41.4°C) and the mean rectal temperature (n=72) was 39.8°C (range 37.4°C -41.4°C). These temperatures were collected under clear skies with a mean ambient temperature of 14.2°C (range 7°C-22°C). The bivariable analysis indicated a significant association of all variables with IRT temperatures, while only rectal temperature, sunlight, and distance were significant in the multivariable analysis. The multivariable
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Analysis indicated that 60.41% of the variance in IRT was contributed by rectal temperature, sunlight and distance with the rectal temperature contributing the most variance (46.23%). The sensitivity of IRT to detect febrile ponies was 44% and the specificity of IRT to detect non-febrile ponies was 98%, when all 282 measurements were used. When the maximum IRT temperature for an individual pony per day (n=72) was only considered, the sensitivity of the IRT eye temperature to detect febrile ponies was 74.6%. Only one febrile measurement was detected by IRT and not by rectal thermometer.

Our results indicate that IRT eye temperatures are associated with body temperatures in ponies, but the IRT reading can be influenced by external variables. Accounting for these variables and using the maximum IRT temperature, sensitivity was respectable and could be improved by lowering the cutoff point for the IRT temperature for definition of a fever. This would allow IRT to be an initial screening tool to determine if a slower, more invasive method (i.e. rectal temperature) should be used for fever detection.
The objectives of this project were to define the characteristics of dairy producers who did, or did not, participate in an ‘official’ Johne’s Disease (JD) Control Program in the United States, and to determine reasons for participation or non-participation. This information was sought out in an attempt to develop programs and strategies for increasing the formal and informal adoption of JD management and control programs.

The PennState Survey center mailed a 4-page survey to 8,013 dairy producers who had previously reported having at least 25 mature cows, systematically, randomly selected from a database of approximately 48,000 mailing addresses. A minimum of 5 herds was selected from every state. A raw response rate of 33% was realized, and a database consisting of 902 usable surveys was assembled for analysis.

Survey recipients were asked to indicate their level of agreement with the following statements: “JD was previously/ is currently / may in the future be a cause for concern in my herd”. Program participants strongly agreed with each of these statements more frequently than the non-participating respondents (p<.01).

Program participants also indicated that, if it was possible, and their herd was free of JD, they would be willing to spend almost 44% more per cow per month than their non-participating counterparts ($2.02 vs. $1.41, p<.01), in order to remain free of JD. They also showed a willingness to pay a higher premium ($196 vs. $156 per head, p<.01) for replacement animals that had a high probability of being free of JD.

Study participants were asked to choose from a list to indicate “Who encouraged you to participate in your state’s Johne’s Program?” Fifty-four (54) percent of non-participants indicated that no one had encouraged them to participate, whereas only 8% of the participants selected this response (p<.001).

Thirty-six percent of the non-participants felt they did not have JD in their herd and therefore would not benefit from participating in a program. The NAHMS Dairy2007 study demonstrated that at least 68% of herds in the USA are likely to be infected with the causative agent of JD, so it seems very likely that many non-participating producers are unaware that they have MAP in their herds. Concerns about the cost of program implementation, and the cost and accuracy of testing were also frequently cited as reasons for non-participation.
Questions were designed to determine the respondents' level of knowledge about JD. Program participants answered more of the questions correctly than did non-participants, with 90% getting at least 50% of the answers correct. Only 68% of the non-participants achieved similar results (P<.005).
Texas Beef Producers – What Do They Know?

Tom Hairgrove, Shannon Degenhart, Jason Cleere, and Shavahn Loux
Texas AgriLife Extension Service, Texas A&M System

Gary Snowder and Tom Powdrill
FAZD Center, A Department of Homeland Security University Center of Excellence

To determine current practices, knowledge gaps, and perceptions of cattle producers a questionnaire was distributed at the 2009 Texas A&M Beef Cattle Short, and data were gathered from 268 producers. The objective was to identify current practices, knowledge gaps, and perceptions of cattle producers regarding best management practices, emergency management animal issues planning, and foreign animal and zoonotic diseases. Producers’ preferred information sources were also identified.

The questionnaire asked producers about: vaccination and parasite control practices; knowledge and concern level for multiple disease management practices; knowledge and concern level for endemic and foreign animal diseases (FAD) which included Rift Valley Fever, TB, and BVD; awareness of FAD impact on their operation; awareness of emergency management animal issues plans; perception of the utility of a biosecurity plan; and animal disease-related information resources utilized.

When conducting programming for cattle producers, Extension educators’ are commonly frustrated with producer’s perceived lack of importance and vulnerability to foreign animal diseases. Educators also feel there is a general lack of knowledge among cattle producers concerning zoonotic diseases. This is a concern because stockmen may routinely be exposed to a variety of zoonotic diseases such as Leptospirosis, Cryptosporidiosis or Salmonella. Approximately two-thirds of emerging infectious diseases and many foreign animal diseases which could be introduced intentionally or accidentally are zoonotic.

Knowledge gaps among cattle producers identified by the questionnaire can be used to increase the effectiveness of Extension programming. Enhanced educational programs for producers may lead to a thorough understanding of: a) Animal emergency management issues plans and their value in an actual emergency; b) Their vulnerability to, and the importance and impact of, foreign animal and zoonotic diseases on their livestock operation; c) The comprehensive and individualized nature of a biosecurity plan; d) The ramifications of not having a biosecurity plan; and e) The importance of timely vaccination and parasite control programs to maximize return.

The questionnaire also identified producers’ preferred information sources. Therefore, high impact information sources can be targeted by
Extension, State and Federal animal health agencies, as well as the FAZD Center to rapidly disseminate critical information to cattle producers.

Extension programmatic efforts guided by the results of the questionnaire will enhance the knowledge of producers who are considered as the first line of surveillance for FADs. Producer understanding of biosecurity measures to prevent the introduction of regulatory diseases such as tuberculosis and brucellosis into herds is expected to contribute to maintaining a disease free status to prevent trade restrictions and associated negative economic impacts. Additionally, producer health and welfare may be better protected by increased awareness and prevention of zoonotic diseases.

This study was conducted by Texas AgriLife Extension Service in collaboration with the FAZD Center and funded in part by a grant from Pfizer Animal Health.
II. F. 3. FIRST CONFERENCE OF EXPERTS ON
CONTAGIOUS EQUINE METRITIS

United States Animal Health Association
First Conference of Experts on Contagious Equine Metritis
October 9, 2009
San Diego, CA

Introduction
Dr. Kent Fowler, Facilitator

Dr. Fowler graduated from U.C. Davis in 1977 and spent 26 yrs in a private equine medicine and surgery practice in Salinas, California. The past 6 yrs he has been with the California Department of Food and Agriculture, initially with Emergency Programs, and for the past 4 years as Chief of the Animal Health Branch.

The 2009 National CEM Incident was the impetus for organizing the First Conference of Experts on Contagious Equine Metritis. Thanks were extended to the speakers and panel members for their participation in this important conference. The purpose of the meeting is to review recent developments concerning the national Contagious Equine Metritis (CEM) incident, discuss CEM protocols, review ongoing Taylorella equigenitalis research, and to discuss possible further CEM research and regulatory actions at the state and Federal level. The agenda is organized to provide some key summary presentations and allow the opportunity for questions answered by panel members and the expression of insights into needed areas for additional research. A key question we should be asking is, “Is CEM a foreign animal disease? This simple question should stimulate some interesting discussions.

Today’s speakers were asked to provide a 3-5 min summary of their presentation at the Infectious Diseases of Horses Committee meeting on Monday, October 12, 2009. We will try to capture the information related today in minutes as complete as possible for distribution. Some questions have been submitted in advance for today and we encourage questions and discussion from the audience.

Background of U.S. 2009 CEM Incident
Dr. Barbara Porter-Spalding
USDA Regional Epidemiologist, Eastern Region

Dr. Porter-Spalding presented a snapshot of CEM as a venereal disease of horses caused by the bacteria *Taylorella equigenitalis*. CEM was a newly described disease in the late 1970’s from England and Ireland. It occurs in both stallions and mares, but there are no clinical symptoms in carrier stallions. The transmission can be direct through
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breeding and indirect through artificial insemination and fomites. There is a need to nail down breeding protocols and management practices since fomites are a means of disease transmission.

The importance of a case definition in an incident was emphasized and the potential for a change in a case definition during the investigation was reinforced. In this investigation, a confirmed positive horse is defined as any horse that has had isolation and identification of *T. equigenitalis* confirmed by the National Veterinary Services Laboratories (NVSL) or a stallion that has bred by live cover two mares free of *T. equigenitalis* and, after breeding, at least one test mare has isolation and identification of *T. equigenitalis* confirmed at the NVSL, or at least one test mare develops a positive CF titer to *T. equigenitalis* confirmed at the NVSL. The trend is that stallions are passing and moving disease, so samples from stallions are sent direct to NVSL. There are 15 labs across the country certified to test CEM in traces horses. The test breeding of stallions is an important component of the testing stallion protocol.

The case definition of an exposed horse is one that was bred, naturally or by AI, to a *T. equigenitalis* positive horse, or one that is otherwise epidemiologically linked to a positive horse.

The primary objectives for the incident investigation were to identify the scale of incident, the source and duration of infection and to return the US to CEM –free status.

USDA APHIS activities for the incident included the CEM testing of samples at NVSL and the 15 certified CEM laboratories across the U.S.; the preparation of Incident Situation Reports, the development of treatment protocols and worksheets and the CEM Incident Manual for distribution to stakeholders; the creation of a the APHIS National Center for Import and Export International Animal Export Regulations web page for stakeholders: www.aphis.usda.gov/regulations/vs/iregs/animals; and the posting of current information and Situation Reports in Hot Issues on the APHIS website.

Epidemiologic priorities were established with stallions of the highest priority. The information for collection included a complete breeding history and list of stallion cohorts for all positive stallions to make sure no stallions were missed; the identification and testing of cohort stallions back to the 2004 breeding season for any high-interest stallion, that is a positive stallion with a positive cohort(s) before 2006; the identification and testing of cohort stallions back to the 2001 breeding season for certain high-interest stallions; and the complete 2007-2008 traces and testing of cohort stallions for all other positive stallions.

For exposed mares, the epidemiologic priorities were high for the complete tracing and testing of mares exposed to positive stallions in the 2008 or 2009 breeding season; the trace and testing of mares exposed to certain high-interest stallions back to the 2005 breeding season; the prioritized testing of mares exposed by natural cover, and mares with
clinical signs of CEM. Mares have a tendency to clear the organism on their own. It is important to remember that there is variability in the usefulness of the Compliment Fixation (CF) test in mares since the response to the CF comes and goes; the test is of little value with older exposure but is of use in screening for recent exposure. There were many challenges faced in the tracking down of AI bred mares due to owner decisions to breed mares other than those originally intended to be bred with acquired semen.

The current Situation Update is that 22 stallions (9 in Wisconsin, 4 in Kentucky, 3 in Illinois, 3 in Indiana, 1 in Georgia, 1 in Iowa, 1 in Texas) and 5 mares (2 in California, 2 in Illinois, 1 in Wisconsin) were found positive for *T. equigenitalis*. The exposures of the positive mares were 1 by live cover and 4 through AI involving 3 different stallions (3 fresh semen, 1 both fresh and cryopreserved semen). None of the positive horses have yet been definitively identified as the source of the outbreak, but a stallion imported from Denmark in late 2000 is currently considered the most likely source. An additional 964 exposed horses have been identified and located.

The total 991 positive or exposed horses were located in 48 States; this includes 276 stallions in 31 States and 715 mares in 46 States. A total 868 horses (216 stallions, 652 mares), or 87.6 percent of the total involved, are now known to be negative for *T. equigenitalis*, including 20 formerly positive stallions (7 WI, 4 KY, 3 IL, 3 IN, 1 GA, 1 IA, 1 TX) and 5 formerly positive mares (2 CA, 2 IL, 1 WI). This represents a tremendous amount of work by private practitioners and state and federal personnel. This has been a monumental effort!

A graph to demonstrate stallion movement was developed. A large number of animals eventually moved to KY and the identification of the first horse was made on export testing from KY. The traces from KY led to the identification in other states. All animals identified as positive had the same strain of *Taylorella equigenitalis*. This lends credence to theory of a single point source for this incident.

Incident findings indicate the positive stallions represent 11 different breeds with the mean and median age of 11 years (range: 5 – 26 yrs); all *T. equigenitalis* isolates have identical antibiotic sensitivity and pulsed field gel electrophoresis (PFGE) patterns; the isolates are resistant to streptomycin, but sensitive to other antibiotics; the PFGE pattern is distinct from all past U.S. isolates; and indirect (fomite) transmission of *T. equigenitalis* appears to have occurred among stallions at 5 facilities in 3 States. There is a need to impress upon practitioners and breeders the ability to spread this organism by fomites, which appears to be the most likely way it is spread in the breeding sheds. Infected trace mares were detected 19 days to 11 months after exposure (1 mare had an additional exposure 32 months prior to detection). The positive stallions lacked any clinical signs; there were reports that 2 traced positive mares and 2
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positive test mares had vaginal discharge; 1 traced positive mare had a normal pregnancy. The treatment regimens and results varied in that some used 2 topicals and/or an oral antibiotic. Treatment failures occurred in 3 stallions and 1 mare using nitrofurazone, but no failures occurred with the use of silver sulfadiazine. One stallion had two treatment failures.

The identified “next steps” are to complete the CEM outbreak investigations in early 2010 (due to some resistant owners), to carry out a proposed nationwide voluntary sampling and testing of approximately 2000 active breeding stallions and imported stallions with implementation prior to the 2010 breeding season.

Question: How many imported horses are found CEM positive at CEM Quarantine stations? Response: Only 0.2% of imported stallions are found CEM positive at CEM Quarantine stations.

Acknowledgement and thanks were expressed to CEM experts (Dr. M. Kristula, Dr. P. Timoney), the 15 CEM certified laboratories throughout the country, State animal health officials, State and APHIS-VS field personnel, NVSL (Dr. M. Erdman, Mr. A. Aalsburg, Mr. S. Hennager), APHIS regional, CEAH, and headquarters staff, accredited equine practitioners and affected horse owners.

Overview of CEM Testing and Treatment for Import Horses

Dr. Michaela Kristula,
Field Services, University of Pennsylvania, New Bolton Center

U.S. pre-import testing requirements for horses from CEM infected countries apply to horses older than 731 days. Stallions require one set of negative samples from the prepuce, urethral sinus, and fossa glandis within 0 days of export. Mares require one set of negative samples from the clitoral sinuses and clitoral fossa. Horses are not to be bred after samples are obtained and specimens must be received by a laboratory approved by National Veterinary Service in region of export within 48 hours after collection.

U.S. post-import testing requirements for horses from CEM infected countries include detention of the horse at the port of entry and the testing for dourine, glanders, equine piroplasmosis and EIA. Mares or stallions are then consigned to a state approved CEM testing facility to receive the mares and stallions from the CEM affected countries to undergo the prescribed CEM testing requirements.

The countries affected with CEM are the Member States of the European Union and the United Kingdom, Countries of the former Yugoslavia, Czech Republic, Guinea Bissau, Japan, Slovakia, Slovenia,
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and Switzerland.

In commentary, it should be noted that the certification from the originating country is sometimes flawed. Dr. Timoney reported that between 1997 and 2009, 30 non-thoroughbred stallions and mares were imported from Europe were found positive for CEM. Importing country laboratories may need to be improved. Can we improve pre-entry protocols? At present, only one pre-entry test is required on stallions and mares. Can we improve importing country specimen handling and pre-entry test protocols?

The 2007 CEM Review Committee recommendation is to continue import testing in the USA.

CEM Testing procedures require that arriving horses travel in sealed vans from the USDA Animal Import Centers (NY, LA, Miami) to the State approved CEM quarantine facility. CEM state coordinators remove the van seals upon arrival at the CEM quarantine facility. Vans are cleaned and disinfected after being unloaded.

The proposed minimum standard recommendations of the 2007 CEM Review Committee are finalized, but not yet published. Recommendations include oversight of the CEM quarantine facilities and personnel working in these facilities; the collection of samples by Accredited Veterinarians; standards for the physical quarantine structure and premises and for the collection, handling, shipping of samples; accreditation of CEM laboratories; and some proposed changes to testing requirements.

The current required procedures for imported mares are the collection of three (3) sets of clitoral sinus and fossa cultures with 3-day intervals between cultures. Current regulations are for culture collections on days 1, 4, and 7 of a 7-day period, without the use of antiseptics prior to sampling. If systemic antibiotics are given, then must wait seven (7) days before initiation of sample collection for cultures. Proposed guidelines include specifying the completion of 3 sets of cultures within twelve (12) days of the 1st culture with an interval of 3 days between cultures to accommodate for holidays, weekends and overnight shipping. Culture sites in mares are very specific – the median and two lateral clitoral sinuses to culture and general swabbing of the fossa. Proposed guidelines on the imported mare testing protocol would include collection of a cervical or endometrial culture in the 3rd set of cultures and an inclusion of blood collection at import centers or CEM quarantine facility for the Compliment Fixation test to screen for potential cases of recent CEM infection. After the third cultures have been collected, flush the bean from clitoral sinuses with cerumene, since the organism likes to “hang out” in the sinuses, and then flush the sinuses with 4% Chlorhexidine; for five consecutive days, the sinuses and fossa are then scrubbed with 4% Chlorhexidine and packed with 0.2 % Nitrofurazone Ointment.

The current required procedures for imported stallions are the
collection of one (1) set of cultures from three (3) culture sites, the urethral sinus, fossa and prepuce, without washing or use of antiseptics prior to sampling. If systemic antibiotics are given, then the testing must wait seven (7) days before initiation of sample collection for cultures. Proposed guidelines would add culture of the terminal urethra to the protocol.

For proper collection and handling of samples for culture, no antiseptics/disinfectants are used prior to swabbing of the specified sites, and culture swabs are placed in the special antibiotic-free media, Amie’s charcoal media. Samples should be immediately refrigerated (4°C) and promptly sent to the laboratory. Samples need to arrive and be plated by an approved laboratory within forty-eight (48) hours of collection. Cultures are read for 7 days after plating. A proposed clarification on culture reading would be to specify time of culture read in hours from plating (i.e., 168 hrs) rather than in days (currently seven (7) days).

After breeding the two test mares, mare post-breeding cultures sets are obtained three (3) times at three (3) day intervals (post-breeding days 3, 6, and 9). Recommended proposals for the test mare post-breeding sampling are to change the completion of 3 sets of post-breeding cultures to within twelve (12) days of breeding with at least 3 days between sample collection and to also obtain either a cervical or endometrial culture. A sample for a CEM complement fixation test is obtained fifteen (15) days post-breeding and sent to either Cornell or NVSL. It is proposed to obtain a blood sample for the CEM CF test from test bred mares twenty-one (21) days post-breeding. After negative results for the culture and CF test on test bred mares are obtained, stallions are released from quarantine.

Currently, qualification of mares for use in test breeding protocols include three (3) sets of sinus and fossa cultures with at least a three (3) day interval between sample collection. Proposed guidelines would add one (1) endometrial or deep cervical culture to the test mare qualification protocol. Mares must also test negative for CEM by compliment fixation to qualify for use on test breeding. Synchronization procedures are used for qualifying mares. Additionally, we vaccinate test breeding mares for Equine Viral Arteritis.

Procedures for CEM positive imported mares include flushing the bean from clitoral sinuses with cerumene and then flushing the sinuses with 4% Chlorhexidine on day 1 of treatment. For five (5) consecutive days, the sinuses and fossa are scrubbed with 4% Chlorhexidine and packed with 0.2 % Nitrofurazone Ointment. Twenty-one (21) days after completion of treatment, the initial culture protocol and treatment procedures are repeated.

For Imported stallions found CEM positive on initial culture, following culture in qualified test mares, or with positive CEM CF in test mares, the same procedures as described for stallions after test breeding are followed: for five (5) consecutive days, the penis is scrubbed with 4% Chlorhexidine and packed with Nitrofurazone. Twenty-one (21) days after
last treatment, the initial protocol and treatment procedures are repeated. 

Test mares found positive on culture or CEM CF test after test breeding can be treated: The clitoral sinuses are flushed with cerumene to remove any beans and then flushed with 4% Chlorhexidine. The sinuses and fossa are scrubbed with 4% Chlorhexidine and packed with 0.2% Nitrofurazone for five (5) consecutive days. Currently, mares may repeat the test mare qualification protocol twenty-one (21) days after the last day of treatment. Proposed guidelines would require identification of test mares found CEM positive after test breeding with no option for their requalification for reuse.

CEM quarantine facilities have histories and experience with imported CEM positive horses. Dr. Peter Timoney has reported clinical signs of CEM being observed in mares bred to 39% of positive stallions. Mares bred to positive stallions may break with CEM two (2) to thirteen (13) days after breeding. Positive mares may show a thin, grayish, white discharge on the thighs and tail (but diagnosis is not based on clinical signs as this type of discharge could be caused by other bacteria), a dry discharge, or no discharge at all.

Dr. Kristula uses an enhanced treatment protocols for positive imported mares and positive test mares: Sulfamethoxazole Trimethoprim (TMS) 30 mg/kg orally for five (5) days; Gentamicin 1500 mg in 20 cc of 8.4% Sodium Bicarbonate and 25 cc saline IU for three (3) days (may be irritating) or Ampicillin 2 grams (60 cc) IU for three (3) days. Additionally, on treatment day 1, flush the bean from clitoral sinuses with cerumene, flush the sinuses with 4% Chlorhexidine and pack with 1% Silver Sulfadiazine; for treatment days 2-5, scrub the sinuses and fossa with 4% Chlorhexidine and pack with 1% Silver Sulfadiazine. After twenty-one (21) days, repeat the initial three (3) set culturing protocols, including an intrauterine culture in one of the three sets of cultures. More cultures may be obtained from test mares. Repeat the CEM CF test - should be negative.

Dr. Kristula uses an enhanced treatment protocol for positive imported stallions:

Sulfamethoxazole Trimethoprim (TMS) 30 mg/kg orally for seven (7) days; scrub penis with 4% Chlorhexidine scrub and pack penis with 1% Silver Sulfadiazine Cream for ten (10) days. Twenty-one (21) days after completion of treatment, repeat the three (3) set culture protocol on post treatment days 21, 28 and 35. Breed two test mares and follow previously stated protocols from the start. Dr. Kristula has used this protocol on ten (10) positive imported stallions. One treated stallion did test positive again on the day 35 culture, but this stallion had not received Sulfamethoxazole Trimethoprim in the treatment protocol. In treatment of CEM positive stallions, meticulous cleaning is most important; thorough cleaning of the stallion is essential.

Reporting of CEM positive animals to the USDA APHIS VS Area

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Veterinarian in Charge, the State CEM Coordinator and the farm is essential.

Recommended proposals to improve CEM recordkeeping and enhance CEM statistics include determination of required paperwork to document every procedure for an imported equine entering an approved CEM facility; entering data from import centers, quarantine facilities and states in a centralized data base; identification of required information for records including identification of the horse and the importer, the dates of quarantine steps, test results, and release date, and the final destination of the animal.

Dr. Kristula provided her CEM facility incidence information on imported horses.

Between 1998 and 2008, 10/533 imported stallions (1.9%) and 1/1639 imported mares (0.06%) tested positive for CEM. The breed representation of positive imported horses was: 4/336 Warmbloods (1.2%), 1/46 Friesian (2.2%), 3/38 Lipizzaner (37.5%), 1/10 Dutch driving (10%), and 1/3 Icelandic Pony (33.3%). The majority of imported horses received at this facility during this time period originated in Germany (176/533 or 33%) and Holland (156/53 or 29%). The positive imported stallions originated from the following countries: Germany (3/176 or 1.7%), Holland (2/156 or 1.3%), United Kingdom (1), Denmark (1), Austria (2), Slovenia (1). The single positive imported mare originated in Germany. Some of the positive imported animals reportedly had histories of never having been bred, which implicates the role of fomites in disease transmission.

The 1998-2008 stallion quarantine farm record reflects that of the ten (10) positive stallions, four (4) or 40% (vs. 32% PT) were detected on initial culture; six (6) were detected by test mares (of these three (3) were just one test mare positive and three (3) were in both test mares as positive). Of the three stallions found in just one test mare, two were by just the positive CF test. For the three stallions found positive in both test mares, the test mares were positive on both culture and CF test. All test mares bred to positive stallions were found positive on the postbreeding day 15 CF test (we also perform 20 day CF in test mares). The CF test has been more reliable on test mares than culture for detecting positive stallions. (Maryland does 15 and 20 day CF test on test mares.) Only NVSL and the approved laboratory in Kentucky run the CF test.

From her import data, Dr. Kristula commented that imported Warmblood stallions pose the greater risk and improvement is needed on pre-entry protocols; culturing for CEM is not sensitive enough to detect positive stallions and test breeding of imported stallions in the U.S. should continue. (Anecdotally, Dr. Kristula believes that many stallions are being treated before being imported.) The compliment fixation test has performed well in testing protocol for imported horses; there is some difficulty reported in cleaning up infected stallions and Dr. Kristula’s data for the repeated enhanced treatment of one (1) of the ten (10) positive
Tools for Assessment of Intervention Options in CEM Incident

Dr. Stan Bruntz
USDA-APHIS-VS

The USDA Center for Epidemiology and Animal Health (CEAH) has been involved with the CEM response since the beginning of the incident. This presentation focused on the tools used in the decision support process for this incident.

Tools for Assessment of Intervention Options (TAIO) is a process that incorporates and uses best information about the economics, epidemiology, and biology of options considered for decisions in an incident. Some factors, such as the political or social climate and specific budgetary constraints, are not considered with this assessment tool. The tool is used to support, but does not replace, the decision making process. TAIO uses a repeatable structured process for information evaluation, and documents all inputs to increase transparency of arguments for various options being considered. TAIO also allows for revised analyses of information as inputs are developed, to update and improve the options. The TAIO also utilizes distributions and allows for incorporation of uncertainty. It has application to assess intervention options for Foreign Animal Diseases (FADs), endemic diseases, and emerging diseases.

TAIO can weigh benefit-cost (b/c) ratios of options and has shown merit in this regard. The options must be well described and the TAIO looks at the host response, the pathway control, the costs, the benefits, and the logistics feasibility of the options.

For the 2008 CEM incident, CEAH was requested to evaluate CEM options utilizing the TAIO with the time of analysis and related decisions up to June 24, 2009. CEM was confirmed in an American Quarter Horse Stallion in Kentucky on December 15, 2008 following routine testing for semen export required by the European Union. As of June 24th, twenty-one (21) stallions and five (5) mares had been confirmed positive for CEM. The locations of an additional 952 exposed horses had also been confirmed. In all, a total of 270 stallions and 708 mares, either positive or exposed, were located in forty-eight (48) states. The ongoing response in progress was a joint USDA, state and equine industry effort.

The defined incident response goals were the eradication of CEM and the declaration of “resolved” status to OIE justified by the economic benefit.
of restoring international trade and interstate commerce to pre-December 2008 status.

For the first six months of the incident, an early economic analysis demonstrated the estimated expenditures of $3.5 M by APHIS, the states and owners for testing. This did not include personnel costs. An estimated $6 M had been spent on additional export testing requirements, since fourteen countries (14) countries imposed increased CEM testing requirements. The cost of lost opportunities for horse breeding owners was unknown. The USDA APHIS role in the incident response included cost sharing, regulatory oversight and personnel time. Cost sharing with producers and the states was provided through diagnostic testing and transportation costs for diagnostic samples. Regulatory oversight was provided for diagnostic sample collection procedures and personnel time invested in support of the epidemiological investigation of the incident.

At this time, since the incident was going to go beyond June 2009, consideration was given to the possible outcome of the incident response. Questions were raised about what the long term consequences and costs might be. It was felt that with an extended effort, longer than this first 6 months, the eradication of CEM was possible. If extended eradication effort failed, or if CEM was otherwise determined to be widespread or endemic, than the economic consequences to the equine industry and the states would be severe.

An analysis of management options was conducted with TAIO, which produced weighted benefit-cost ratios: the numerator - benefit weighted by the probability of achieving the objectives and the denominator - the costs.

Many discussions were held with subject matter experts and analysts resulting in four possible options. Option 1 was to stop the outbreak investigation without determining if CEM is widespread and endemic. There was no support for this option. Option 2 was to complete the current investigation and obtain an additional 2,000 samples from export and owner testing as supplemental evidence to support a claim of freedom. Option 3 was to complete the current outbreak investigation, obtain an additional 2,000 from export and owner testing, and at the same time collect an additional 2,000 samples to reach a statistical prevalence threshold of 1 in 1,000 (0.1 percent at 95 percent confidence) or less, to support a claim of disease freedom. Option 4 was to complete the current outbreak investigation, obtain an additional 2,000 from export and owner testing, and at the same time collect an additional 4,000 samples as a national survey to provide additional evidence to support a claim of disease freedom.

TAIO was used to weigh the benefit-cost ratios (WBCR) for the options. If WBCR was 1 then Costs = Benefits; if WBCR was <1 then Cost > Benefits, and if WBCR was >1 then Benefits > Costs. The WBCR for the four options were: Option 1 = <1; Option 2 = 0 or 6.4; Option 3 = 5.7 (good benefit); and Option 4 = 5.4. The WBCR for Option 2 was
0 or 6.4 depending on whether trading partners would accept claim of disease freedom without additional sampling and the statistical prevalence threshold for Option 2 is about 2 in 1,000 (0.2 percent at 95 percent confidence) or less. USDA APHIS management reviewed the TAIO results and agreed to proceed with Option 3 using the actual sampling numbers and collection of 2000 samples from national population beginning before the completion of the current outbreak investigation.

It was decided that options would be reassessed if more than fifty (50) additional positive stallions were found in the current investigation, if an additional outbreak occurred, outside the current network of epidemiologically related cases, was detected and found likely to have been introduced 5 or more years ago, or if multiple Thoroughbred horses were found positive for CEM.

In closing, TAIO is an assessment tool that will be further developed. It was stressed that the TAIO does not replace the leadership decision process but supports it.

Question: (Dr. Timoney) Prevailing on trading partners, some countries are still looking for clearance of *Taylorella asinigenitalis*. What is the current situation in this regard?

Answer: (Dr. Ellen Buck) Concerns about *T. asinigenitalis* come from Australia and New Zealand and they have indicated that they are unwilling to remove this requirement unless the U.S. is willing to prove levels of U.S. prevalence of *T. equigenitalis*.

Question: (Dr. Angela Pelzel) With TAIO options with additional samples, will this meet their requirements?

Answer: (Dr. Buck) I do not know. Are we going to report *T asinigenitalis*? If so, we may need to expand testing.

Dr. Timoney: We must decide if *T asinigenitalis* is in fact a viable disease in the horse.

Mr. Rusty Ford: In CEM testing, Kentucky laboratory reports state “No *Taylorella* species detected”. It was indicated that current testing for Taylorella includes both *T. equigenitalis* and *T. asinigenitalis*.
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Dr. Ellen Buck
Dr. Claudia Klein

Question: (Dr. Timoney) Prevailing on trading partners, some countries are still looking for clearance of *Taylorella asinigenitalis*. What is the current situation in this regard?

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Dr. Timoney: We must decide if *T asinigenitalis* is in fact a viable disease in the horse.

Mr. Rusty Ford: In CEM testing, Kentucky laboratory reports state “No *Taylorella* species detected”.

Dr. Fowler: Let’s discuss the issue of antibiotic use within the 7 day window of CEM testing. There are situations where horses are treated a day or two with antibiotics before going into CEM testing facilities.

Dr. Timoney: This goes back to 1977-1978 when it was considered necessary for a 7 day lapse from antibiotic treatment until swabbing mares or stallions. Precious little has been done on control studies for this issue due to variations in treatments and modalities to cleanse a horse from this infection. Some of antimicrobials in use today have extended efficacy and half-life persistence, therefore we are fooling ourselves if we swab animals within 7 days of treatment. At one premises we know of, they were administering antimicrobials while swabbing was in process.

Dr. Ferraro: This issue has created problems at our center by owners. Owners push to get these animals out of quarantine as soon as possible. We have problems with this. In the California import center, after deplaning there may be a stress induced temperature spike. We have difficulty getting veterinarians to hold off treatment with antibiotics for a fever. The delay in culturing for 7 days creates a problem in our relationship with the owner.

Mr. Ford: We get good records from import center regarding treatments and receive treatment sheets. If owners complain, we explain that if their horse is in our quarantine facility, they must follow our rules. We don’t allow the tail to wag the dog on issues like this.

Mr. Ford: The CEM Review in 2003 also had recommendations made in this regard.

Dr. Ferraro: A great variability exists among states, so people will import through states without the strict rules.

From Audience…Will consistency about this be put in CFR (Code of
Federal Regulations)?

Dr. Buck: The 2007 CEM Review recommendations would be regulatory changes, which occur at glacial speed, but the regulatory testing changes could potentially be in place by the end of 2009. Regarding antibiotic treatment, an alert was sent to states regarding antibiotic treatments, but is also in a VS treatment memo. Have owners call NCIE if they complain about implementation of strict rule. State laxness should not be happening; Dr. Clifford’s 2005 Alert was sent specifying 7 days withdrawal.

Question: (Dr. Mike Short) Is it policy that import facilities get the report of antibiotic treatment to the state?

Answer: (Dr. Buck) There is no good means for distributing the information, but it should be on bottom of the 1-27 and there has been discussion at the centers; it is an electronic form. If you have a question on treatment, call the AVIC and have them contact Import Center for treatment information.

Mr. Ford: We overcame the problem by going to the center and have them understand that providing this information is not a release of information compromising the Veterinarian-Client-Patient relationship.

Dr. Kristula: We get treatment sheets from the centers at Newburg.

Mr. Ford: If a horse arrives and did not come with treatment sheet from the center and we suspect something, for example, the horse has a history of an injury while on the plane and arrives to us without a treatment record, we call.

Question: (Dr. Josie Traub-Dargatz) What are the methods of transmission for stallions by fomites in this incident? Are there lessons learned?

Answer: (Dr. Porter-Spalding) It is clear from the outbreaks in 2006 and 2009 that there are risks at breeding stations…buckets, human hands, exercise. Phantoms at breeding sheds must be cleaned with more than water. Artificial vaginas (AVs) must be managed and disinfected carefully. Covers of AVs must also be cleaned and disinfected. Stallions at collection stations need exercise and/or training, and if ridden in serial with the same tack, this may have been a transmission route. Stations in KY now shrink wrap phantoms and soak AVs in alcohol. It is clear that a breeding shed may have normal population and workload, and then add new clients for collection when freezing of semen services become available. With the increase in population, there may be shortcuts in protocols taken and this results in increased risks. People identify problems and do make some attempt to address weaknesses identified in the past.

Question: (Josie Traub-Dargatz) How can this be controlled?

Dr. Ferraro: Strict procedures. We allow people to come in to exercise horses. We have prescribed times and check-in and checkout procedures. Protocols must be followed.
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Antibiotic-containing Semen Extender Reduces Spread of CEM

Dr. Claudia Klein

As of September 2009, in the current CEM outbreak in the U.S., twenty-two (22) stallions have been found positive for CEM and five (5) of 715 exposed mares were diagnosed positive (5/715 is <1%). This is a much lower incidence of disease compared to the 1978-1979 outbreak in Thoroughbreds. The 1978-79 incident in Thoroughbreds involved natural breeding, therefore raw semen and mechanical contact. The 2008-09 incident involved non-Thoroughbreds and artificial insemination (AI) therefore raw semen and extended semen. Semen extenders are a diluent mixed with semen to preserve its fertilizing ability and contain a milk component, sucrose and/or glucose and antibiotics, such as ticarcillin, amikacin or penicillin).

Our hypothesis was that the presence of antibiotics prevents the growth of *Taylorella equigenitalis* in extended semen and therefore reduces the risk of CEM transmission. The study objective was to compare the growth rate of *T. equigenitalis* in raw and extended CEM positive semen samples.

Equipro®, containing amikacin and penicillin, was used to extend CEM positive semen at a ratio of 1:3. The ratio 1:3 is most commonly used in a clinical setting when processing semen. The positive control was raw CEM positive semen and the negative control was raw CEM negative semen. The number of colony-forming units (CFU) per milliliter were determined at different times and temperatures; with 30 min. at room temperature (n=3), 6 hours at room temperature (n=3) and 24 hours at 4°C in an Equitainer (n=3). The determination of CFUs was done with serial 10-fold dilutions (1:10, 1:100 and 1: 1000) in tryptic soya broth that were plated on 4 chocolate Eugon agar plates (two plates without antibiotics and two using the modified Timoney-Shin formulation and incubated at 37 degrees C in 8% CO2. After seven (7) days incubation, the CFUs were determined. Experiments were carried out in triplicate. The study showed that raw semen had the highest number of CFU per milliliter and extended semen with significantly lower numbers of CFUs. Thirty (30) minutes was enough time for Equipro® to inhibit growth of CEM. Growth was also inhibited in the extended semen at 6 hrs and 24 hrs. The conclusion of the study was that the combination of amikacin and penicillin is highly effective in reducing the number of CFUs; ticarcillin is also effective in this regard, experiments using ticarcillin were however only carried out once.

Part 2 – In vivo Experimental infections of *Taylorella equigenitalis*

Our hypothesis was that antibiotic-containing semen extender used for artificial insemination reduces the risk of transmission of CEM. The study objective was to compare the occurrence of clinical signs of CEM after artificial
insemination with raw and extended semen positive for *T. equigenitalis*.

To experimentally infect stallions with CEM, we created micro lesions on the penile surface and applied *T. equigenitalis* suspension two (2) times, 48 hours apart. Stallions were confirmed positive through bacterial culture obtained seven (7) days after experimental infection. Semen was collected from the experimentally infected stallions three (3) times and stored at -80°C. Semen was thawed, cooled, pooled and then split into 10 ml aliquots for insemination in mares. All mares used were confirmed free of *T. equigenitalis* before insemination in the study. Four mare study groups were formed: six (6) mares received raw semen via AI; six (6) mares received extended CEM positive semen (10 cc in 1:3 ratio) after incubation in an Equitainer for 24 hrs via AI; six (6) mares received cryopreserved CEM positive semen (8 straws each) via AI; and three (3) mares received raw CEM negative semen via AI.

After artificial insemination, study mares had clinical examination of the perivaginal area, vaginoscopy, and transrectal ultrasonography performed on post-AI days 3, 5, 7, 14 and 21 days to look for clinical signs of disease. Additionally, swabs of the clitoral fossa, clitoral sinuses, and uterus were collected for bacterial culture on post-AI days 7, 14, and 21 days and blood was obtained for CEM Complement Fixation (CF) testing on post-AI day 21.

The study results were that only the raw semen mares had clinical signs of disease. The mares that received raw CEM positive semen (6/6), all had clinical signs (vaginitis, cervicitis, or vaginal discharge) of disease, were all culture positive for CEM and were all positive for *T. equigenitalis* by CF test at post-AI day 21 days. All other study mares were free of clinical signs of disease, were culture negative for CEM and did not have CF CEM titers.

The conclusion is that extension of CEM positive semen in antibiotic-containing semen extender reduces the risk of transmission of CEM during artificial insemination. This finding has implications for the apparent switch in disease transmission from stallion to mare transmission towards transmission between stallions: lateral transmission between stallions sharing the same breeding phantom and/or through a contaminated AV. With the lateral transmission between stallions there are no reports on a decrease in fertility in the affected stallions and no occurrence of clinical symptoms in mares.

**In summary, antibiotic containing semen extender effectively inhibits growth of T. equigenitalis. Extension of semen positive for *T. equigenitalis* in antibiotic-containing semen extender reduces the risk of transmission of CEM during artificial insemination.**

**Question:** (Dr. Fowler) On ultrasound of raw semen mares, were there any significant observations?

**Dr. Klein:** No. Uterine edema or discharge was only seen through vaginoscopy.
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Comment: (Dr. Angela Pelzel) In the 2008 incident, two (2) CEM positive mares were exposed to the same positive stallion and extended semen was used. With excessive organic material or high loads of *T. equigenitalis*, it may overwhelm the system.

Dr. Timoney: In the 1977 Irish CEM outbreak, we saw mares with huge volumes of fluids. An organism changes, and the strains and pathogenicity of strains vary.

Dr. Timoney: A factor was seen experimentally, if a mare is challenged with an organism. Many mares have prominent growth of *Proteus mirabilis* after challenge, which camouflages the clinical response in mares.

Question: (Dr. Josie Traub-Dargatz) So the dose of organism could impact the effectiveness of extended semen?

Dr. Erdman: We did not do strict quantification, but we did see variability in growth of cultures on stallions.

Question: (Dr. Josie Traub-Dargatz) Was this the only organism seen?

Dr. Erdman: Other organisms can get in the way, so it is difficult to know if competing organisms interfere.

Dr. Timoney: Early work shows glucose fermenters inhibit growth of *T. equigenitalis*.

Question: (Dr. Porter-Spalding) Have you seen breed predilections, such as Fjords from cold countries?

Dr. Timoney: It seems to be that the thoroughbred is more predisposed to clinical signs and severe clinical signs than pony breeds, but there is no controlled study.

NVSL CEM Diagnostics Updates

Dr. Matt Erdman

Dr. Erdman presented an overview of CEM, the 2009 culture results and trends, information on pulsed-field gel electrophoresis (PFGE) and also described other work in progress at the National Veterinary Services Laboratories (NVSL).

Contagious Equine Metritis regulations require that all CEM diagnostic testing be performed at NVSL or one of fifteen (15) CEM-approved laboratories. All suspect isolates are sent to NVSL for confirmation. The requirements for laboratory approval to conduct CEM testing are found in VS Memo 558.2. Required training courses for laboratory personnel are held at NVSL which provide disease information, hands-on exposure and laboratory protocols. The next training courses are being scheduled for Jan. 2010 and possibly Summer 2010 at NVSL. The announcement of the January training is to be sent out to interested laboratories next week.

The NVSL and the fifteen approved-laboratories have the total
capacity to run 2500 cultures per week. A week is the minimum time cultures are incubated, and the limiting factor for laboratories is the amount of CO2 incubator space. If the laboratories that have contacted NVSL with interest in the CEM training attend the upcoming training, the number of approved laboratories will probably increase to thirty (30), and therefore be doubled.

Proficiency Tests are required to maintain laboratory approval, although this has not been done in the past. This test required some development in order to closely represent the type of scenarios commonly seen in the laboratory. This has now been done and an announcement for 1st CEM Proficiency Test has been sent out to approved laboratories and the proficiency test will be shipped on Nov 2, 2009. Laboratories will have three weeks to return proficiency test results. If a lab fails the proficiency test, we will do follow up assessment and training.

*Taylorella equigenitalis* is the etiologic agent of Contagious Equine Metritis. *T. asinigenitalis* is not considered a cause of CEM and has typically been associated with donkeys with a few known cases of isolation of organism from horses.

Testing for CEM uses a specific transport media, Amies charcoal media, and samples must be received by the laboratory within forty-eight (48) hours of collection. Cultures are plated on chocolated Eugon agar and CEM selective medium (modified Timoney-Shin). The organism is a gram negative cocobacillus that is positive on oxidase, catalase and alkaline phosphotase biochemical tests, which can be run at approved laboratories. Suspect positive isolates are sent to NVSL where additional confirmation using monoclonal antibody latex agglutination and Fluorescent antibody tests. These tests do not differentiate *T. equigenitalis* from *T. asinigenitalis* so molecular methods using RT-PCR with two (2) sets of primers and 16s rDNA sequencing are used to confirm and differentiate between these species. There are approximately 1,600 nucleotides amplified in the 16s rDNA test with approximately 98% sequence homology between *T. equigenitalis* and *T. asinigenitalis*.

In the CEM 2009 outbreak, testing was performed on 2,458 sets of cultures (6,982 swabs) at NVSL and 3,007 sets of cultures (6,765 swabs) at the other approved labs. When we looked at the number of positive cultures and the number of days on test, a graph showed tallest bar on Day 3. When we were picking positive growth, none was found after Day 6. Looking at the positive diagnoses of CEM using the testing protocol, twenty-five (25) horses were diagnosed on the first culture; one (1) stallion and one (1) mare were diagnosed on the second culture, one (1) gelding was diagnosed on third culture, and three (3) stallions who were culture negative were found positive on test breeding mares.

So of the 22 positive stallions, 19 were diagnosed on prebreeding cultures and 3 were found positive on test mare breeding. This finding is
possibly a strain characteristic or possibly reflects lack of pretreatment of
the horses prior to testing. As far as sites for the positive isolation of the
organism from stallions at NVSL, we evaluated twenty-three positive swab
sets. Of these, 22 sets were positive at the fossa glandis (1 gelding was
negative at the fossa glandis); 21/23 stallions were positive at the urethral
sinus; 18/23 were positive at the urethra; and 10/23 were positive at the
prepuce. As far as sites for the positive isolation of the organism from
mares at NVSL, we evaluated twelve (12) positive swab sets. 11/12 sets
were positive at the clitoral sinus and 10/12 were positive at the clitoral
fossa. There were three (3) positive endometrial cultures, all from positive
test mares.

Antibiotic susceptibility was tested in disc form. The silver sulfadiazine
and nitrofurazone creams were tested via Nathan’s Agar well diffusion. All
CEM 09 isolates demonstrated the same susceptibility profile – susceptible
to all antibiotics tested except resistant to streptomycin. Streptomycin
resistance has been used as strain characterization marker for \textit{Taylorella}.
For comparison, isolates from WI 2006 were all streptomycin sensitive.

NVSL conducted 1289 CF tests for CEM09; 635 for CF Test Mares
and 654 for exposed mares. The CF test was positive on four (4) test
mares and one (1) exposed mare.

Pulsed-field gel electrophoresis (PFGE) is used to separate and
analyze large DNA fragments from bacterial genome. The banding
patterns are used in epidemiological studies of pathogenic organisms.
The objective was to determine the relatedness of CEM09 outbreak
isolates. \textit{T.equigenitalis} was embedded in agarose plugs treated with
proteinase K to digest the cell wall and proteins. The DNA is digested with
restriction enzymes, either \textit{Apa I}, \textit{Not I}, or \textit{Nae I}. Bionumerics software
is then used for pattern analysis and construction of dendrograms. CEM
creates 11-13 bands of 15 to 450 base pairs. We looked at 156 total
isolates from CEM09, CEM06, CEM 78 and isolates in the NVSL isolate
library or received from other countries. We saw 21 banding patterns and
we were able to distinguish differences in strains not epidemiologically
related. For CEM 2009 isolates, three enzymes were used to test the
isolates. Within each enzyme treatment, the same patterns were found
for each of the CEM 09 isolates. When CEM09 pattern was compared to
other isolates including CEM06 and CEM78, no matches were found. This
suggests the CEM09 isolates are from a single source and are different
than isolates from the previous U.S. incidents.

Regarding \textit{T asinigenitalis}, a mare being tested for export and not
part of the CEM09 investigations was found positive for \textit{T asinigenitalis}
in 2009. This is the first known natural isolation from a horse in the U.S.
Comparison by PFGE to those previous isolates from donkeys in California
and Kentucky showed no matches.

The NVSL work with PFGE demonstrated that the use of PFGE
using \textit{Apa I} gave good differentiation between tested strains of \textit{Taylorella}
that have no known epidemiologic link and that PFGE patterns of the CEM09 isolates are indistinguishable using Apa I, Not I, and Nae I. These results coupled with epidemiologic linkage between the horses suggest a common, single source for the CEM09 outbreak. The CEM09 band pattern does not match any isolates tested thus far. NVSL maintains an inventory of CEM isolates obtained from the U.S. outbreaks in 1978 and 2006, import quarantine stations (various countries), and from United Kingdom and Netherlands reference laboratories.

Currently, we are maintaining open dialogue with Gluck and Missouri and are obtaining and analyzing more Taylorella isolates by PFGE. PCR development and validation will be emphasized for use on swabs and semen. A mare in vivo study is being done to create reagents and test samples via multiple different assays. Mares were infected via AI with spiked semen and study results are being evaluated at this time. We are also looking at genome sequencing which could lead to enhanced genotyping, PCR assays and serologic assays.

Question: What happens when trained people leave a laboratory or retire?

Dr. Erdman: We have someone else from the approved laboratory sent for training to replace the previous person.

Question: (Dr. Josie Traub-Dargatz) Do you think it matters the material that the swabs are made of, acrylic versus cotton, or the material of stick? What kind of swabs should be used?

Dr. Erdman: The media, Amies-Charcoal, currently being used come from three sources all with the same swabs, but research is underway. Cotton is currently the material of the swab.

Question: (Dr. Fowler) Based on 2006 Lipizzaner incident, is there a high level of confidence that the CEM09 isolate is not the same isolate?

Dr. Erdman: Yes. The use of PFGE and the differences with antibiotic susceptibility testing along with the epidemiology information gave a high degree of confidence that this is a different organism from CEM06.

Question: With a 2009 isolate, could the animal have possibly been infected in 2004?

Dr. Erdman: Yes, it is possible. With lack of immunological pressure the organism could persist with very little change and a stable PFGE profile.

Contagious Equine Metritis: Suggested Areas for Future Research

Dr. Peter Timoney
University of Kentucky

This presentation reviewed the recent occurrence of CEM in the U.S. and highlighted the need for research on a number of aspects of
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this disease. CEM was first discovered over 30 yrs ago, but relatively little research has been done since then and much is to yet be learned about certain aspects of the disease, especially in relation to the risk of transmission by artificial insemination. Aside from the concerns over the disease in the late 70s, events over the past twelve months have reawakened interest in the causal organism and the disease. Although CEM is of continued importance in relation to international trade with a significant economic impact, yet little research on the disease has been conducted worldwide. This may now be changing. There are still significant gaps in our knowledge of the disease. Even though the causal agent is endemic in many countries in continental Europe, very little research has been done to better control the infection.

What aspects of the disease and the organism *Taylorella equigenitalis* should we consider warrant additional study? Proposed areas of study include:

1. **Comprehensive validation of a real time PCR assay for detection of *T. equigenitalis* on swabs from the reproductive tract of the stallion and mare, as well as in raw, extended & frozen semen.** This is a most important topic to address. As already alluded to by others, there is a need for a fully validated PCR assay for detection of *T. equigenitalis*. What is required is an assay to evaluate swabs from animals and semen that is rapid, well validated and economical. Such a study has not been done. One of the reasons few are interested in pursuing it is because it is difficult to obtain adequate appropriate specimens with which to validate a test for the organism.

2. **Compare the relative reliability of PCR versus culture or test breeding for detection of this organism in the stallion.** CEM is a disease that can be costly for both owners and breeders. We need a screening test for stallions that is more economical, quicker and more reliable than conventional culture and test breeding. The molecular tools are available to develop and validate such a test.

3. **Development of an improved selective culture medium permitting more rapid isolation of *T. equigenitalis / T. asinigenitalis*.** Improved selective media permitting more rapid isolation of either organism need to be developed. Is it possible to develop a better medium that could supplant the currently used media and successfully prevent overgrowth of culture plates by other organisms? This is very important with respect to isolation of the streptomycin sensitive strains of *T. equigenitalis*, especially in the case of imported horses.

4. **Investigate the effect of recent treatment of a carrier stallion on subsequent detection of *T. equigenitalis* on culture &
What’s the effect of recent antibiotic treatment of a carrier stallion on subsequent detection of the organism on culture or by PCR assay? After 32 yrs, this is still not known, although it is speculated that such prior treatment likely interferes with detection of T. equigenitalis.

5. Investigate survivability of T. equigenitalis under different environmental conditions. Investigation of the survivability of the organism on various fomites under differing environmental conditions is long overdue. Clearly indirect transmission has played a major role in the latest occurrence of CEM. Such information would be valuable in preventing similar problems occurring in the future.

6. What are the determinants of pathogenicity of T. equigenitalis in the mare and are they primarily organized or host related? Little research has been carried out on this subject since the original studies conducted in Japan and in the USA (Plum Island Animal Disease Center) linking colonial size to pathogenicity of strains of T. equigenitalis.

7. What causal agents, host-related, or other factors promote establishment of the carrier state in the mare / stallion? When considered 25 yrs ago, the necessary genomic and other molecular tools were not available at the time to investigate this. Establishment of the carrier state in the male or female is very important in the case of both T. equigenitalis and T. asinigenitalis.

8. Identify & characterize the factors that favorably or adversely influence colonization of T. equigenitalis or T. asinigenitalis on the external genitalia of the stallion. It would help greatly to know what other organisms favorably or unfavorably influence T. equigenitalis persistence on the external genitalia of the stallion. Certain flora appear to have a conducive growth effect on T. equigenitalis whereas others have an adverse effect. Regrettfully, what is currently known is anecdotally based information.

9. Investigate the minimum infective dose of T. equigenitalis needed to establish infection in the mare and the carrier state in the stallion. There is no information on the threshold or challenge dose needed to establish infection in either gender. We attempt to assess the risks associated with the use of T. equigenitalis contaminated semen, without having an idea of the MID50 of T. equigenitalis in the mare?

10. Can T. equigenitalis establish the carrier state in the gelding & if so, how does carriage of T. equigenitalis compare with persistence in the stallion? Based on a few investigative studies, it is known that T. asinigenitalis can persist in the distal
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reproductive tract and external genitalia of the male donkey. Over the past 30+ years since the USDA imposed import requirements for CEM, is it possible CEM positive geldings have inadvertently been imported into the country?

11. Compare & contrast *T. equigenitalis* & *T. asinigenitalis* infection in the mare with special reference to strain pathogenicity, clinical significance, cross-immunity & occurrence of the carrier state. In recent months, an organism has been isolated from a mare that appeared to be *T. equigenitalis* but in fact was *T. asisnigenitalis*. What is the significance of this in terms of pathogenicity of this organism for the mare? The majority of *T. asinigenitalis* isolates thus far isolated have been from gelded jacks. Can this organism be readily transmitted from donkeys to horses? At this time, there is very little information on whether this organism evokes the same clinical response in mares as *T. equigenitalis*.

12. Conduct a pilot survey of the occurrence and distribution of *T. asinigenitalis* in the non-horse equid population. Is *T. asinigenitalis* more widespread than is currently known? It would appear that the natural host of *T. asinigenitalis* is the donkey, whereas that for *T. equigenitalis* is the horse. What if *T. equigenitalis* is also present in the nonequid horse population?

This concludes my comments on a range of proposed research studies on Contagious Equine Metritis.
Dr. Fowler: What lessons have been learned in this ICS Incident? We know there are always communication challenges. What additional challenges were there and what lessons were learned?

Dr. Creekmore: Functional lessons were learned on epidemiology and biosecurity. On the incident itself, this is one that has worked well; the collaboration between federal, state, and owners has been a success.

Dr. Porter-Spalding: We still struggle with multi-state incidents, and this has truly been greater than the tuberculosis incident. A single source database is key, and EMRS (Emergency Management Response System) is it right now. But whatever the platform, the need to share information across state lines in a single format is critical; the import centers need to be able to transfer information to the state(s) of destination.

Another challenge was individual animal tracing and horses ID (identification). There were names, nicknames, misspelled names.

The burden to horse owners, the collaborative state, federal and animal owners to carry expense of the incident, may not have been equitably shared.

Dr. Creekmore: Weekly NASAHO calls were an important means of communication.

Dr. Porter-Spalding: I would have liked to see the states develop an incident command (IC). This was not consistent across all states, which made it difficult to get the information from the states; states were talking to each other, but may not have been communicating effectively with us. In each incident we learn a great deal.

Dr. Fowler: I agree on the benefit and importance of the weekly calls.

Dr. Fowler: If this incident did not reach the criteria for an emergency, what would have been needed to qualify this incident for funding release? This was a multi-state incident with 48/50 states affected and required thousands of hours of work. So what would have been needed?

Dr. Jack Shere: At the beginning of the incident, we looked to FAD monies, but much was already spent. The next considered was CCC funds; this is difficult to obtain and we have gone to the well too many times. The next step is the Deputy and Administrator Reserve, but there are great difficulties in getting these funds. So the potential sources, CCC, Department Reserve and then OMB…no emergency was declared. In the event of an emergency declaration, we use contingency funds from the Administrator funds. In END, we went to CCC, the states declared and went to the well. There is pressure on two sides, if we try to deal with it (politics) or do we blow it up and get attention.

Dr. Fowler: EMRS is not very user friendly, especially when dealing with traces. This is an issue. The response to this may be that it is the best we have, but?

Dr. Buck: Import database will be EMRS since it is too expensive to
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develop a new database.

Dr. Porter-Spalding: Some of the problems are security-related such as state access to Intelliview. A multistate problem is that states developed multiple spreadsheets. We encourage opening up to other states; let another state see the information from the originating trace; if the information is not put on the trace form, it is not obtained by the state receiving the trace. Regarding case control, development will allow …the more you use EMRS, the better you get at using it. I wish we could clear up the security issue.

Dr. Shere: Collect the problems (with EMRS) you experienced and send to them to VS, so the problems can be addressed. To fix it, the problems must be put forward.

Dr. Becky Brewer: We will put the list together. The changes in the security system created great problems, some states had VS put all data in. If we do the work and can’t put the information in…the challenge is state accessibility.

Dr. Mary Jane Lee (CT): EMRS is okay when someone shows you how to use it and you use it often.

Mr. Ford: Early on we had the question, is CEM an FAD? When looking at a multi-state incident like this, our industry was greatly affected, we were aggressively trying to address the problem, but we were impacted regarding trade by what was going on in other states. How can USDA better serve the state whose industry is being affected the most?

Dr. Brian McClusky: There is a philosophical question of government and industry role in these incidents. What is the industry role? In VS, we don’t have equine programs to the same level as other animal programs, so we don’t have appropriated dollars for this. Is it an FAD in only one part of the country? What is industry role? The industry role in this case was getting the owner to pony up to get this done. Without appropriated dollars, it is difficult to get industry to respond to an incident. There must be a balance of funding sources from industry and government.

Mr. Ford: The impact of the problem in another state is impacting our industry in transport to Mexico. This is one point. How do we facilitate addressing the problem nationwide?

Dr. Brian McClusky: What is an industry? There are many components -- trailriding, breeding, showing, etc. The response to the question in Utah is different from the response by Kentucky.

Mr. Ford: What is the VS model of more responsibility?

Dr. Brian McClusky: The AAEP best management practices on CEM; then it becomes the role of state and federal governments to support the best management practices.

Dr. Jack Shere: Look at all our programs, Tuberculosis and Brucellosis programs are winding down. Unless an industry decides it wants to eradicate a disease, it can’t happen. The states, federal government and industries need to have partnerships working together
again. We don’t have the dollars to depopulate TB herds. There is dust in the well. States are struggling. The horse industry has sectors of their own interest, but maybe this disease can unite the stakeholders. Congress doesn’t think these things are important. TB needs to be a partnership. Brucellosis needs to be a partnership. Everyone must come to the table to address the problem.

Dr. Becky Brewer: This is bigger than we are seeing. The public does not understand the impact of agriculture and are farther away from Ag than ever before. As Departments of Agriculture, how do we get the message out to public? “Know your farmer…know your food”. We must get into Information Technology to reach public.
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CEM Panel Session III

Dr. Fowler: The Friesian breed association was questioning whether there should be a certification process for CEM-free stallions? Have there been any communications from industry on this issue?

Dr. Kenney: We have not had much response from breed organizations by email. The American Quarter Horse Association is very concerned. A breed association issue for CEM-certified stallions is, what if certified-free and found positive later?

Dr. Fowler: What would be the number of cultures for a proposed Certified-free status (of a stallion)?

Dr. David Fly (NM) to Dr. Ferraro: What are we going to recommend to industry?

Dr. Ferraro: Certified-free stallions and mares? We have nothing to go forward on this. Strains may have been circulating for years and being spread without anyone knowing about it. In answer to the industry, better testing, better research for testing, and more stringent oversight of testing facilities is needed. You have to be diligent every day; we only have to error just once. Industry must step up to the plate, and regulations must be put in place to protect the industry.

Mr. Ford: By coincidence this meeting in concurrent with the Kentucky Veterinary Medical Association Meeting. CEM protocols are being recommended that every stallion used in KY should have one set of swabs taken. One culture may not give the entire picture, but it gives something. We worked with larger semen collection centers and observed collection procedures that looked good to me, but we are sending everyone to Sam’s to get supplies to wrap up every phantom in saran wrap. We are trying to identify every stallion in KY that has had a relationship with any stallion in Wisconsin.

Dr. Fowler: Regarding single cultures, Dr. Timoney, in 100 infected stallions, how many will turn up positive on first culture?

Dr. Timoney: One set processed at a reliable laboratory will identify most carriers. There are probably carriers out there in all breeds. In a perfect world, we would pick up every carrier. All we are really going to do is hope that we would reduce the risk to an acceptable level and eventually clear the disease from the population. This policy worked in Ireland and was entered into on a voluntary basis.

Dr. Fowler: On the FAD issue, is CEM a foreign animal disease? In OIE’s eye, is CEM now considered endemic or foreign (in the US) and what do we do to clear the US?

Dr. Buck: I don’t know answer from the OIE perspective.

Dr. Bruntz: Only 4-5 diseases are OIE free in the US. When we indicate it as resolved, how other countries accept is another issue. We consider this an outbreak and are reporting it as such.

Dr. Timoney: Consideration was given for sampling 2,000 horses to
ascertain the presence of this organism in the breeding population. What breeds? What cross-section of the population? Where will the emphasis of sampling be?

Dr. Bruntz: The sampling plan is in the early stages and is still being developed. Right now we are just trying to provide additional information to support resolutions, but it is not defined. Semen and embryos for export will be part of this investigation.

Question: How many animals are tested for export on an annual basis?

Dr. Erdman: A survey that went to the laboratories at the end of April 2009 to get a 12 month snapshot of testing unrelated to the incident showed 7,000 export testing samples. We don’t know the variables, since surely many were multiple samples from the same horse.

Dr. Brewer: On surveillance testing, we were asked to submit information on testing over the past 10 years.

Dr. Creekmore: In discussing how to develop a cross section for sampling, imported horses would be a good group to sample. We are going to the centers to see records with a list of horses for targeting of surveillance sampling. A more official request will be made for information. Nothing is being done yet, but information will be collected from all centers.

Dr. Porter-Spalding: We have discussed 2,000 samples as a subset group, in addition to those being tested for export. We are to implement sampling on a voluntary basis without quarantine. We would like to sample imported stallions still breeding in the last ten years. We will look at high risk animals, those imported and those being collected at large breeding sheds. Again, we don’t know if we will have a big list due to record documentation gaps and we question if owners will do this voluntarily.

Dr. Ferraro: I am pessimistic, we have unwanted horse challenges. The reason this was discovered is that these horses were of a high enough economic value and were tested for shipment around the world. But there is a much larger group on a lower economic value scale that may be missed completely.

Dr. Timoney: Good issue. We need to look at other countries with control programs following the Code of Practice for CEM for 25 yrs. That will emphasize the importance of the Code if no carriers are found in Thoroughbreds. We need to give a great deal of thought to stallions selected for sampling, to be all inclusive and to not overlook a population. We still should make a good faith effort to determine the status of carrier stallions.

Dr. Fowler: It has been stated that “All infected stallions appear to have a direct link to a single infected WI facility”. This raises a lot of questions about stallions cleared through this station over the past few years.

Dr. Porter-Spalding: There is a subset of animals that came through
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the Wisconsin Import Center that have been tested again and were not part of the positive subset of animals. That import center had good records, so we have animal names and dates back to 1975. Because of this incident, most have been tested. There are probably fifteen (15) more to find, some of which are dead.

Dr. Fowler: What is the level of confidence that the Wisconsin stallion population is free of CEM?

Dr. Porter-Spalding: Not all of these horses are in Wisconsin, but are in other parts of the US. We have tested so many stallions in Wisconsin. There are probably only about 100 stallions in the state that have not been tested.

Question from audience: Of those 100 stallions, has the state decided to test them?

Dr. Porter-Spalding: None of them are linked to this incident.

Mr. Ford: Point, I wouldn’t have discounted that the Lipizzaners were not implicated. Dr. Erdman’s data changed that. The facility missed the Lipizzaner in 2004 and then again now; the facility is implicated. It’s a valid concern. All the data is demonstrating the transfer to domestic horses, so if we don’t delve deeper now, we may be rehashing it again in 202.

Dr. Porter-Spalding: The Import Center in Wisconsin is not the same physical location where we believe the transmission occurred; an equine practice several miles away is implicated. One animal, that possibly came in from another country, and transmission in two breeding sheds in Wisconsin, and in Kentucky and Illinois. The incursion and imports are not the same question. Of animals that came through import center, the list goes back to 1995; only a small number came through the Wisconsin Center and these animals will be on the trace list for testing.

Dr. Creekmore: I am an optimist, but it is important to remember that so far with this incident, we have a point source, the same isolate, and have identified every horse with a good epidemiological link to exposure. We may get lucky that this is one introduction and we may trace it to completion, but we still need to look at potential for other sources of infection.

Dr. Fowler: The imported gelding potential as a source of infection is viable.

Dr. Mike Short (Comment): If AAEP comes out with guidelines, there are big practices doing breeding protocols and breeding soundness exams that will incorporate them. Depending on how AAEP handles the recommendations, I think we will see increased testing, probably much more than the 2,000 samples we are talking about.

Dr. Fowler: Single culture samples?

Dr. Short: One set (of cultures) at three sites is probably being realistic.

Mr. Ford: Four swabs are taken at Rood and Riddle.

Dr. Timoney: Select Breeding services will screen prior to, and after
arrival; they are proactive.

Dr. Fowler: What is the cost of this disease, a great deal of money? What is the cost of this disease versus the cost of the disease to the industry?

Dr. Timoney: The only real life situation of financial impact was 1978 in Kentucky. All breeding sheds were closed and there was a complete shut down of movement. It was a significant economic impact to industry.

Dr. Josie Traub-Dargatz: More specifically, what was the fertility rate of mares bred to positive stallions, the actual fertility impact of positive stallions?

Dr. Klein: There are no reports of reduced fertility; we bred mares with infected extended semen, with no reduction in fertility resulting.

Dr. Timoney: Good point. Regarding the actual impact on fertility, in Ireland we found animals positive, who have never been in a breeding shed. This strain created clinical disease in mares; we followed their offspring and had success finding positive offspring. There was no prior historical data on this.

Question from audience: What was the outcome on the semen of these positive stallions? We had one horse gelded and another state has semen from this horse? We have an unclear picture of stallion status, so what should we do with the semen?

Dr. Porter-Spalding: State regulations may vary, but states cannot hold semen unless the stallion tests positive; semen from confirmed positive stallions is being held at this time and may never be released, unless another way to test is developed to clear the semen from quarantine. There is not much semen under quarantine, but there is some from multiple stallions in multiple states. Some has undergone voluntary destruction and some has gone to research.

Question (Josie Traub-Dargatz) What about animals less than 731 days of age being tested? Do we want untested horses coming in at all?

Dr. Angela Pelzel: In all our determinations, we had questions on what to do about foals of positive mares and the evidence of transmission in utero or during parturition. We should have future research on risk to foals?

Dr. Fowler: One of the positive California mares delivered a live foal that was subsequently euthanized for hemorrhagic enteritis, but we were unable to obtain samples from this foal.

Dr. Timoney: On the age issue, the risk may not be great, but is still a risk. In 1977-1978, there were young foals that were found positive at 6 months of age. Furthermore, CEM positive mares that did get pregnant had CEM positive placentas; the organism can colonize the placenta and could expose foals in utero. If a mare was a reproductive tract carrier, there is the ability of contamination at time of foaling; foaling fluids were culture positive and contaminated the area. The partial extrusion of the penis in foals could have resulted in indirect transmission of disease to the
foal. Should we change our import policy? It is impossible to eliminate all risks. The primary source of reintroduction into this country was the carrier stallion. Should we continue policies allowing inadequate histories from importing countries? We may mitigate the risk, but will not be eliminating the risk.

Dr. Timoney: Not to be provocative, but the Mexico restriction on Kentucky was unfair when all that needed to be done was done. Can we argue restrictive trade practices without a scientific basis? Does it boil down to politics?

Dr. Buck: We can present the best scientific argument and the other country can do with it as they want. This may have been impacted by our practices on horses coming in from Mexico. They think their restrictions are more lenient toward us. Between January and June, Mexico was debating on what they were going to do and movement of all but Kentucky horses was ongoing. The protocol now addresses all 50 states and Mexico was within days of closing their border to all horses from the US. Sorry for the impact on KY, but we did the best we could do nationally. This was no reflection on APHIS’ concern for the issue.

Dr. David Fly: On Mexico issues, it is often funding issues, and we do much work with them. On these issues, Mexico industry puts up money. Funding sources are 1/3 industry, 1/3 state and 1/3 federal and interchange at local level with Mexico helps.

Dr. Fowler: This concludes the First Conference of Experts on CEM and I’d like to express appreciation to all of our expert panel members and speakers. Thank you.

Final note:
A very special thanks to all of the distinguished speakers and panel members for participating in the First Conference of Experts on Contagious Equine Metritis. I would also like to express my appreciation to Dr. Ellen Wilson for her dedication and time commitment in transcribing minutes for the entire conference.
III. Organizational Matters
   A. Bylaws of USAHA
   B. USAHA Administrative Policies
   C. Previous Meetings
   D. USAHA Medal of Distinction Award Recipients
III.A. BYLAWS

BYLAWS
OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION
APPROVED 2007

ARTICLE I – NAME

The name of this Association shall be “The United States Animal Health Association.”

ARTICLE II – PURPOSE

The United States Animal Health Association is a forum for communication and coordination among State and Federal governments, universities, industry, and other concerned groups for consideration of issues of animal health and disease control, animal welfare, food safety and public health. It is a clearinghouse for new information and methods, which may be incorporated into laws, regulations, policy, and programs. It develops solutions of animal health-related issues based on science, new information and methods, public policy, risk/benefit analysis and the ability to develop a consensus for changing laws, regulations, policies, and programs.

ARTICLE III – MEMBERS

3.1. Classes of Members. The classes of members are: Official Agency Members; Allied Organization Members; Individual Members; Student Members; Elected Regional Delegate Members; International Members; Life Members; and, Honorary Members.

a. Official Agency Member. The animal health department or agency of each state, U.S. territory or commonwealth, and the District of Columbia; the animal health department of the United States of America; and such other governmental departments or agencies as the Board of Directors may, by a two-thirds majority vote, approve.

b. Allied Organization Member. Any non-profit organization that is national in scope and actively and directly concerned with and supportive of the interests and objectives of the Association as outlined in Article II-Purpose, may become a member upon approval of the Board of Directors by a two-thirds majority vote.

c. Individual Member. Any person engaged in work related to animal production, animal health, food safety, public health, veterinary medicine and animal research and who supports the interests and objectives of the Association as outlined in Article II-Purpose, may
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become a member upon approval of the Executive Committee by a majority vote.

d. Elected Regional Delegate Member. Such elected regional delegates as provided for in Article VI-Board of Directors shall by virtue of such election automatically become members of the Association and shall serve from the close of the annual meeting following their election to the close of the following annual meeting and shall pay dues as the Board of Directors may determine.

e. Student Member. Any person enrolled in the study of animal production, animal health, food safety, public health, veterinary medicine, and animal health research who supports the interests and objectives of the Association as outlined in Article II-Purpose is eligible to become a member of the Association. Student members may take part in the open proceedings and meetings of the Association but shall not hold voting privileges as provided in 3.2.

f. International Member. The chief official agency member from any foreign federal animal health, food safety, public health and animal health research agency or department, and any foreign national animal industry organization or person who supports the interests and objectives of the Association as outlined in Article II-Purpose, or said person’s designee, is eligible to become a member of the Association upon approval of the Board of Directors by a two-thirds majority. International Members may take part in the open proceedings and meetings of the Association but shall not hold voting privileges as provided in 3.2. However, the Association recognizes that Australia, Canada, Mexico and New Zealand are voting members and shall continue to remain full voting members after the adoption of these bylaws. New International Members shall obtain voting rights only by amendment of the bylaws.

g. Life Member. Any individual member who has maintained membership in the Association for 35 years, or if such member is at the point of retirement, for 25 years, is eligible to be a life member. Past Presidents of the Association are deemed to be life members. Life members shall have all the privileges of regular membership and shall be exempted from payment of all dues. Election to Life Membership of individual members shall be elected by a majority vote of the Board of Directors. Life Members shall be exempt from the payment of one-half of annual meeting registration fees; provided that retired past presidents who receive no remuneration for expenses incurred while in attendance are fully exempt from the payment of annual meeting registration fees.
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h. Honorary Member. Any person not otherwise a member of the Association who has contributed materially to the advancement of animal science, food safety, public health, veterinary medicine, animal research, or the purposes of the Association, may be nominated by the Executive Committee for Honorary Membership. Honorary Membership shall be conferred by a majority vote of the Board of Directors. Honorary Members shall be exempt from the payment of all dues and shall not have voting privileges as provided in 3.2.

3.2 Voting. Each member shall have one vote, unless otherwise provided in these By-Laws.

a. By State and Federal Official Agency Members and Allied Organization Members. The director or chief executive officer of each Official Agency Member and Allied Organization Member shall appoint and certify in writing to the Executive Director of the Association a person to be its representative who shall represent, vote, and act for each of these classifications of member in all the affairs of the USAHA, until further notification.

3.3. Dues. The Board of Directors at any annual meeting shall have the power to determine the amount of dues.

a. Non-payment of Dues. Subject to any policy the Board of Directors may establish for reinstatement, failure to pay dues within 90 days of notice of delinquency shall result in automatic termination of membership.

b. Voluntary Withdrawal of Membership. A member may voluntarily terminate membership effective upon submission of notice of withdrawal to the Association but shall not be entitled to a refund of any dues paid.

3.4. Effective Date of Membership. Membership shall become effective upon submission of written application in the form required, satisfaction of eligibility requirements, election to membership by an appropriate vote of the Executive Committee, and payment of annual dues.

3.5. Suspension or Expulsion. For cause, and upon reasonable notice setting forth the specific reasons therefore any member may be suspended or terminated. Sufficient cause for such suspension or termination of membership shall be violation of these bylaws or any lawful rule or practice duly adopted by this Association, or any other conduct prejudicial to its interests. Suspension or expulsion shall be by two-thirds vote of the entire membership of the Board of Directors.
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ARTICLE IV – MEETINGS

4.1. Annual. There shall be an annual meeting between September 15 and November 15 for receiving annual reports and the transaction of other business.

a. Notice Requirements. Written notice setting forth the Agenda and location of the annual meeting shall be mailed or transmitted electronically to all members at least 60 days prior to the first day of such meeting.

b. Annual Meeting Location. The location of the annual meeting shall be selected by the Regional Districts on the following rotational basis: North Central, Northeast, Western, and Southern; and with the concurrence of the state animal health official of the state in which the meeting is to be held. The location and site shall be finally selected in accordance with guidelines proposed by the Executive Director and approved by the Executive Committee. The Board of Directors shall be advised of the selected meeting location at least five years in advance of the meeting. In the event that any annual meeting location becomes unavailable and/or unacceptable the Executive Committee is authorized to select an alternate location.

c. Closure. The annual meeting shall be considered officially closed upon the completion of the Board of Directors’ meeting held on the last day of the annual meeting.

4.2. Special. Special meetings may be called by the President, in consultation with the Executive Committee, or by a majority of the Board of Directors. Notice of any special meeting shall be mailed, published in the Association newsletter and/or transmitted electronically to the membership with a statement of time and place and information as to the subject(s) to be considered at least 30 days prior to the date of the meeting. Emergency situations shall be dealt with by the Executive Director with the approval of the Executive Committee who shall provide as much notice to the Board of Directors as may be practical under the circumstances.

4.3 Committee and General Membership Meetings. Unless otherwise specifically set forth in these bylaws, all committee and general membership actions require a majority vote provided a quorum of the voting membership is present.

4.4 Quorum. A quorum of the Executive Committee shall consist of two-thirds of its membership. A quorum of the Board of Directors shall consist of thirty (30) or more members, providing that a majority of those in attendance is comprised of Official Agency Members. A quorum of all
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other committees shall be ten (10) voting members or thirty percent (30%) of the committee membership, whichever is less. A quorum of the general membership shall consist of thirty (30) or more members.

4.5 Proxy Voting. Proxy voting (the power of attorney given by one person to another to vote in his or her stead) is not permitted in any meeting.

ARTICLE V – OFFICERS AND EMPLOYEES

Section 5.1. Elected Officers. The elected officers of the Association shall be a President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President, and Treasurer. They shall be voting members in good standing of the Association.

a. President. The President is the chief officer of the Association and shall preside at the annual meeting and all meetings of the Executive Committee and perform such other duties as customarily belong to that office or which the Board of Directors or Executive Committee from time to time may assign. The president is an ex-officio member of all Committees and may designate an appropriately qualified member as his designee to attend any committee meetings of the Association in his place and stead.

b. President-Elect. The President-Elect shall act in place of the President in the event of his/her absence, death, or inability to act. When so acting the President-Elect shall have all the powers of and be subject to all restrictions upon the President. Specifically he/she shall be the chairman of all meetings of the Board of Directors. He/she shall perform such other duties as the President, Board of Directors or Executive Committee from time to time may assign. The President-Elect shall automatically become President upon election at the close of the annual meeting.

c. First Vice-President. The First Vice-President shall act in place of the President Elect in the event of his/her absence, death or inability to act; and shall perform such other duties as the President, Board of Directors or Executive Committee may assign.

d. Second Vice-President. The Second Vice-President shall act in place of the First Vice-President in the event of his/her absence, death or inability to act; and shall perform such duties as the President, Board of Directors or Executive Committee may assign.

e. Third Vice-President. The Third Vice-President shall take the place of the Second Vice-President in the event of his/her absence,
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death, or inability to act; and shall perform such duties as the President, Board of Directors or Executive Committee may assign.

f. Treasurer. The Treasurer shall be the chief financial officer of the Association, shall be chairman of the Audit Committee and perform those duties that are delegated to the office by the Board of Directors and the Executive Committee. The treasurer shall not be responsible for the day-to-day financial transactions of the Association, which will be assumed by the Executive Director.

g. Election.

1) The Committee on Nominations and Resolutions shall annually report its recommendations for the offices of President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President, Treasurer and Regional Delegates to the Association membership at the first business session.

2) The District from which the President originated shall submit a nominee for the office of Third Vice President.

3) Should vacancy(ies) occur before the next annual meeting, the District(s) from which the officer(s) vacated shall submit a nominee for the office of Second Vice President (if two vacancies occur a First Vice President will also need to be nominated).

4) Nominees for Regional Delegates from the Districts shall be selected by the individual districts and supplied in a timely fashion to the Committee on Nominations and Resolutions for inclusion in its report.

5) The Committee on Nominations report will be presented during the first business session. The committee report shall be posted on the registration bulletin board immediately following its presentation at the first business session. The report shall be read again during the second business session at a time certain specified in the program for “Report of Action of the Committee on Nominations and Resolutions.” If a paper is being presented at the specified time, the presentation will be completed and, immediately after, the report shall be read. If the program is ahead of schedule, a recess will be taken until the time specified in the program for the amendments to the slate presented by the Committee.

6) The report or amendments approved by a majority vote of the membership is forwarded to the Board of Directors. The acceptance of the report by a majority vote of the Board of
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Directors shall constitute election of the nominees to office.

h. Term. The officers shall serve for one year or until their successors are elected and qualify.

5.2. Executive Director. The Executive Director shall be employed by and serve at the pleasure of the Executive Committee, manage the Association’s day-to-day affairs and perform such other duties as customarily belong to that office or as the Board of Directors or Executive Committee may assign. The Executive Committee shall prepare and negotiate a contract with the Executive Director for a period of not more than five (5) years which shall be subject to approval by a majority of the Board of Directors. If the Association does not have an Executive Director, the Board of Directors shall elect a Secretary.

ARTICLE VI – BOARD OF DIRECTORS

6.1. Board of Directors. The Board of Directors shall have authority over all matters of the Association within the limits of the bylaws.

2.2 Composition. The Board of Directors shall be composed of the following:

a. The Official Agency Members or their designees
b. One representative selected by each of the Allied Organization Members
c. Two delegates-at-large from each of the four regional districts
d. Past presidents of the Association
e. The International Member who is the chief animal health executive officer representing the principal federal animal health department of Canada, Mexico, Australia and New Zealand, or said person’s designee.
f. Members of the Executive Committee

6.3. Meetings. The Board of Directors shall have a regular meeting at the time and place of the annual meeting, and shall meet at such other times and places selected by the President or by request of a majority of the directors, in which latter event, the President shall promptly set the time and place of the meeting. Notice of all meetings of the Board of Directors shall be mailed, published in the Association newsletter or transmitted electronically at least thirty days in advance of such meetings. The President, on such reasonable notice as may be practicable under the circumstances, may call emergency meetings of the Board of Directors.
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At any meeting of the Board of Directors, the President Elect (Chairman of the Board of Directors), with a majority vote of the Board of Directors, may call for an Executive Session limiting attendance.

6.4. Duties. The Board of Directors shall: receive all committee reports and accept or reject all or part of them; review and approve or disapprove with comment the actions of the Executive Committee; and perform such other functions set forth in the By-Laws of the Association.

ARTICLE VII – EXECUTIVE COMMITTEE

7.1. Executive Committee. The Association shall have an Executive Committee composed of the elected officers and the immediate Past President of the Association. In addition the Executive Director shall serve as an ex officio, non-voting member of the Executive Committee and shall not be counted for the purpose of determining a quorum.

7.2. Duties. The Executive Committee shall manage the financial, administrative and internal affairs of the Association when the Board of Directors is not in session. To exercise the authority of the Board of Directors, the Executive Committee must act as a whole, and must forthwith submit its action for approval at the next meeting of the Board of Directors.

7.3. Meetings. The Executive Committee shall meet at least four times each fiscal year at such time and place and upon such notice as the President determines. The Executive Committee is authorized to take action upon the concurring votes of a majority of its total membership, provided that a quorum is present.

7.4. Emergency Meetings. Should the President determine that an emergency situation exists, the President may convene a telephone or other type of electronic conference meeting of the Executive Committee, which may then act provided a quorum participates.

ARTICLE VIII – ORGANIZATIONAL DISTRICTS

8.1. Districts. The Association shall be organized into five districts composed of the Northeast Regional District, the North Central Regional District, the Southern Regional District, the Western Regional District and the District-At-Large.

a. The Northeast Regional District consists of Association members of the states of Connecticut, Delaware, Maine,

b. The North Central Regional District consists of Association members of the states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

c. The Southern Regional District consists of Association members of the states of Alabama, Arkansas, Georgia, Florida, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; and the Virgin Islands and Puerto Rico.

d. The Western Regional District consists of Association members of the states of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

e. The District-At-Large shall be composed of the Allied Organization Members and the Elected Regional Delegate Members and Past Presidents.

**ARTICLE IX – STANDING AND SPECIAL COMMITTEES**

9.1. **General.** The President shall annually appoint from the members of the Association such standing or special committees or subcommittees and their chairpersons as may be required by the bylaws or as he/she may find necessary. Each committee shall meet at least once per year at the time of the annual meetings of the Association, and at such other times as the President of the Association and committee Chairman deem necessary to accomplish the work of the Committee. Only members of the Association permitted by these by-laws are permitted to vote on the work of the committee.

9.2. **Program Committee.** A program committee shall be appointed by the President and shall consist of the chairpersons of all committees and the elected officers of the Association to develop the programs for the annual and any special meetings of the Association with the goal of furthering the purposes of the Association. The Program Committee shall be chaired by the President-Elect and co-chaired by the First Vice-President.

9.3. **Committee on Nominations and Resolutions.** The Committee
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on Nominations and Resolutions shall be comprised of the living past presidents of the Association, the Presidents of the Northeast, North Central, Southern and Western Regional Districts, and the President of the District-At-Large.

a. **Chairman.** The immediate past President of the Association shall chair this committee.

b. **Nomination of Elected Officers.** This Committee shall receive, consider and recommend to the Association’s membership at the annual meeting nominations for the elected officers specified in 5.1 and delegates from each district as specified in 6.2.c. The recommendation of elected officers and delegates from each district shall be submitted no later than the third day of September next preceding the annual meeting at which the election will be held.

c. **Resolutions.** This committee shall review all resolutions of the standing and special committees (the Executive Committee and Board of Directors are standing Committees) for ambiguities and redundancy, but shall not alter their intent. After this review, this committee shall present the resolutions to the general membership for approval, which shall require a majority vote.

9.4. **Audit Committee.** The Audit Committee shall receive the annual audit report, and confirm that all financial affairs of the Association are in order and make such recommendations to the Board of Directors as may be necessary to ensure the proper management of the finances of the Association.

9.5. **Special Committees.** The President with the advice of the Executive Committee shall appoint the chairman and members of such other committees as are necessary to accomplish the purposes of the Association.

ARTICLE X – MISCELLANEOUS

10.1. **Amendments.**

a. These bylaws may be amended by: (1) Specific proposed amendment(s) being presented in writing to the Executive Committee for review. The Executive Committee shall then provide their recommendations on the proposed amendments to the Board of Directors for deliberation and action;(2) If preliminarily approved by majority vote of the Board of Directors, the proposed amendment(s) shall then be presented to the membership; by
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publication in the next annual proceedings; (3) The proposed amendment(s) shall then be presented to the membership at the next annual meeting.

b. Amendments to bylaws shall be presented section-by-section at a meeting of the members and shall be approved only upon an affirmative vote of two-thirds of the voting members, provided a quorum is present.

c. In the event the amendment(s) proposed are not approved by the Board of Directors as set forth in (1), then the proposed amendment(s) may be presented by a petition signed by at least thirty members which shall result in their proceeding through steps (2) and (3) above as if the Board of Directors had initially approved the proposed amendment(s).

10.2. Fiscal Year. The Executive Committee shall from time to time establish the Association’s fiscal year.

10.3. Parliamentary Procedure. Robert’s Rules of Order Newly Revised shall govern the proceedings of the Association, the Board of Directors and all committees in all cases not otherwise provided for in applicable federal or state statute or rule, the articles of incorporation or bylaws of the Association or its policies or procedures.

10.4. Confidential Information. Confidential information of the Association shall be maintained in confidence and not used for any other than Association purposes nor disclosed to others, except as permitted by law, these bylaws or written consent of the Association, by Association members, directors, officers, employees and agents.

10.5. Liability of Officers and Directors. The officers and directors of the Association shall not be personally liable for the debts or actions of the Association.

10.6. Annual Audit. The Association shall cause an independent certified public accountant, selected by the Executive Committee, to make an annual examination of its financial accounts and shall submit the report of examination to Audit Committee.

10.7. Compensation/Reimbursement. No member of the Board of Directors, committee member or elected officer of the Association shall receive any compensation for his or her services as such. The Association shall develop policies providing for reimbursement of expenses reasonably incurred in attending meetings and performing special assignments of the Association by the elected officers.
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8.8. **Dissolution.** In the event of dissolution, the Association shall distribute its assets as required by the laws and statutes of the State of Delaware; and distribute its remaining net assets in a manner permitted an entity to maintain its status as exempt from taxation under Section 501 (c) (5) of the Internal Revenue Code of 1986, as amended, or any successor provision.
III.B. USAHA ADMINISTRATIVE POLICIES

ESTABLISHMENT AND OPERATION OF STANDING COMMITTEES
1. All members of standing committees must be official members of USAHA in good standing in accordance with Section 3.4 of the bylaws.
2. The Chair, Vice Chair, and all members of USAHA Committees shall be appointed by the President. It is expected that member appointments will be made in consultation with Committee Chair.
3. Efforts should be made to keep committee size to a manageable number of members, and to maintain a geographical balance, as well as an appropriate balance of State, federal, industry and technical members.
4. Committee Chairs shall be appointed for term of not more than five years, and should not be reappointed Chair for at least one year.
5. All USAHA members present at committee meetings may enter into discussions. Only committee members may introduce resolutions or vote on items of business.
6. Committees shall submit reports only to the Board of Directors and Resolutions only to the Committee on Nominations and Resolution. Committee reports are not considered official actions until approved by the Board of Directors. Committee resolutions are not considered official actions of USAHA until approved by the general membership.
7. Committee Chairs may appoint subcommittees as necessary. Subcommittee members must be members of the parent committee. Subcommittees shall deliberate only the subject matter(s) delegated to them by the parent committee and shall report only to the parent committee.

PARTICIPATION IN USAHA OF FEDERAL AGENCIES AND FEDERAL EMPLOYEES
Federal agencies and personnel have long been an integral and valuable part of USAHA. Agencies have taken part in the organization through official membership and representation on the Board of Directors. This provides the opportunity for presenting agency positions and concerns to the Association.
Of undoubtedly greater value has been the individual membership and participation of numerous animal health, food safety, and research professionals from a variety of federal agencies. All disease program-related committees have long had key federal agency members who were critical to the committees’ success.
A major function of USAHA is to develop and recommend policies and procedures of national disease control and eradication programs. This means that many committee findings and resolutions constitute recommendations to the appropriate federal agency which is responsible for the area of concern. Some of these recommendations
are contrary to agency policy or position. For this reason, federal employees should actively share their expertise and opinions as committee members, but should not serve as chairmen where they would be making recommendations to their employer.

A number of committees have used federal employees as assistant chairmen to good advantage. Also, committees which do not deal with federal agency policy may be chaired by federally-employed USAHA members where appropriate.

The committee strongly recommends that we maintain USAHA as a professional and technical advisory organization. We recognize that many of the Association’s activities have political implications, but feel that lobbying and other political activity should be left to the official, affiliate and individual members.

REIMBURSEMENT AND EXPENSES

In accordance with the Bylaws, Section 10.7, USAHA may provide reimbursement or stipend to its officers, board of directors or committee leadership for reasonable expenses incurred while performing specific assignments of the Association. Requests must be submitted to the Executive Committee for approval in advance of the assignment. The Executive Committee will remain judicious in granting requests and mindful of budgetary limitations when considering requests.

USAHA will reimburse staff for all reasonable expenses incurred while performing duties of the Association. Each individual will furnish full documentation of expenses for audit purposes, subject to review of the Treasurer.

Mileage will be reimbursed at the federal Internal Revenue Service rate.

FINANCIAL AND INVESTMENT POLICY

The following policy outlines the administrative principles of the United States Animal Health Association reserve funds.

Goals

1. Build and maintain two year’s operation expenses in reserves.
2. Maintain adequate liquidity in the instance funds must be called for use.
3. Earn reasonable interest on reserves to maintain principle and exceed economic inflation rates.

Delegation of Authority

Both Treasurer and Executive Director should be designated as signors on any USAHA accounts. At this time, USAHA will not employ a third-party account manager to manage investments. However, USAHA may utilize the services of a brokerage manager for locating investment opportunities and advice.

Responsibilities

- Treasurer: Primary authority for investment decisions, acting within parameters of investment policy. Responsible for
III.B. ADMINISTRATIVE POLICIES

monthly review of financials and chairing audit committee.

- Executive Director: Manager of investments, to act under direction of Treasurer. Provide research, recommendations to Treasurer for decisions. Responsibility for day-to-day bookkeeping and reporting (to Treasurer/Executive Committee) of financial information. Compile and distribute quarterly investment reports to EC.
- Executive Committee: Provide regular review of investments from quarterly reports. Provide oversight of Treasurer and Executive Director decisions.
- Board of Directors: Provide approval and/or amendments to investment policy for execution.

Asset Management

USAHA shall put at risk no principle of its reserve funds or operating funds. Investments will be held in secured, FDIC insured institutions. Investments should be less than $100,000 in any single financial institution whenever possible.

All cash received will be deposited into the checking account. To the extent possible, the checking account balance should not exceed $100,000 at the end of each monthly reporting period.

Reserve funds shall be invested in Certificates of Deposit, Money Market, Treasury Bills or Treasury Notes as determined by the Treasurer. The following guidelines will assist in determining terms to allow reasonable liquidity should the reserves be needed.

- Maximum of 25% of Reserve Funds in products of greater than 4 years.
- Maximum of 25% of Reserve Funds in products of 24 months to 4 years.
- Minimum of 40% of Reserve Fund in products less than 24 months.
- Minimum of 0% of Reserve funds in money market savings account for immediate liquidity.

USAHA shall make efforts to ladder CD maturity dates so that at least $50,000 comes due in each fiscal quarter.

This policy will be reviewed annually by the Executive Committee, with any amendments to be brought before the Board of Directors.

CONFLICT OF INTEREST POLICY

Any member or employee involved in a business transaction of the United States Animal Health Association in which a conflict of interest may be present, shall notify the Executive Committee promptly. Said individual shall refrain from voting on such transactions, and exclude themselves from deliberations. The individual will refrain from any personal influence on the transaction. A transaction that involves a conflict of interest should be reviewed against relative competitive bids or proposals. Decisions to pursue a transaction with a potential conflict
of interest should first uphold the best interests of USAHA, and include terms that are reasonable to USAHA within the given marketplace. Approvals will be made by the Executive Committee. A written disclosure summarizing any possible conflict of interest shall be kept on file at the USAHA office. Discussion and resolution shall be indicated in the minutes of the USAHA Executive Committee session. Conflict of interest should be disclosed if: a transaction of USAHA involves any close relative of a Director or Employee as the direct vendor/provider, or the Director/Employee stands material gain through a transaction. A Director or Employee holds financial interest if holdings are of 5% or greater of the potential vendor, or holds position of influence with an organization that seeks to do business with USAHA. A close relative is defined as any parent, spouse, sibling, child, grandchild, or spouse of the aforementioned. Also to be included would be any individual residing in the same household that would resemble a parental or marital relationship.

WHISTLEBLOWER POLICY
Employees and members of USAHA should report illegal or unethical activities, directly relating to the business of USAHA, to the President. The President, in consultation with the Executive Committee, will then determine appropriate actions for investigation, reporting to proper authorities, and reconciliation as necessary. Employees and members will be provided full confidentiality for reporting such activities, and the President and Executive Committee will ensure due diligence in protecting against retaliation by the organization, its members or other employees and supervisors.

DOCUMENT RETENTION AND DESTRUCTION POLICY
USAHA will maintain all financial records for seven years. They will then be disposed of by either cross-shredding or incineration. Meeting registrations and membership renewals will be kept for three years.

YEAR-ROUND ACTIVITIES
USAHA is a year-round organization, and is often asked to comment on specific issues related to its mission. USAHA should first refer to its resolutions to address a given issue. USAHA staff will act upon all resolutions as directed by the membership and Board of Directors, involving necessary correspondence. For issues that arise, that pertain to resolutions, can have direct action taken as deemed necessary. No additional voting is necessary, though the input of the executive committee is encouraged. Should an issue be presented that no resolution has been approved, the Executive Director/Secretary will coordinate with President and First Vice President (Chair of Government Relations) to determine if USAHA
III.B. ADMINISTRATIVE POLICIES

should address the specific issue, with consensus from the Executive Committee.

ANNUAL MEETING SPEAKER REGISTRATION/COMPLIMENTARY REGISTRATION

USAHA will not provide complimentary registration to any member or regular attendee of USAHA annual meetings that is speaking on a committee agenda.

USAHA will provide a one-day complimentary registration to non-member, invited speakers by request for committees for the purpose of presenting to a committee or general session. Requests must be submitted to the USAHA office.

USAHA does not offer speaker stipend, nor reimburse for travel expenses. Exceptions to this, or any of the above items must be approved by the Executive Committee.

VIDEO & AUDIO RECORDING OF COMMITTEE PROCEEDINGS

USAHA prohibits third-party video and audio recording of Committee meetings at the Annual Meeting.

THIRD PARTY MEETINGS

USAHA will permit related organizations, with missions consistent with those of USAHA, to partner in its Annual Meeting to provide a venue for their gatherings. Agreements are arranged on a case-by-case basis, with input from the Program Chair and approval by the Executive Committee. In general, these organizations are expected to cover related expenses to USAHA for their event. Attendees are also expected to pay registration fees for the Annual Meeting.

AAVLD PARTNERSHIP

USAHA will maintain a Memorandum of Understanding with AAVLD regarding all issues surrounding the Annual Meeting execution. The MOU will serve as a basis for coordination between the two organizations, and be reviewed annually.
### III.C. PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 27-28, 1997†</td>
<td>Fort Worth, TX</td>
<td>Mr. C.P. Johnston, Springfield, IL</td>
<td>Mr. D. O. Lively, Fort Worth, TX</td>
</tr>
<tr>
<td>Oct. 2-3, 1998</td>
<td>Chicago, IL</td>
<td>Mr. C.P. Johnston, Springfield, IL</td>
<td>Mr. D. O. Lively, Fort Worth, TX</td>
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<tr>
<td>Oct. 22-23, 1999†</td>
<td>Buffalo, NY</td>
<td>Dr. E.P. Niles, VA</td>
<td>Mr. W.H. Dunn, TN</td>
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<tr>
<td>Sept. 22-23, 2000</td>
<td>Wichita, KS</td>
<td>Mr. W.J. Bolton, Woodward, OK</td>
<td>Mr. W.J. Bolton, Woodward, OK</td>
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<tr>
<td>Sept. 24-25, 2000</td>
<td>St. Louis, MO</td>
<td>Mr. Wm. P. Smith, Monticello, IL</td>
<td>Dr. E.T. Eisenman, Louisville, KY</td>
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<tr>
<td>Oct. 26-27, 2000</td>
<td>Springfield, IL</td>
<td>Dr. E.T. Eisenman, Louisville, KY</td>
<td>Mr. Wm. P. Smith, Monticello, IL</td>
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<tr>
<td>Oct. 22-23, 2001</td>
<td>Virginia, DC</td>
<td>Dr. D. F. Luckey, Columbia, MD</td>
<td>Mr. Wm. P. Smith, Monticello, IL</td>
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<tr>
<td>Sept. 24-25, 2000</td>
<td>Richmond, VA</td>
<td>Dr. Charles G. Lamb, CO</td>
<td>Mr. Wm. P. Smith, Monticello, IL</td>
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<td>Dec. 5-7, 2000</td>
<td>Chicago, IL</td>
<td>Dr. W.H. Dalrymple, Baton Rouge, LA</td>
<td>Mr. Wm. P. Smith, Monticello, IL</td>
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<tr>
<td>Dec. 6-7, 2000</td>
<td>Chicago, IL</td>
<td>Dr. C.E. Cotton, St. Paul, MN</td>
<td>Mr. Wm. P. Smith, Monticello, IL</td>
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<tr>
<td>Feb. 6-7, 2001</td>
<td>Washington, DC</td>
<td>Dr. J.J. Ferguson, Chicago, IL</td>
<td>Mr. Wm. P. Smith, Monticello, IL</td>
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<td>Dec. 20-21, 2000</td>
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<td>Dr. J.I. Ferguson, Chicago, IL</td>
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<td>Dec. 25-26, 2000</td>
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<td>Dec. 28-29, 2000</td>
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<td>Dr. J.I. Ferguson, Chicago, IL</td>
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<td>Meeting</td>
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<td>Place of Meeting</td>
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<td>Dec. 3-5, 1917</td>
<td>Chicago, IL</td>
<td>*Dr. J. G. Wills, Albany NY</td>
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<td>22</td>
<td>Dec. 2-4, 1918</td>
<td>Chicago, IL</td>
<td>*Dr. M. Jacob, Knoxville, TX</td>
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<td>23</td>
<td>Dec. 1-3, 1919</td>
<td>Chicago, IL</td>
<td>*Dr. G. W. Dumphy, Lansing, MI</td>
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<td>24</td>
<td>Nov. 29-Dec. 1, 1920</td>
<td>Chicago, IL</td>
<td>*Dr. S. F. Musselman, Frankfort, KY</td>
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<td>25</td>
<td>Nov. 28-30, 1921</td>
<td>Chicago, IL</td>
<td>*Dr. W. F. Crewe, Bismarck, MD</td>
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<td>26</td>
<td>Dec. 6-8, 1922</td>
<td>Chicago, IL</td>
<td>*Dr. T. E. M. Munce, Harrisburg, PA</td>
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<td>27</td>
<td>Dec. 5-7, 1923</td>
<td>Chicago, IL</td>
<td>*Dr. W.J. Butler, Henena, MT</td>
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<td>*Dr. J. G. Ferneyhough, Richmond, VA</td>
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<td>*Dr. J. H. McNeil, Trenton, NJ</td>
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<td>Dec. 1-3, 1926</td>
<td>Chicago, IL</td>
<td>*Dr. John R. Mohler, Washington, DC</td>
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<td>31</td>
<td>Nov. 30-Dec. 2, 1927</td>
<td>Chicago, IL</td>
<td>*Dr. L. Van Es, Lincoln, NE</td>
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<td>32</td>
<td>Dec. 5-7, 1928</td>
<td>Chicago, IL</td>
<td>*Dr. C. A. Cary, Auburn, AL</td>
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<td>33</td>
<td>Dec. 4-6, 1929</td>
<td>Chicago, IL</td>
<td>*Dr. Chas. O. Lamb, Denver, CO</td>
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<td>34</td>
<td>Dec. 3-5, 1930</td>
<td>Chicago, IL</td>
<td>*Dr. A. E. Wright, Washington, DC</td>
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<td>Dec. 2-4, 1931</td>
<td>Chicago, IL</td>
<td>*Dr. J. W. Connaway, Columbia, MD</td>
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<td>36</td>
<td>Nov. 30-Dec. 2, 1932</td>
<td>Chicago, IL</td>
<td>*Dr. Peter Malcolm, Des Moines, IA</td>
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<td>Dec. 6-8, 1933</td>
<td>Chicago, IL</td>
<td>*E. T. Faulder, Albany, NY</td>
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<td>38</td>
<td>Dec. 5-7, 1934</td>
<td>Chicago, IL</td>
<td>*Dr. T. E. Robinson, Providence, RI</td>
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<td>Dec. 4-6, 1935</td>
<td>Chicago, IL</td>
<td>*Dr. Edward Records, Reno, NV</td>
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<td>Dec. 2-4, 1936</td>
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<td>*Dr. Walter Wisnicky, Madison, WI</td>
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<td>Dec. 1-3, 1937</td>
<td>Chicago, IL</td>
<td>*Dr. R. W. Smith, Concord, NH</td>
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<td>Nov. 30-Dec. 2, 1938</td>
<td>Chicago, IL</td>
<td>*Dr. D. E. Westmoreland, Frankfort, KY</td>
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<td>Dec. 6-8, 1939</td>
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<td>*Dr. J. L. Axby, Indianapolis, IN</td>
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<td>44</td>
<td>Dec. 4-6, 1940</td>
<td>Chicago, IL</td>
<td>*Dr. H. D. Port, Cheyenne, WY</td>
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<td>45</td>
<td>Dec. 3-5, 1941</td>
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<td>*Dr. E. A. Crossman, Boston, MA</td>
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<td>Dec. 2-4, 1942</td>
<td>Chicago, IL</td>
<td>*Dr. I. S. McDady, Auburn, AL</td>
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<td>47</td>
<td>Dec. 1-3, 1943</td>
<td>Chicago, IL</td>
<td>*Dr. W. H. Hendricks, Salt Lake City, UT</td>
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<td>Dec. 6-8, 1944</td>
<td>Chicago, IL</td>
<td>*Dr. J. M. Sutton, Atlanta, GA</td>
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<td>*Dr. C. U. Duckwork, Sacramento, CA</td>
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<td>Chicago, IL</td>
<td>*Dr. William Moore, Raleigh, NC</td>
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<td>Dec. 3-5, 1947</td>
<td>Chicago, IL</td>
<td>*Dr. Will J. Miller, Topeka, KS</td>
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<td>52</td>
<td>Oct. 13-15, 1948</td>
<td>Denver, CO</td>
<td>*Dr. Jean V. Knapp, Tallahassee, FL</td>
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<td>53</td>
<td>Oct. 12-14, 1949</td>
<td>Columbus, OH</td>
<td>*Dr. T. O. Brandenburg, Bismarck, ND</td>
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<td>54</td>
<td>Nov. 1-3, 1950</td>
<td>Phoenix, Az</td>
<td>*Dr. C. P. Bishop, Harrisburg, PA</td>
</tr>
<tr>
<td>55</td>
<td>Nov. 14-16, 1951</td>
<td>Kansas City, KS</td>
<td>*Mr. F. E. Mollin, Denver, CO</td>
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<td>56</td>
<td>Oct. 29-31, 1952</td>
<td>Louisville, KY</td>
<td>*Dr. Ralph L. West, St. Paul, MN</td>
</tr>
<tr>
<td>57</td>
<td>Sept. 23-25, 1953</td>
<td>Atlantic City, NJ</td>
<td>*Dr. T. Childs, Ottawa, Canada</td>
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<td>58</td>
<td>Nov. 10-12, 1954</td>
<td>Omaha, NE</td>
<td>*Dr. T. C. Green, Charleston, WV</td>
</tr>
<tr>
<td>59</td>
<td>Nov. 16-18, 1955</td>
<td>New Orleans, LA</td>
<td>*Dr. H. E. Wilkins, Helena, MT</td>
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<td>60</td>
<td>Nov. 28-30, 1956</td>
<td>Chicago, IL</td>
<td>*Dr. A. L. Brueckner, Baltimore, MD</td>
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<tr>
<td>Meeting</td>
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<td>Place of Meeting</td>
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<td>Nov. 13-15, 1957</td>
<td>St. Louis, MO</td>
<td>*Dr. G. H. Good, Cheyenne, WY</td>
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<td>62</td>
<td>Nov. 4-6, 1958</td>
<td>Miami Beach, FL</td>
<td>*Dr. John G. Milligan, Montgomery, AL</td>
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<td>63</td>
<td>Nov. 15-18, 1959</td>
<td>San Francisco, CA</td>
<td>*Mr. F. G. Buzzell, Augusta, ME</td>
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<td>64</td>
<td>Oct. 17-21, 1960</td>
<td>Charleston, WV</td>
<td>*Dr. J. R. Hay, Chicago, IL</td>
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<td>65</td>
<td>Oct. 30-Nov. 3, 1961</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. P. Schneider, Boise, ID</td>
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<td>Oct. 30-Nov. 2, 1962</td>
<td>Washington, DC</td>
<td>*Dr. W. L. Bendix, Richmond, VA</td>
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<td>67</td>
<td>Oct. 15-18, 1963</td>
<td>Albuquerque, NM</td>
<td>*Dr. T. J. Grennan, Jr. Providence, RI</td>
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<td>69</td>
<td>Oct. 25-29, 1965</td>
<td>Lansing, MI</td>
<td>*Dr. J. W. Safford, Helena, MT</td>
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<td>70</td>
<td>Oct. 10-14, 1966</td>
<td>Buffalo, NY</td>
<td>Dr. C. L. Campbell, Tallahassee, FL</td>
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<td>Oct. 16-20, 1967</td>
<td>Phoenix, AZ</td>
<td>*Dr. Grant S. Kaley, Albany, NY</td>
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<td>72</td>
<td>Oct. 6-11, 1958</td>
<td>New Orleans, IA</td>
<td>*Dr. John F. Quinn, Lansing, MI</td>
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<td>73</td>
<td>Oct. 12-19, 1969</td>
<td>Milwaukee, WI</td>
<td>*Dr. John L. Oharra, Reno, NV</td>
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<td>*Dr. Frank B. Wheeler, Baton Rouge, LA</td>
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<td>Oct. 18-23, 1970</td>
<td>Philadelphia, PA</td>
<td>*Dr. M.D. Mitchell, Pierre, SD</td>
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<td>75</td>
<td>Oct. 24-29, 1971</td>
<td>Oklahoma City, OK</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>76</td>
<td>Nov. 5-10, 1972</td>
<td>Miami Beach, FL</td>
<td>*Dr. W. C. Tobin, Denver, CO</td>
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<td>Oct. 14-19, 1973</td>
<td>St. Louis, MO</td>
<td>*Mr. O. H. Timm, Dixon, CA</td>
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<td>78</td>
<td>Oct. 13-18, 1974</td>
<td>Roanoke, VA</td>
<td>*Mr. J. E. Andrews, GA</td>
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<td>79</td>
<td>Nov. 2-7, 1975</td>
<td>Portland, OR</td>
<td>*Dr. H. E. Goldstein, Columbus, OH</td>
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<td>80</td>
<td>Nov. 7-12, 1976</td>
<td>Miami Beach, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>Oct. 16-21, 1977</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. E. Janawicz, Montpelier, VT</td>
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<td>Buffalo, NY</td>
<td>**Dr. L. E. Bartell, Sacramento, CA</td>
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<td>San Diego, CA</td>
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<td>Nov. 2-7, 1980</td>
<td>Louisville, KY</td>
<td>*Mr. B. W. Hawkins, Ontario, OR</td>
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<td>85</td>
<td>Oct. 11-16, 1981</td>
<td>St. Louis, MO</td>
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<td>86</td>
<td>Nov. 7-12, 1982</td>
<td>Nashville, TN</td>
<td>Dr. G. B. Rea Salem, OR</td>
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<td>87</td>
<td>Oct. 15-21, 1983</td>
<td>Las Vegas, NV</td>
<td>Dr. J. R. Ragan, Nashville, TN</td>
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<td>88</td>
<td>Oct. 21-26, 1984</td>
<td>Fort Worth, TX</td>
<td>*Mr. J. O. Pearce, Jr. Okeechobee, FL</td>
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<td>89</td>
<td>Oct. 27-Nov. 1, 1985</td>
<td>Milwaukee, WI</td>
<td>*Dr. David U. Walker, Montpelier, VT</td>
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<td>Oct. 14-19, 1986</td>
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<td>*Dr. N. W. Kruse, Lincoln, NE</td>
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<td>91</td>
<td>Oct. 25-30, 1987</td>
<td>Salt Lake City, UT</td>
<td>*Dr. J. F. Hudelson, Denver, Co</td>
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<td>92</td>
<td>Oct. 16-21, 1988</td>
<td>Little Rock, AR</td>
<td>*Dr. J. A. Cobb, Atlanta, GA</td>
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<td>93</td>
<td>Oct. 28-Nov. 3, 1989</td>
<td>Las Vegas, NV</td>
<td>Mr. P. E. Bradshaw, Griggsville, IL</td>
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<td>94</td>
<td>Oct. 6-12, 1990</td>
<td>Denver, CO</td>
<td>Dr. M. A. Van Buskirk, Harrisburg, PA</td>
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<td>Oct. 26-Nov. 1, 1991</td>
<td>San Diego, CA</td>
<td>*Dr. P. L. Smith, Sacramento, CA</td>
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<td>Oct. 31-Nov. 6, 1992</td>
<td>Louisville, KY</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
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<td>97</td>
<td>Oct. 23-29, 1993</td>
<td>Las Vegas, NV</td>
<td>Dr. T. J. Hagerty, St. Paul, MN</td>
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<td>98</td>
<td>Oct. 29-Nov. 4, 1994</td>
<td>Grand Rapids, MI</td>
<td>Mr. J. B. Finley, Jr., Encinal, TX</td>
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<td>Oct. 28-Nov. 3, 1995</td>
<td>Reno, NV</td>
<td>Dr. H. Wesley Towers, Dover, DE</td>
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<td>Oct. 12-18, 1996</td>
<td>Little Rock, AR</td>
<td>Dr. M. R. Marshall, Salt Lake City, UT</td>
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<td>Meeting</td>
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<td>101</td>
<td>Oct. 17-24, 1997</td>
<td>Louisville, KY</td>
<td>Dr. Larry L. Williams, Lincoln NE</td>
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<td>102</td>
<td>Oct. 3-9, 1998</td>
<td>Minneapolis, MN</td>
<td>Dr. Jones W. Bryan, Columbia, SC</td>
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<td>103</td>
<td>Oct. 7-14, 1999</td>
<td>San Diego, CA</td>
<td>Dr. Richard H. McCapes, Davis, CA</td>
</tr>
<tr>
<td>104</td>
<td>Oct. 19-26, 2000</td>
<td>Birmingham, AL</td>
<td>Dr. Ernest W. Zirkle, Trenton, NJ</td>
</tr>
<tr>
<td>105</td>
<td>Nov. 1-8, 2001</td>
<td>Hershey, PA</td>
<td>Dr. Bob R. Hillman, Boise, ID</td>
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<tr>
<td>106</td>
<td>Oct. 1-24, 2002</td>
<td>St. Louis, MO</td>
<td>Dr. Maxwell Lea, Jr., Baton Rouge, LA</td>
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<td>107</td>
<td>Oct. 9-16, 2003</td>
<td>San Diego, CA</td>
<td>Mr. Bob Frost, Lincoln, CA</td>
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<td>108</td>
<td>Oct. 21-27, 2004</td>
<td>Greensboro, NC</td>
<td>Dr. Donald Lein, Ithaca, NY</td>
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<td>109</td>
<td>Nov. 3-9, 2005</td>
<td>Hershey, PA</td>
<td>Dr. Richard D. Willer, Phoenix, AZ</td>
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<td>110</td>
<td>Oct. 12-18, 2006</td>
<td>Minneapolis, MN</td>
<td>Dr. Bret D. Marsh, Indianapolis, IN</td>
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<td>111</td>
<td>Oct. 18-24, 2007</td>
<td>Reno, NV</td>
<td>Dr. Lee M. Myers, Atlanta, GA</td>
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<td>112</td>
<td>Oct. 23-29, 2008</td>
<td>Greensboro, NC</td>
<td>Mr. James W. Leafstedt, Alcester, SD</td>
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**Key**

* Deceased
** Resigned Dec. 12, 1977
† Reprinted in 54th Annual Proceedings
‡ Last meeting of the Interstate Association of Livestock Sanitary Boards
†† Reprinted in 66th Annual Proceedings
§ USAHA hired an Executive Director, in lieu of the Secretary
III.D. USAHA MEDAL OF DISTINCTION RECIPIENTS

USAHA MEDAL OF DISTINCTION RECIPIENTS

110th Annual Meeting, Minneapolis Minnesota – 2006
Dr. Clarence L. Campbell, Tallahassee, Florida
Dr. Richard H. McCapes, Davis, California

111th Annual Meeting, Reno, Nevada – 2007
Dr. J. Lee Alley, Montgomery, Alabama
Mrs. Linda B. Ragland, Richmond, Virginia

Dr. John C. Shook, Mechanicsburg, Pennsylvania

113th Annual Meeting, San Diego, California – 2009
Dr. Bret E. Marsh, Indianapolis, Indiana
GLOSSARY OF COMMONLY USED ACRONYMS

AAHSC  Aquatic Animal Health Standards Commission
AAVCT  American Academy of Veterinary and Comparative Toxicology
AAVLD  American Association of Veterinary Laboratory Diagnosticians
ABADRL Arthropod-Borne Animal Disease Research Laboratory
ABSL  Animal Biosafety Levels
AC  Animal Care (USDA-APHIS)
ACE  Antigen Capture ELISA
ACVIM  American College of Veterinary Internal Medicine
ADT  Animal disease traceability
AF  Accredited Free
AFIA  American Feed Industry Association
AFS  American Fisheries Society
AFWA  Association of Fish and Wildlife Agencies
AHP  Animal Health and Production Division
AHPA  Animal Health Protection Act
AHSISC  Animal Health Surveillance and Information Systems Committee
AHSM  Animal Health Surveillance and Management
AICAP  Avian Influenza Coordinated Agricultural Program
AI-CMC  Avian Influenza Crisis Management Center
ANV  Avian nephritis virus
APHIS  Animal and Plant Health Inspection Service
### IV.A. GLOSSARY

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APIC</td>
<td>Association for Professionals in Infection Control and Epidemiology</td>
</tr>
<tr>
<td>ARS</td>
<td>Agriculture Research Service</td>
</tr>
<tr>
<td>AVMA</td>
<td>American Veterinary Medical Association</td>
</tr>
<tr>
<td>AVMC</td>
<td>Aquatic Vet Med Committee</td>
</tr>
<tr>
<td>AWA</td>
<td>Animal Welfare Act</td>
</tr>
<tr>
<td>AWI</td>
<td>Animal Welfare Institute</td>
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<tr>
<td>BCG</td>
<td>Bacille Calmette-Guerin</td>
</tr>
<tr>
<td>BEAP</td>
<td>Brucellosis Emergency Action Plan</td>
</tr>
<tr>
<td>BHS</td>
<td>Bighorn sheep</td>
</tr>
<tr>
<td>BMAP(s)</td>
<td>Brucellosis Management Action Plan(s)</td>
</tr>
<tr>
<td>BMP(s)</td>
<td>Best Management Practice(s)</td>
</tr>
<tr>
<td>BMST</td>
<td>Brucellosis Milk Surveillance Testing</td>
</tr>
<tr>
<td>BNC</td>
<td>Bi-National Committee</td>
</tr>
<tr>
<td>BQFS</td>
<td>Bison Quarantine Feasibility Study</td>
</tr>
<tr>
<td>BRT</td>
<td>Brucellosis ring test</td>
</tr>
<tr>
<td>BSC</td>
<td>Biological Standard Commission</td>
</tr>
<tr>
<td>BSE</td>
<td>Bovine spongiform encephalopathy</td>
</tr>
<tr>
<td>BSL</td>
<td>Breed-specific legislation</td>
</tr>
<tr>
<td>BTV</td>
<td>Bluetongue virus</td>
</tr>
<tr>
<td>BVDV</td>
<td>Bovine diarrhea virus</td>
</tr>
<tr>
<td>CAC</td>
<td>Codex Alimentarius Commissions</td>
</tr>
<tr>
<td>CAHFS</td>
<td>California Animal Health and Food Safety Lab</td>
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</table>
### IV.A. GLOSSARY

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CAHFSE</td>
<td>Collaboration for Animal Health, Food Safety and Epidemiology</td>
</tr>
<tr>
<td>CAST</td>
<td>Council for Agricultural Science and Technology</td>
</tr>
<tr>
<td>CAstV</td>
<td>Chicken astrovirus</td>
</tr>
<tr>
<td>CBPP</td>
<td>Contagious bovine pleuropneumonia</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CEAH</td>
<td>Centers for Epidemiology and Animal Health</td>
</tr>
<tr>
<td>CEI</td>
<td>Center for Emerging Issues</td>
</tr>
<tr>
<td>CEM</td>
<td>Contagious equine metritis</td>
</tr>
<tr>
<td>CENAPA</td>
<td>National Parasite and Toxic Residue Laboratory (Mexico)</td>
</tr>
<tr>
<td>CENASA</td>
<td>National Animal Disease Laboratory (Mexico)</td>
</tr>
<tr>
<td>CFIA</td>
<td>Canadian Food Inspection Agency</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>CI/KR</td>
<td>Critical infrastructure and key resources</td>
</tr>
<tr>
<td>CIMBS</td>
<td>The Center for Research at the Interface of Mathematical and Biological Sciences</td>
</tr>
<tr>
<td>CMC</td>
<td>Crisis Management Center</td>
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<tr>
<td>CNS</td>
<td>Central Nervous System</td>
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<tr>
<td>COMEXA</td>
<td>Mexico - United States Commission on the Eradication of Livestock Screwworm</td>
</tr>
<tr>
<td>CONASA</td>
<td>Consejo Nacional de Salud Animal</td>
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<tr>
<td>COOL</td>
<td>Country of Origin Labeling</td>
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<tr>
<td>COSDA</td>
<td>Communications Officers for State Department of Agriculture</td>
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<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
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<tr>
<td>CPA</td>
<td>Mexico - United States Commission on the Eradication of Foot-and-Mouth Disease and Other Foreign Animal Diseases</td>
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<tr>
<td>CPI</td>
<td>Consumer Price Index</td>
</tr>
<tr>
<td>CSF</td>
<td>Classical swine fever</td>
</tr>
<tr>
<td>CSPS</td>
<td>Caprine Scrapie Prevalence Study</td>
</tr>
<tr>
<td>CSREES</td>
<td>Cooperative State Research Education and Extension Service (USDA)</td>
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<tr>
<td>CVB</td>
<td>Center for Veterinary Biologics (USDA)</td>
</tr>
<tr>
<td>CVB-IC</td>
<td>Center for Veterinary Biologics - Inspection and Compliance (USDA)</td>
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<tr>
<td>CVI</td>
<td>Certificate of Veterinary Inspection</td>
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<tr>
<td>CVM</td>
<td>Center for Veterinary Medicine (FDA)</td>
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<tr>
<td>CWD</td>
<td>Chronic wasting disease</td>
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<tr>
<td>DAL</td>
<td>District at Large (USAHA)</td>
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<tr>
<td>DBE</td>
<td>Designated Brucellosis Epidemiologist</td>
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<tr>
<td>DHHS</td>
<td>Department of Health and Human Services</td>
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<tr>
<td>DHIA</td>
<td>Dairy Herd Improvement Association</td>
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<tr>
<td>DHS</td>
<td>Department of Homeland Security</td>
</tr>
<tr>
<td>DIVA</td>
<td>Differentiating Infected from Vaccinated Animals</td>
</tr>
<tr>
<td>DJC</td>
<td>Designated Johne’s Disease Coordinator</td>
</tr>
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<td>DNR</td>
<td>Department of Natural Resources</td>
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<tr>
<td>DOI</td>
<td>Department of the Interior</td>
</tr>
<tr>
<td>DS</td>
<td>Diplomatic security</td>
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<tr>
<td>DVM</td>
<td>Doctor of Veterinary Medicine</td>
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<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>EC</td>
<td>Executive Committee (USAHA)</td>
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<td>EDEN</td>
<td>Extension Disaster Education Network</td>
</tr>
<tr>
<td>EHD(V)</td>
<td>Epizootic hemorrhagic disease (virus)</td>
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<tr>
<td>EIA</td>
<td>Equine infectious anemia</td>
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<td>EIS</td>
<td>Environmental Impact Statement</td>
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<td>ELISA</td>
<td>Enzyme Linked Immunosorbent Assay</td>
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<td>EM</td>
<td>Electron microspray</td>
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<tr>
<td>END</td>
<td>Exotic Newcastle disease</td>
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<td>ESF</td>
<td>Emergency Support Function</td>
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<td>EU</td>
<td>European Union</td>
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<td>FAD</td>
<td>Foreign animal disease(s)</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<td>FAS</td>
<td>Foreign Agricultural Service (USDA)</td>
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<tr>
<td>FAV</td>
<td>Food, Agriculture and Veterinary Defense</td>
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<td>FD&amp;C</td>
<td>Food, Drug and Cosmetic Act</td>
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<td>FDA</td>
<td>Food and Drug Administration</td>
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<td>FEMA</td>
<td>Federal Emergency Management Agency (DHS)</td>
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<td>FERN</td>
<td>Food Emergency Response Network</td>
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<td>FHS</td>
<td>Fish Health Section</td>
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<td>FMD</td>
<td>Foot-and-mouth disease</td>
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<td>FPA</td>
<td>Fluorescent polarization assay</td>
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<td>FPD</td>
<td>Foreign poultry diseases</td>
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<td>FSIS</td>
<td>Food Safety and Inspection Service</td>
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<td>Acronym</td>
<td>Full Form</td>
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<td>FWD-IRN</td>
<td>Food and Waterborne Diseases Integrated Research Network</td>
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<td>FWS</td>
<td>Fish and Wildlife Services</td>
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<tr>
<td>FY</td>
<td>Fiscal Year</td>
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<tr>
<td>GAP</td>
<td>Good aquaculture practice</td>
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<tr>
<td>GCC</td>
<td>Government Coordinating Council</td>
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<tr>
<td>GDB</td>
<td>Generic Database</td>
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<tr>
<td>GFRA</td>
<td>Global FMD Research Alliance</td>
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<td>GIEFA</td>
<td>InterHemispheric Group for the Eradication of FMD</td>
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<tr>
<td>GMP</td>
<td>Good management practices</td>
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<tr>
<td>GTNP</td>
<td>Grand Teton National Park</td>
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<tr>
<td>GYA</td>
<td>Greater Yellowstone Area</td>
</tr>
<tr>
<td>GYIBC</td>
<td>Greater Yellowstone Area Interagency Brucellosis Committee</td>
</tr>
<tr>
<td>HACCP</td>
<td>Hazard analysis and critical control points</td>
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<tr>
<td>HEYM</td>
<td>Herrold's egg yolk medium</td>
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<tr>
<td>HD</td>
<td>Hemorrhagic disease</td>
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<tr>
<td>HPAI</td>
<td>Highly pathogenic avian influenza</td>
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<tr>
<td>HSIN</td>
<td>Homeland Security Information System</td>
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<tr>
<td>IAI</td>
<td>Integrated agricultural intelligence</td>
</tr>
<tr>
<td>IBH</td>
<td>Inclusion body hepatitis</td>
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<tr>
<td>IBMP</td>
<td>Interagency Bison Management Plan</td>
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<td>ICS</td>
<td>Incident Command System</td>
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<td>IFAH</td>
<td>International Federation for Animal Health</td>
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<td>IHC</td>
<td>Immunohistochemistry</td>
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<td>Description</td>
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<tr>
<td>ILRI</td>
<td>International Livestock Research Institute</td>
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<tr>
<td>IMT</td>
<td>Incident Management Teams</td>
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<td>IS</td>
<td>International Services (USDA)</td>
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<tr>
<td>ISO</td>
<td>International Standards Organization</td>
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<tr>
<td>IT</td>
<td>Information technology</td>
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<tr>
<td>ITRCB</td>
<td>International Technical Regulatory Capacity Building</td>
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<tr>
<td>JEI</td>
<td>Johne’s Education Initiative</td>
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<tr>
<td>JPPD</td>
<td>Johnin purified protein derivative</td>
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<tr>
<td>LBMS</td>
<td>Live Bird Marketing System</td>
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<tr>
<td>LC/MS</td>
<td>Liquid Chromatography/Mass Spectroscopy</td>
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<tr>
<td>LPAI</td>
<td>Low Pathogenic avian influenza</td>
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<tr>
<td>LPNAI</td>
<td>Low Pathogenic notifiable avian influenza</td>
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<tr>
<td>MA</td>
<td>Modified Accredited</td>
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<tr>
<td>MAA</td>
<td>Modified Accredited Advanced</td>
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<td>MAC</td>
<td>Multi-agency coordination committee</td>
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<td>MAP</td>
<td>Mycobacterium avium paratuberculosis</td>
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<td>MAZ</td>
<td>Modified Accredited Zone</td>
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<td>MCI</td>
<td>Market cattle identification</td>
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<td>MDOL</td>
<td>Montana Department of Livestock</td>
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<td>MDR</td>
<td>Multi-drug resistant</td>
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<td>MIM</td>
<td>Mobile Information Management</td>
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<td>MOU</td>
<td>Memorandum of Understanding</td>
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<td>MST</td>
<td>Microbial Source Tracking</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>MUMS</td>
<td>Minor Use/Minor Species</td>
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<td>NAA</td>
<td>National Aquaculture Association</td>
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<tr>
<td>NADC</td>
<td>National Animal Disease Center</td>
</tr>
<tr>
<td>NAHLN</td>
<td>National Animal Health Laboratory Network</td>
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<tr>
<td>NAHMS</td>
<td>National Animal Health Monitoring System</td>
</tr>
<tr>
<td>NAHRS</td>
<td>National Animal Health Reporting System</td>
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<tr>
<td>NAHSS</td>
<td>National Animal Health Surveillance System</td>
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<td>NAIS</td>
<td>National Animal Identification System</td>
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<tr>
<td>NARMS</td>
<td>National Anti-Microbial Resistance Monitoring System</td>
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<td>NCAHEM</td>
<td>National Center for Animal Health and Emergency Management</td>
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<tr>
<td>NCBA</td>
<td>National Cattlemen’s Beef Association</td>
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<td>NCFAD</td>
<td>National Centre for Foreign Animal Disease</td>
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<tr>
<td>NCIE</td>
<td>National Center for Import and Export</td>
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<td>NCUSAHA</td>
<td>North Central USAHA (District)</td>
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<td>NDV</td>
<td>Newcastlte disease virus</td>
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<tr>
<td>NER</td>
<td>National Elk Refuge Bison</td>
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<td>NEUSAHA</td>
<td>Northeast USAHA (District)</td>
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<td>NFSMS</td>
<td>National Feral Swine Mapping System</td>
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<td>NIAA</td>
<td>National Institute for Animal Agriculture</td>
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<tr>
<td>NIH</td>
<td>National Institute of Health</td>
</tr>
<tr>
<td>NJDDHP</td>
<td>National Johne’s Disease Demonstration Herd Project</td>
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<tr>
<td>NJWG</td>
<td>National Johne’s Working Group</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
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</tbody>
</table>
IV.A. GLOSSARY

NPB  National Pork Board
NPD  National Preparedness Directorate
NPIP National Poultry Improvement Plan
NPS  National Park Service
NRF  National Response Framework
NRI  National Research Initiative’s
NSTC National Science and Technology Council
NSU  National Surveillance Unit (USDA)
NVAP National Veterinary Accreditation Program
NVS  National Veterinary Stockpile (USDA)
NVSL National Veterinary Services Laboratories
NYSCHAP New York State Cattle Health Assurance Program
OCVI Online Certificate of Veterinary Inspections System
OD  Optical density
OHA  Office of Health Affairs (DHS)
OIE  World Animal Health Organization
OM  Osteomyelitis
ORST Outbreak Response and Surveillance Team
OSTP Office of Science and Technology Policy
PADOH Pennsylvania Department of Health
PC  Pre-conditioning
PBS  phosphate buffered saline
PCR Polymerase chain reaction
### IV.A. GLOSSARY

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>PCV 2</td>
<td>Porcine circovirus 2</td>
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<tr>
<td>PETS</td>
<td>Pets Evacuation and Transportation Standards Act</td>
</tr>
<tr>
<td>PFGE</td>
<td>Pulsed Field gel electrophoresis</td>
</tr>
<tr>
<td>PFI</td>
<td>Pet Food Institute</td>
</tr>
<tr>
<td>PHLIS</td>
<td>Public Health Laboratory Information Systems</td>
</tr>
<tr>
<td>PIIWG</td>
<td>Pork Industry Identification Working Group</td>
</tr>
<tr>
<td>PKEMRA</td>
<td>Post Katrina Management Reform Act</td>
</tr>
<tr>
<td>PNF</td>
<td>Payette National Forest</td>
</tr>
<tr>
<td>PQA</td>
<td>Pork Quality Assurance</td>
</tr>
<tr>
<td>PRRS(V)</td>
<td>Porcine respiratory and reproductive syndrome (virus)</td>
</tr>
<tr>
<td>PRV</td>
<td>Pseudorabies virus</td>
</tr>
<tr>
<td>PSAs</td>
<td>Public Security Advisors</td>
</tr>
<tr>
<td>PT</td>
<td>Proficiency Test</td>
</tr>
<tr>
<td>PVS</td>
<td>Performance, Vision and Strategy</td>
</tr>
<tr>
<td>RA/HMP</td>
<td>Risk Assessments/Herd Management Plans</td>
</tr>
<tr>
<td>RAPIDD</td>
<td>The Research and Policy for Infectious Disease Dynamics</td>
</tr>
<tr>
<td>RES</td>
<td>Regionalization Evaluation Services</td>
</tr>
<tr>
<td>RFID</td>
<td>Radio frequency identification</td>
</tr>
<tr>
<td>RSSS</td>
<td>Regulatory Scrapie Slaughter Surveillance</td>
</tr>
<tr>
<td>RT-PCR</td>
<td>Real-Time Polymerase Chain Reaction</td>
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<tr>
<td>SAGARPA</td>
<td>Secretary of Agriculture, Ranching, Rural Development, Fisheries and Food Supply (Mexico)</td>
</tr>
<tr>
<td>SAHA</td>
<td>Southern Animal Health Association (District)</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
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</tr>
<tr>
<td>SB</td>
<td>Brucella suis (swine brucellosis)</td>
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<tr>
<td>SCWDS</td>
<td>Southeastern Cooperative Wildlife Disease Study</td>
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<td>SENASICA</td>
<td>National Services of Animal and Plant Health, Quality and Food Safety (Mexico)</td>
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<td>SEPRL</td>
<td>Southeastern Poultry Research Laboratory (ARS)</td>
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<tr>
<td>SFCP</td>
<td>Scrapie Flock Certification Program</td>
</tr>
<tr>
<td>SHI</td>
<td>Synergistic Hemolysin Inhibition</td>
</tr>
<tr>
<td>SHTP</td>
<td>Slaughter Horse Transport Program</td>
</tr>
<tr>
<td>SIV</td>
<td>Swine Influenza Virus</td>
</tr>
<tr>
<td>SNGD</td>
<td>Scrapie National Generic Database</td>
</tr>
<tr>
<td>SODA</td>
<td>Statistical Outbrek Detection Algorithm</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>SOSS</td>
<td>Scrapie Ovine Slaughter Surveillance</td>
</tr>
<tr>
<td>SPP</td>
<td>Security and Prosperity Partnership of North America</td>
</tr>
<tr>
<td>SRM</td>
<td>Specified Risk Materials</td>
</tr>
<tr>
<td>STD</td>
<td>Science and Technology Directorate (DHS)</td>
</tr>
<tr>
<td>SWAP</td>
<td>Swine Welfare Assurance Program</td>
</tr>
<tr>
<td>TAD</td>
<td>Targeted Advanced Development</td>
</tr>
<tr>
<td>TDC</td>
<td>Tibial dyschondroplasia</td>
</tr>
<tr>
<td>TRV</td>
<td>Turkey-origin reovirus</td>
</tr>
<tr>
<td>TSE</td>
<td>Transmissible spongiform encephalaphy</td>
</tr>
<tr>
<td>UDB</td>
<td>Unified Database</td>
</tr>
<tr>
<td>UEP</td>
<td>United Egg Producers</td>
</tr>
<tr>
<td>UHF</td>
<td>Ultra High Frequency</td>
</tr>
</tbody>
</table>
## IV.A. GLOSSARY

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>UM&amp;R</td>
<td>Uniform Methods &amp; Rules</td>
</tr>
<tr>
<td>USAHA</td>
<td>United States Animal Health Association</td>
</tr>
<tr>
<td>USDA</td>
<td>United States Department of Agriculture</td>
</tr>
<tr>
<td>USFS</td>
<td>United States Forest Service</td>
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<tr>
<td>USFW</td>
<td>United States Fish &amp; Wildlife Services</td>
</tr>
<tr>
<td>VBJDCP</td>
<td>Voluntary Bovine Johne’s Disease Control Program</td>
</tr>
<tr>
<td>VHS(v)</td>
<td>Viral Hemmoratic Septicemia (Virus)</td>
</tr>
<tr>
<td>VICH</td>
<td>International Cooperation on Harmonization of Technical Requirements for Registration of Veterinary Medicinal Products</td>
</tr>
<tr>
<td>VIC-S</td>
<td>Veterinary Infection Control Society</td>
</tr>
<tr>
<td>VJDHSP</td>
<td>Voluntary Johne’s Disease Herd Status Program</td>
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<tr>
<td>VLT</td>
<td>Vaccinal laryngotracheitis</td>
</tr>
<tr>
<td>VS</td>
<td>Veterinary Services (USDA)</td>
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<tr>
<td>VSPS</td>
<td>Veterinary Service Process Streamling</td>
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<tr>
<td>WAFWA</td>
<td>Western Association of Fish and Wildlife Agencies</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WS</td>
<td>Wildlife Services (USDA)</td>
</tr>
<tr>
<td>WSLHA</td>
<td>Western States Livestock Health Association</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
</tr>
<tr>
<td>YNP</td>
<td>Yellowstone National Park</td>
</tr>
<tr>
<td>YWHP</td>
<td>Yellowstone Wildlife Health Program</td>
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</table>