The United States Animal Health Association (USAHA), the nation's animal health forum for over a century, is a science based, national organization of official state and federal animal health agencies, national allied organizations, district representatives, and individual members founded in 1897 to protect animal and public health.

The Association's mission is implemented through deliberations of science-based committees and the adoption of resolutions and recommendations, aimed at solving problems. USAHA has 31 committees, varying in size from 11 to 155 members.

USAHA is administered by the Executive Committee and Board of Directors, which also determines policy. The Association headquarters are located in St. Joseph, Missouri.

USAHA has met annually since its founding in 1897 and produces a printed proceedings of each meeting. These proceedings represent the most complete history of the nation's animal health endeavors over the past century.

USAHA's mission is to:

• Serve as a forum for communication and coordination among state and federal governments, universities, industry and other groups on issues of animal health and disease control, animal welfare, food safety and public health.

• Serve as a clearinghouse for new information and methods that may be incorporated into laws, regulations, policy and programs.

• Act to develop solutions to animal-health related issues based on science, new information and methods and the ability to develop a consensus for changing laws, regulations, policies and programs.

USAHA Membership

Official State Animal Health Agency (50)

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

National Allied Organizations (34)

Alpaca Owners & Breeders Association
American Association of Avian Pathologists
American Association of Bovine Veterinarians
American Association of Equine 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 Quarter Horse Association
American Horse Council
American Sheep Industry Association
American Veterinary Medical Association
Association of American Veterinary Medical Colleges
Association of Fish & Wildlife Agencies
Bat Science
Bovine Wildlife Association
Breeders Research Association USA, Inc.
International Llama Registry
Livestock Exporters Association USA
Livestock Marketing Association
National Agriculture 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 Poultry Board
National Poultry Producers Council
National Funders Association
National Turkey Federation
North American Deer Farmers Association
North American Exotic Breeds Association
U.S. Poultry & Egg Association

Regional Delegates (8)

Northeast (2), North Central (2), South (2), West (2)

Individual Members (1,002)
# 2008 TABLE OF CONTENTS

## I. 2008 Officers and Committees
- **A. Officers** ............................................................................................................. 13
- **B. Committees** ........................................................................................................ 14

## II. 2008 Annual Meeting Proceedings

**SUNDAY, October 26, 2008**

- **A. USAHA/AAVLD President’s Reception and Dinner**
  - Invocation – Richard Breitmeyer ................................................................. 36
  - Memorial Service – Donald Hoenig .............................................................. 36
  - Welcome to North Carolina – Howard Isley .............................................. 38
  - AAVLD President’s Remarks – Grant Maxie .............................................. 40
  - USAHA President’s Remarks – James Leafstedt ........................................ 42
  - Recognize Sponsors – Grant Maxie, James Leafstedt ............................... 43
  - USAHA Medal of Distinction Award – James Leafstedt ........................... 44
  - AAVLD Administrator’s Award – Kevin Shea ............................................ 47
  - AAVLD Awards – Barbara Powers ............................................................... 50
  - National Assembly Award – Sam Holland ................................................ 53
  - Invitation to San Diego – Richard Breitmeyer ........................................... 54

- **B. USAHA/AAVLD Scientific Session**

  **Foot-and-Mouth Disease: If “When” Happened**
  **Monday, October 27, 2008**

  Status of the National Foot and Mouth Disease Response Plan:

  The National Animal Health Laboratory Network (NAHLN): Laboratory Response and Surge Capacity – B. M. Martin, United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services.......................................................... 61

  An Overview Of The Diagnostic and Molecular Epidemiology Data From The 2007 Outbreaks of Foot and Mouth Disease In The United Kingdom – D. P. King, Institute of Animal Health, Pirbright.......................................................... 62
New Foot-and-Mouth Disease Vaccine and Countermeasure Research  
- L. Rodriguez, and M.J. Grubman, Foreign Animal Disease Research Unit, United States Department of Agriculture, Agriculture Research Service .................................................................64


Foot and Mouth Disease Eradication Efforts in South America, Current Status of the Disease: Vaccination Strategies in Countries that are Vaccinating – D. Ashford, United States Department of Agriculture, Animal and Plant Health Inspection Service, International Services........................................................................................................70

Issues for the Dairy Industry in a Foot and Mouth Disease Outbreak  
– J. Tickel, North Carolina Department of Agriculture .................73

Issues for the Beef Industry in a Foot and Mouth Disease Outbreak  
– E. Parker, National Cattlemen’s Beef Association.........................74

Issues for the Swine Industry in a Foot and Mouth Disease Outbreak  
– P. Webb, National Pork Board............................................................76

Consumers Are Always Right (Even When They’re Wrong)  
– R. Crawford, McDonald’s Corporation.................................................79

C. USAHA Scientific Papers, Posters and Abstracts

Accurate Diagnostic Tests that Efficiently Identify Johne’s Disease Positive Sheep and Goats – B.E. Mamer, M. W. Ayers, M. S. Bulgin.................................................................85

Cattle, Deer and Bovine Tuberculosis: Current Research in Michigan  
– A.R. Berentsen, R.S. Miller, M. R. Dunbar and R. Ebersole.............87

Detection of Brucellosis from Swine Meat Juice Samples – J. Nelson, L. Anderson and D. Pyburn.................................................................88

Diagnostic Investigation of Acute Respiratory Syndrome in Alpacas  
– B. Crossley, R. Mock, B. Barr, A. Ardans and S. Hietala...............90
Use of Infrared Thermography to Detect Signs of Foot and Mouth Disease in Experimentally Infected Mule Deer (*Odocoileus hemionus*) and other ungulates – M. R. Dunbar, S. R. Johnson, J. Rhyan and M. McCollum .................................................................92

Experimental Inoculation of Coyotes with *Mycobacterium bovis*: Susceptibility and Shedding – S. R Johnson, M. R Dunbar, L. Martinez, R. L. Jones, R. Bowen and P. Gordy.................................94


Use of Genomic Interspecies Microarray Hybridization to Detect Differentially Expressed Genes Associated with H5N1 Avian Influenza Virus Infections in Ducks – M. J. Pantin-Jackwood, L. Sarmento and C. L. Afonso.................................................................99


Use of Infrared Thermography as an Alternative Method to Evaluate the Comparative Cervical Test (CCT) in Cattle Sensitized to *Mycobacterium bovis* or *M. avian* – S. R. Johnson and M. R. Dunbar........................................................................101

D. USAHA Membership Meetings

MONDAY, OCTOBER 27, 2008

**USAHA Membership Luncheon and Meeting**
Presiding, James W. Leafstedt, USAHA President
State of the Association – James W. Leafstedt.....................103
Treasurer’s Report – William L. Hartmann...........................104
Report of the Committee on Nominations – Bret D. Marsh…..105

WEDNESDAY, OCTOBER 29, 2008

**USAHA Membership Meeting**
Report of the Action of the Committee on Nominations – Bret D. Marsh .................................................................107
President’s Address – Donald E. Hoenig..............................107
Recognition of Immediate Past President – Lee M. Myers.....110
Executive Director’s Report – Benjamin D. Richey ...............110
Report of the Committee on Resolutions – Bret D. Marsh …..111
E. Committee Reports

USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
Report of the Committee – K. Roehr and M. Simunich..............................113

USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
Report of the Committee – B. L. Akey and F. Elvinger .........................121

COMMITTEE ON ANIMAL WELFARE
Report of the Committee – J.A. Facchiano ........................................129

USAHA/AAVLD COMMITTEE ON AQUACULTURE
Report of the Committee – A. Goodwin and K. Snekvik ......................136

COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
Report of the Committee – R. Pitts .....................................................140

COMMITTEE ON BLUETONGUE AND BOVINE RETROVIRUSES
Report of the Committee – J. Pearson ..............................................147

COMMITTEE ON BRUCELLOSIS
Report of the Committee – G. Plumb ..............................................162
Report of the Scientific Advisory Subcommittee on Brucellosis
– P. Elzer ......................................................................................164
Report of the Feral Swine Subcommittee on Brucellosis and Pseudorabies
– C. Black and J. Corn .....................................................................167
Report of the Subcommittee on Brucellosis in the Greater Yellowstone
Area – M. Zualuski .........................................................................172
National Brucellosis Elimination Zone Proposal – B. McCluskey .........179
Status Report of Fiscal Year 2008, Cooperative State-Federal Brucellosis
Eradication Program – D. Donch and A. Gertonson .........................187

COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
Report of the Committee – M. Miller ..............................................198
Risk Model Design for Decision-Making – S. Gillette .....................203
COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

Report of the Committee – B. Frost and B. Osburn .................................204

COMMITTEE ON ENVIRONMENT

Report of the Committee – R. Lovell ..........................................................206

COMMITTEE ON FOOD AND FEED SAFETY

Report of the Committee – D. E. LaFontaine ..............................................228

COMMITTEE ON FOREIGN AND EMERGING DISEASES

Report of the Committee – A. Torres and P. Gibbs .................................244
Rift Valley Fever Overview and Recent Developments at USDA
– K. Linthicum .........................................................................................256

COMMITTEE ON GOVERNMENT RELATIONS

Report of the Committee – R. E. Breitmeyer ...........................................266

COMMITTEE ON IMPORT-EXPORT

Report of the Committee – C. Brown .......................................................278

COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON, AND CAMELIDS

Report of the Committee – H. D. Lehmkuhl ..........................................295

COMMITTEE ON INFECTIOUS DISEASES OF HORSES

Report of the Committee – P. J. Timoney ...............................................299
Report of the Subcommittee on Equine Piroplasmosis – K. Fowler .........305
Report of the Subcommittee on Equine Infectious Anemia – D. Ellis .......310
High Dose Imidocarb Dipropionate Treatment, Cleared Chronic Babesia caballi Infection – D. Knowles .........................................................318

COMMITTEE ON INTERNATIONAL STANDARDS

Report of the Committee – N. Willis .........................................................322
COMMITTEE ON JOHNE’S DISEASE
Report of the Committee – A. Schwartz..............................................346

COMMITTEE ON LIVESTOCK IDENTIFICATION
Report of the Committee – B. R. Hillman ........................................379

COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY

COMMITTEE ON NOMINATIONS AND RESOLUTIONS
Report of the Committee – B. D. Marsh ..........................................402

COMMITTEE ON PARASITIC DISEASES
Report of the Committee – J. L. Corn ..............................................449

COMMITTEE ON PHARMACEUTICALS
Report of the Committee – J. Bradford ...........................................456

COMMITTEE ON PROGRAM
Report of the Committee – D. E. Hoenig........................................459

COMMITTEE ON PUBLIC HEALTH AND RABIES
Report of the Committee – J. P. Sanders ........................................461

COMMITTEE ON SALMONELLA
Report of the Committee – P. L. McDonough.................................467
Evolutionary Trends of Salmonella enteritidis Linked to Subpopulation Biology and Virulence Attributes – J. Guard-Boldin.........................480

COMMITTEE ON SCRAPIE
Report of the Committee – J. Logan ..............................................503

COMMITTEE ON SHEEP AND GOATS
Report of the Committee – C. B. Wolf ...........................................508
A Novel Approach to Control Johne’s Disease in a Western U.S. Range Flock – M. W. Ayers, B. E. Mamer, M. S. Bulgin* .......................511
COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY

Report of the Committee – J. A. Smith ...............................................513
Report of the Subcommittee on Mycoplasma – E. Jensen………………518
Report of the Subcommittee on Vaccinal Laryngotracheitis
– S. Davison......................................................................................519
Report of the Subcommittee on Avian Influenza and Newcastle Disease
– D. Swayne......................................................................................523

COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE

Report of the Committee – M. Engle.................................................569

COMMITTEE ON TUBERCULOSIS

Report of the Committee – K. M. Connell ......................................575
Report of the Subcommittee on Diagnostic Test Review ..............583
Report of the Subcommittee on Elephant Tuberculosis ..............588
Report of the Subcommittee on Tuberculosis Test & Reverse Policy ....589
Bovigam IFN-Gamma Assay Development and Its Use in International
Tuberculosis Programs – I. Schiller..................................................602

COMMITTEE ON WILDLIFE DISEASES

Report of the Committee - J. R. Fischer .........................................610
Pastuerellosis Transmission Risks Between Domestic and Wild Sheep
– M. Miller*, D. Knowles, M.S. Bulgin...........................................621

F. Other Reports

1. 2008 USDA-ARS Research Review: Advances in
Foot-and-Mouth Disease Research

Gap Analysis of Countermeasures and Research in the Control and
Eradication of FMD – C. Gay.........................................................633
Early Events in FMD Pathogenesis in Cattle – J. Arzt..................634
Novel Countermeasures for FMD Control – M. Grubman...........635
Joint DHS-ARS Vaccine Development Program – D. Brake........637
Utilizing functional genomics to understanding FMDV Virus-Host
Interactions – L. Rodriguez..............................................................639
Management Practices Associated with Beef Quality Assurance/Master Beef Producer Certification Among Cattle Producers – F. Hopkins, A. Green, C. Lane, D. Edmisson, L. R. Carpenter, J. Dunn………………..641


Montana’s BVD-PI Biosecurity Project - C. Peck*, Mo Harbac, J. Paterson........................................................................................................645

Review of Pooled Testing Strategies and Applying Them to Detect Bovine Viral Diarrhea Virus Persistent Infected Calves and Tritrichomonas foetus Infected bulls - J. A. Kennedy…………………………………………..647


Survey of Virginia and Maryland Dairy Practitioners on the Treatment of Metritis and a Literature Review – J. F. Currin………………………………..650

Epidemiology of Neospora Caninum in Mississippi Cattle Herd - J.E. Huston, C.L. Huston, J. Carter, L.R. Ballweber, J.D. Anderson…..652

Epidemiological Study of the Risk Factors that Affect Mortality Due to Columnaris on a Commercial Catfish Farm – F. L. Cunningham, R.W. Wills…………………………………………………………………………….653

Educating and Training Future Scientists in Biodefense – H. Simmons, B. Norby, T. Powdril…………………………………………………………..655

III. Organizational Matters

A. Bylaws of USAHA ........................................................................658
B. USAHA Administrative Policies .................................................670
C. Previous Meetings ....................................................................675
D. USAHA Medal of Distinction Award Winners…………………..681

IV. Appendix

A. Glossary of Acronyms.................................................................682
I. 2008 Officers and Committees
   A. Officers
   B. Committees
Section I

A. Officers

2007-2008 USAHA Elected Officers

Seated, from left: Richard Breitmeyer, First Vice President; James Leafstedt, President; Donald Hoenig, President-Elect.

Standing, from left: David Marshall, Third Vice President; Steven Halstead, Second Vice President; William Hartmann, Treasurer.
Section I

B. Committees

USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
Co-Chairs: Keith Roehr, Lakewood, CO
Marilyn M. Simunich, Boise, ID

John B. Adams, VA
Bruce L. Akey, NY
Gary A. Anderson, KS
Joan M. Arnoldi, WI
Tammy R. Beckham, TX
Lisa Becton, IA
Shane A. Brookshire, GA
Consuelo Carrillo, NY
Matt H. Cochran, TX
Leslie E. Cole, OK
Thomas L. Cropper, TX
S. Peder Cuneo, AZ
Kevin M. Dennison, CO
Orlo R. Ehart, DC
Brigid N. Elchos, MS
Dee B. Ellis, TX
Francois C. Elvinger, VA
W. Kent Fowler, CA
Cyril G. Gay, MD
Levee G. Gayle, TX
Jeffrey J. Hamer, NJ
Greg N. Hawkins, TX
Donald E. Hoenig, ME
Gregory P. Jillson, NM
Patrice N. Klein, MD
Charlotte A. Krugler, SC
Elizabeth A. Lautner, IA
Randall L. Levings, IA
Martha A. Littlefield, LA
Barbara M. Martin, IA
John Maulsby, CO
Thomas J. McGinn, III, DC
David L. Meeker, VA
Lee M. Myers, GA
Brian V. Noland, ID
Sandra K. Norman, IN
Kristy L. Pabolino, CO
Boyd Parr, SC
Deidre A. Qual, ND
Jeanne M. Rankin, MT
Paul E. Rodgers, CO
James A. Roth, IA
Mo D. Salman, CO
A. David Scarfe, IL
Gary B. Sherman, MD
Brian T. Smith, DC
Harry Snelson, NC
George A. Teagarden, KS
Kerry Thompson, DC
Dave B. Tomkins, TX
Alfonso Torres, NY
William C. Wagner, VA
Sherrilyn H. Wainwright, CO
Patrick Webb, IA
Brad L. Williams, TX

USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
Chair: Bruce L. Akey, Ithaca, NY
Francois C. Elvinger, Blacksburg, VA

Marianne Ash, IN
Laurence J. Berry, CA
Stan D. Bruntz, CO
Craig N. Carter, KY
James T. Case, CA
Max E. Coats, Jr., TX
William L. Hartmann, MN
John Heller, CO
Jodi A. Hoynoski, VT
Paul E. Knepley, PA
Elizabeth A. Lautner, IA
Janet E. Maass, CO
Kevin D. Maher, IA
Larry D. Mark, VA
Michael K. Martin, SC
Michael F. McGrath, IRL
James D. McKean, IA
Andres Perez, CA
Deidre A. Qual, ND
Tom Ray, NC
Stanley R. Robertson, MS
Emi K. Saito, CO
Mo D. Salman, CO
A. David Scarfe, IL
Jack L. Schlater, IA
David Smith, NY
Glenn B. Smith, GA
Victor L. Velez, CA
Patrick Webb, IA
Stephen E. Weber, CO
Jay P. Weidner, WA
Gary W. Wilson, OH
Nora E. Wineland, CO

COMMITTEE ON ANIMAL WELFARE
Chair: J Amelita Facchiano, Dallas, TX
Vice Chairs: Carolyn L. Stull, Davis, CA
Ria de Grassi, Sacramento, CA

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
Sherrie R. Niekamp, IA
Sandra K. Norman, IN
Roger E. Olson, MD
Elizabeth J. Parker, DC
Kristine R. Petrin, MN
John R. Ragan, MD
Sebastian Reist, NJ
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
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
Belinda S. Thompson, NY
Kerry Thompson, DC
Bob Tully, KS
Charles D. Vail, CO
Gary M. Weber, MD
Katherine Wetherall, CA
Annette M. Whiteford, CA
Norman G. Willis, ONT
COMMITTEE ON ANIMAL WELFARE (continued)

Ellen M. Wilson, CA  Richard W. Winters, Jr., TX
Ross Wilson, TX    Michael J. Wood, VT
Josh L. Winegarner, TX  Ernest W. Zirkle, NJ.
Nora E. Wineland, CO

USAHA/AAVLD COMMITTEE ON AQUACULTURE
Chair: Andrew E. Goodwin, Pine Bluff, AR
Kevin R. Snevik, Pullman, WA

Marilyn Blair, ID  Vader M. Loomis, PA
Deborah L. Brennan, MS  John R. MacMillian, AR
Stan D. Bruntz, CO  Phillip M. Mamer, ID
Jones W. Bryan, SC  Larry D. Mark, VA
William W. Buisch, NC  Otis Miller, NC
Tony A. Caver, SC  Regg D. Neiger, SD
Robert G. Ehlenfeldt, WI  Lanny W. Pace, MS
James M. Foppoli, HI  Charles Palmer, CA
Nancy A. Frank, MI  Kristine R. Petrini, MN
Suzanne N. Gibbons-Burgener, WI  Jill B. Rolland, MD
Burke L. Healey, NC  James A. Roth, IA
Donald E. Hoenig, ME  John P. Sanders, WV
Frederic J. Hoerr, AL  A. David Scarfe, IL
Sherman W. Jack, MS  Tara J. Schnell, WI
Myron J. Kebus, WI  Robert M. S. Temple, OH
Lester H. Khoo, MS  Norman G. Willis, ONT
Scott E. LaPatra, ID  Ria de Grassi, CA
Tsang Long Lin, IN

COMMITTEE ON BIOLOGICS & BIOTECHNOLOGY
Chair: Bob E. Pitts, Athens, GA

Gary A. Anderson, KS  Joseph N. Huff, CO
Joan M. Arnoldi, WI  Majon Huff, CO
Charles A. Baldwin, GA  Terry L. Klick, OH
Yung Fu Chang, NY  Hiram N. Lasher, DE
James J. England, ID  Lloyd H. Lauerman, WA
William H. Fales, MO  John C. Lawrence, ME
Robert W. Fulton, OK  Randall L. Levings, IA
Ted Girshick, CT  Robert E. Pitts, WV
Keith N. Haffer, SD  Carol L. Rinehart, MO
Larry L. Hawkins, MO  Deepanker Tewari, PA
Chris S. Hayhow, KS  Deoki N. Tripathy, IL
Ruud G. Hein, DE  Bob Tully, KS
Richard E. Hill, IA
COMMITTEE ON BLUETONGUE AND RELATED ORBIVIRUS
Chair: James E. Pearson, Ames, IA
Vice Chair: William C. Wilson, Laramie, WY

T. Lynwood Barber, CO
Shane A. Brookshire, GA
Charles E. Brown, II, WI
Joseph L. Corn, GA
Edward J. Dubovi, NY
James F. Evermann, WA
Robert W. Fulton, OK
Robert F. Gerlach, AK
Chester A. Gipson, MD
William L. Hartmann, MN
Larry L. Hawkins, MO
Chris S. Hayhow, KS
Robert B. Hillman, NY
Thomas J. Holt, FL

Oscar Kennedy, VA
Francine Lord, CAN
N James MacLachlan, CA
Daniel G. Mead, GA
James O. Mecham, WY
Bennie I. Osburn, CA
Eileen N. Ostlund, IA
Laurie S. Prasnicki, WI
Shawn P. Schafer, ND
Charly Seale, TX
David E. Stallknecht, GA
Susan W. Tellez, TX
George O. Winegar, MI

COMMITTEE ON BRUCELLOSIS
Chair: Glenn E. Plumb, Yellowstone Park, WY
Vice Chair: Claude E. Barton, Nashville, TN

John B. Adams, VA
J Lee Alley, AL
Dan J. Anderson, TX
Neil J. Anderson, MT
Bill Barton, ID
Carter Black, GA
Richard E. Breitmeyer, CA
Becky L. Brewer-Walker, OK
Max E. Coats, Jr., TX
Thomas F. Conner, OH
Walter E. Cook, WY
Ed Corrigan, WI
Donald S. Davis, TX
Mark L. Drew, ID
Anita J. Edmondson, CA
Robert G. Ehlenfeldt, WI
Philip H. Elzer, LA
Steven R. England, NM
Donald E. Evans, KS
Dave E. Fly, NM
James M. Foppoli, HI
Tony G. Frazier, AL
Bob Frost, CA
Frank D. Galey, WY
Tam Garland, DC
Robert F. Gerlach, AK
Arnold A. Gertonson, CO
Michael J. Gilksdorf, MD
L. Wayne Godwin, FL
William L. Hartmann, MN

Greg N. Hawkins, TX
Steven G. Hennager, IA
Bob R. Hillman, TX
E. Ray Hinshaw, AZ
Sam D. Holland, SD
Majon Huff, CO
Dennis A. Hughes, NE
David L. Hunter, MT
Jon G. Johnson, TX
Susan J. Keller, ND
Terry L. Klick, OH
Terry J. Kreeger, WY
Maxwell A. Lea, Jr., LA
Jim R. Logan, WY
Laurent O’Gene Lollis, FL
Phillip M. Mamer, ID
Bret D. Marsh, IN
Barbara M. Martin, IA
Chuck E. Massengill, MO
Andrea Mikolon, CA
Henry I. Moreau, LA
Elizabeth J. Parker, DC
Janet B. Payeur, IA
Valerie E. Ragan, MD
Thomas J. Roffe, MT
Shawn P. Schafer, ND
David D. Schmitt, IA
Marilyn M. Simunich, ID
Robert C. Stout, KY
Paul L. Sundberg, KY
COMMITTEE ON BRUCELLOSIS (continued)

George A. Teagarden, KS
Kenneth J. Throlson, ND
Rick L. Wallen, WY
James A. Watson, MS
Gary M. Weber, MD
Diana L. Whipple, IA
P. J. White, WY

Margaret A. Wild, CO
Richard D. Willer, HI
Larry L. Williams, NE
Taylor H. Woods, MO
Martin A. Zaluski, MT
Glen L. Zebarth, MN

COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

Chair: Michele A. Miller, Lake Buena Vista, FL
Vice Chair: Robert Hilsenroth, Yulee, PA

Wilbur B. Amand, PA
Paul L. Anderson, MN
Mark W. Atkinson, NV
Daniel R. Baca, TX
Scott C. Bender, AZ
Warren Bluntzer, TX
Charles S. Brown, NC
Kristina Brunjes, KY
Scott W. Bugai, TX
Beth W. Carlson, ND
William H. Clay, DC
Robert A. Cook, NY
Donald S. Davis, TX
Mark L. Drew, ID
Joel K. Espe, WI
Tim J. Feldner, MT
John R. Fischer, GA
Nancy A. Frank, MI
Tam Garland, DC
Robert F. Gerlach, AK
Paul Gibbs, FL
Colin M. Gillin, OR
Michael J. Gilsdorf, MD
Chester A. Gipson, MD
Dean Goeldner, MD
James R. Hail, OK
Greg N. Hawkins, TX
Burke L. Healey, NC
Sam D. Holland, SD
Fred Huebner, IA
David L. Hunter, MT
John P. Huntley, NY
Sherman W. Jack, MS
Donald L. Janssen, CA
Kevin Keel, GA
Karl G. Kinsel, TX
Patrice N. Klein, MD
Terry L. Klick, OH
Paul E. Knepley, PA

Terry J. Kreeger, WY
Carolyn Laughlin, OH
Steve K. Laughlin, OH
Calvin W. S. Lum, HI
Konstantin Lyashchenko, NY
John R. MacMillian, AR
Phillip M. Mamer, ID
Leslie A. McFarlane, UT
Robert G. McLean, CO
Robert M. Meyer, CO
Andrea Mikolon, CA
L. Devon Miller, IN
Julie Napier, NE
Jeffrey T. Nelson, IA
Janet B. Payeur, IA
Laurie S. Prasnicki, WI
Michael R. Pruitt, OK
Chris V. Rathe, WA
Kerry A. Rood, UT
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
Anne L. Sherwood, WA
Daryl L. Simon, MN
Jonathan M. Sleeman, VA
Joe Starcher, WV
Evaleen J. Starkel, MT
Les C. Stutzman, NY
Cleve Tedford, TN
Robert M. S. Temple, OH
John “Brad” Thurston, In
Kimberly K. Wagner, WI
Rick Wahlert, CO
Kenneth Waldrup, TX
COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK (continued)

Ray Waters, IA
Kyle W. Wilson, TN
Richard W. Winters, Jr., TX
Jill Bryar Wood, TX
Taylor H. Woods, MO
Glen L. Zebarth, MN.

COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

Chair: Bob Frost, Lincoln, CA
Bennie I. Osburn, Davis, CA

J Lee Alley, AL
Gary A. Anderson, KS
Alex A. Ardans, CA
Joan M. Arnoldi, WI
Lawrence Barrett, NY
Thomas W. Bates, CA
Judith Bossé, CAN
Mike Chaddock, DC
Neville P. Clarke, TX
John R. Clifford, DC
Karen Conyngham, TX
Ron DeHaven, IL
Leslie A. Dierauf, WI
Brian R. Evans, CAN
Peter J. Fernandez, AE
J. Pat Fitch, MD
Frank D. Galey, WY
Tam Garland, DC
Pamela J. Hullinger, CA
Paul Kitching, CAN
Don P. Knowles, WA
Elizabeth A. Lautner, IA
Randall L. Levings, IA
Bret D. Marsh, IN
Barbara M. Martin, IA
Grant M. Maxie, CAN
Richard H. McCapes, CA
Terry F. McElwain, WA
Doris M. Miller, GA
Terry L. Nipp, DC
Donal T. O'Toole, WY
Gary D. Osweiler, IA
Kristy L. Pabilonia, CO
Lanny W. Pace, MS
Elizabeth J. Parker, DC
Barbara E. Powers, CO
Willie M. Reed, IN
Ralph C. Richardson, KS
Y.M. Saif, OH
Emi K. Saito, CO
A. David Scarfe, IL
Brian T. Smith, DC
Mark Spire, KS
Alfonso Torres, NY
Richard D. Willer, HI
William C. Wilson, WY.

COMMITTEE ON ENVIRONMENT

Chair: Gavin Meerdink, Mahomet, IL
Vice Chair: Randall A. Lovell, Martinsburg, WV

Frank D. Galey, WY
L. Wayne Godwin, FL
John P. Honstead, CO
Laurent O'Gene Lollis, FL
Lee M. Myers, GA
Gary D. Osweiler, IA
Elizabeth J. Parker, DC
Jane F. Robens, MD
Larry J. Thompson, MO
Gary M. Weber, MD

19
COMMITTEE ON FOOD AND FEED SAFETY
Chair: Daniel E. LaFontaine, Columbia, SC
Vice Chair: Bonnie J. Buntain, Calgary, Alberta, CAN

David C. Ailor, DC
Alex A. Ardans, CA
Deanna L. Baldwin, MD
Marilyn F. Balmer, MD
Joseph L. Blair, VA
Richard E. Breitmeyer, CA
Roy D. Brister, AR
Peggy N. Carter, VA
Tony A. Caver, SC
Max E. Coats, Jr., TX
Kevin G. Custer, IA
Retta K. Dyess, TX
Kathy D. Finnerty, NY
Robert F. Gerlach, AK
L. Wayne Godwin, FL
C. Ross Hamilton, TX
Jay Hawley, IN
Christine N. Hoang, IL
Donald E. Hoenig, ME
Tom Holder, MD
Rex D. Holt, GA
Clyde B. Hoskins, SC
Danny R. Hughes, AR
John P. Huntley, NY
Lee C. Jan, TX
Heidi D. Kassenborg, MN
Susan J. Keller, ND
Sung G. Kim, NY
Spangler Klopp, DE
Elizabeth A. Lautner, IA
Laurent O’Gene Lollis, FL
Kelli S. Ludum, DC
John R. MacMillian, AR
Bret D. Marsh, IN
David T. Marshall, NC
Kris Mazurczak, IL
James D. McKean, IA
Katherine M. Mcnamara, VT
David L. Meeker, VA
Andrea Mikolon, CA
Lee M. Myers, GA
Nicole Neeser, MN
Carol A. Olmstead, MT
Kenneth E. Olson, IL
Gary D. Osweiler, IA
Gerardo Quaassdorff, VT
John R. Ragan, MD
James T. Rankin, Jr., PA
Jane F. Robens, MD
Nancy J. Robinson, MO
Kerry A. Rood, UT
Leon H. Russell, Jr., TX
John P. Sanders, WV
Richard S. Sellers, VA
Glenn N. Slack, KY
Harry Snelson, NC
Rosemary A. Speers, VA
Philip Stayer, MS
Bruce N. Stewart-Brown, MD
James E. Stocker, NC
Stanley A. Stromberg, OK
H. Wesley Towers, DE
Liz K. Wagstrom, IA
Gary L. Waters, MT
Larry L. Williams, NE
Rob S. Williams, DC
Nora E. Wineland, CO
John F. Wortman, Jr., NM
Ria de Grassi, CA
Ignacio T. dela Cruz, MP

COMMITTEE ON FOREIGN AND EMERGING DISEASES
Chair: Alfonso Torres, Ithaca, NY
Vice Chair: Paul Gibbs, Gainesville, FL

Helen M. Acland, PA
John B. Adams, VA
L. Garry Adams, TX
Bruce L. Akey, NY
Wilbur B. Amand, PA
Sandra Amass, IN
Gary A. Anderson, KS
Alex A. Ardans, CA
Joan M. Arnoldi, WI
Marianne Ash, IN
George P. Badley, AR
Charles A. Baldwin, GA
Lawrence Barrett, NY
Thomas W. Bates, CA
Tammy R. Beckham, TX
Lisa Becton, IA
<table>
<thead>
<tr>
<th>Name</th>
<th>State 1</th>
<th>State 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Derek J. Belton</td>
<td>NZ</td>
<td></td>
</tr>
<tr>
<td>Bob H. Bokma, MD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philip E. Bradshaw, IL</td>
<td>IL</td>
<td></td>
</tr>
<tr>
<td>Richard E. Breitmeyer, CA</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Deborah L. Brennan, MS</td>
<td>MS</td>
<td></td>
</tr>
<tr>
<td>Becky L. Brewer-Walker, OK</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>Shane A. Brookshire, GA</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Corrie C. Brown, GA</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>William W. Buisch, NC</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>Johnny D. Callahan, MD</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Jerry J. Callis, NY</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>David M. Castellan, CA</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Tony A. Caver, SC</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Yung Fu Chang, NY</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>Neville P. Clarke, TX</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Leslie E. Cole, OK</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>Thomas F. Conner, OH</td>
<td>OH</td>
<td></td>
</tr>
<tr>
<td>Robert A. Cook, NY</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>Joseph L. Corn, GA</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Paula L. Cowen, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>Stephen K. Crawford, NH</td>
<td>NH</td>
<td></td>
</tr>
<tr>
<td>S. Peder Cuneo, AZ</td>
<td>AZ</td>
<td></td>
</tr>
<tr>
<td>Fred J. DeGraves, OH</td>
<td>OH</td>
<td></td>
</tr>
<tr>
<td>Thomas J. DeLiberto, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>Linda A. Detwiler, NJ</td>
<td>NJ</td>
<td></td>
</tr>
<tr>
<td>Leah C. Dorman, OH</td>
<td>OH</td>
<td></td>
</tr>
<tr>
<td>Edward J. Dubovi, NY</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>Anita J. Edmondson, CA</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Dee B. Ellis, TX</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Francois C. Elvinger, VA</td>
<td>VA</td>
<td></td>
</tr>
<tr>
<td>John I. Enck, Jr., PA</td>
<td>PA</td>
<td></td>
</tr>
<tr>
<td>Peter J. Fernandez, AE</td>
<td>AE</td>
<td></td>
</tr>
<tr>
<td>J. Pat Fitch, MD</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>James M. Foppoli, HI</td>
<td>HI</td>
<td></td>
</tr>
<tr>
<td>Rose Foster, MO</td>
<td>MO</td>
<td></td>
</tr>
<tr>
<td>W. Kent Fowler, CA</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Anthony M. Gallina, FL</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>Tam Garland, DC</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>John E. George, TX</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Robert F. Gerlach, AK</td>
<td>AK</td>
<td></td>
</tr>
<tr>
<td>Colin M. Gillin, OR</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>Linda Glaser, MN</td>
<td>MN</td>
<td></td>
</tr>
<tr>
<td>Stephen W. Goldsmith, VA</td>
<td>VA</td>
<td></td>
</tr>
<tr>
<td>Thomas M. Gomez, GA</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Mara Elma E. Gonzalez, ESA</td>
<td>ESA</td>
<td></td>
</tr>
<tr>
<td>Nancy E. Halpern, NJ</td>
<td>NJ</td>
<td></td>
</tr>
<tr>
<td>Jeffrey J. Hamer, NJ</td>
<td>NJ</td>
<td></td>
</tr>
<tr>
<td>William R. Hare, MD</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Greg N. Hawkins, TX</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Larry L. Hawkins, MO</td>
<td>MO</td>
<td></td>
</tr>
<tr>
<td>Ruud G. Hein, DE</td>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>Richard E. Hill, IA</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Donald E. Hoenig, ME</td>
<td>ME</td>
<td></td>
</tr>
<tr>
<td>Sam D. Holland, SD</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Thomas J. Holt, FL</td>
<td>FL</td>
<td></td>
</tr>
<tr>
<td>Floyd P. Horn, MD</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Dennis A. Hughes, NE</td>
<td>NE</td>
<td></td>
</tr>
<tr>
<td>John P. Huntley, NY</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>John L. Hyde, NY</td>
<td>NY</td>
<td></td>
</tr>
<tr>
<td>Lee C. Jan, TX</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Thomas R. Kasari, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>Patrice N. Klein, MD</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Anthony P. Knight, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>Charlotte A. Krugler, SC</td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td>Elizabeth A. Lautner, IA</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Randall L. Levings, IA</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>David J. Ligda, IN</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td>Tsang Long Lin, IN</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td>Martha A. Littlefield, LA</td>
<td>LA</td>
<td></td>
</tr>
<tr>
<td>Linda L. Logan, TX</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Margie M. Lyness, GA</td>
<td>GA</td>
<td></td>
</tr>
<tr>
<td>Janet E. Maass, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>Edward T. Mallinson, MD</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Bret D. Marsh, IN</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td>Barbara M. Martin, IA</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Sarah J. Mason, NC</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>MaryAnn T. McBride, NC</td>
<td>NC</td>
<td></td>
</tr>
<tr>
<td>Robert G. McLean, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>James O. Mecham, WY</td>
<td>WY</td>
<td></td>
</tr>
<tr>
<td>David L. Meeker, VA</td>
<td>VA</td>
<td></td>
</tr>
<tr>
<td>Andrea Mikoloon, CA</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Gay Y. Miller, IL</td>
<td>IL</td>
<td></td>
</tr>
<tr>
<td>Fonda A. Munroe, CAN</td>
<td>CAN</td>
<td></td>
</tr>
<tr>
<td>Thomas J. Myers, MD</td>
<td>MD</td>
<td></td>
</tr>
<tr>
<td>Jim Niewold, IL</td>
<td>IL</td>
<td></td>
</tr>
<tr>
<td>Terry L. Nipp, DC</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>Sandra K. Norman, IN</td>
<td>IN</td>
<td></td>
</tr>
<tr>
<td>James E. Novy, TX</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>Bruno Oesch,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kristy L. Pabilonia, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>Lanny W. Pace, MS</td>
<td>MS</td>
<td></td>
</tr>
<tr>
<td>Charles Palmer, CA</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Andres Perez, CA</td>
<td>CA</td>
<td></td>
</tr>
<tr>
<td>Gerardo Quaassdorff, VT</td>
<td>VT</td>
<td></td>
</tr>
<tr>
<td>Deidre A. Qual, ND</td>
<td>ND</td>
<td></td>
</tr>
<tr>
<td>Keith Roehr, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>James A. Roth, IA</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Emi K. Saito, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>Mo D. Salman, CO</td>
<td>CO</td>
<td></td>
</tr>
<tr>
<td>A. David Scarfe, IL</td>
<td>IL</td>
<td></td>
</tr>
<tr>
<td>Jack L. Schlater, IA</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>David D. Schmitt, IA</td>
<td>IA</td>
<td></td>
</tr>
<tr>
<td>Larry A. Schuler, ND</td>
<td>ND</td>
<td></td>
</tr>
<tr>
<td>Dan J. Sheesley, DC</td>
<td>DC</td>
<td></td>
</tr>
</tbody>
</table>
COMMITTEE ON FOREIGN AND EMERGING DISEASES (continued)

Shari C. Silverman, NJ
Harry Snelson, NC
David L. Suarez, GA
David E. Swayne, GA
R. Flint Taylor, NM
Cleve Tedford, TN
David Thain, NV
Lee Ann Thomas, MD
John “Brad” Thurston, IN
Peter H. Timm, CA
Peter J. Timoney, KY
Susan C. Trock, NY
Paul O. Ugstad, TX
Jesse L. Vollmer, ND
Sherrilyn H. Wainwright, CO
Patrick Webb, IA
Marsharee Wilcox, MD
Margaret A. Wild, CO
Catherine L. Wilhelmsen, MD
Larry L. Williams, NE
Rob S. Williams, DC
Norman G. Willis, ONT
William C. Wilson, WY
Saul T. Wilson, Jr., AL
Richard W. Winters, Jr., TX

COMMITTEE ON GOVERNMENT RELATIONS

Chair: Richard E. Breitmeyer, Sacramento, CA
Vice Chair: Steven L. Halstead, Lansing, MI

Stephen K. Crawford, NH
Dave E. Fly, NM
Tony M. Forshey, OH
William L. Hartmann, MN
Donald E. Hoenig, ME
Sam D. Holland, SD
James W. Leafstedt, SD
David T. Marshall, NC
Lee M. Myers, GA
Nancy J. Robinson, MO
John R. Scamahorn, IN
Brian T. Smith, DC
Robert C. Stout, KY

COMMITTEE ON IMPORT-EXPORT

Chair: Charles E. Brown, II, DeForest, WI
Vice Chair: George O. Winegar, Howell, MI

Bob H. Bokma, MD
John L. Braly, CO
Timothy R. Cordes, MD
Linda A. Detwiler, NJ
Mark J. Engle, TN
J Amelita Facchiano, TX
William H. Fales, MO
Bob Frost, CA
Chester A. Gipson, MD
Mara Elma E. Gonzalez, ESA
Steven G. Hennager, IA
Robert B. Hillman, NY
Robert Hilsenroth, PA
Donald E. Hoenig, ME
Floyd P. Horn, MD
Oscar Kennedy, VA
Ralph C. Knowles, FL
Elizabeth A. Lautner, IA
Amy W. Mann, VA
Richard D. Mitchell, CT
Lee M. Myers, GA
Elizabeth J. Parker, DC
James E. Pearson, IA
Gerardo Quaassdorff, VT
Paul E. Rodgers, CO
Susan W. Tellez, TX
Lynn Anne Tesar, SD
Lee Ann Thomas, MD
Kerry Thompson, DC
Peter J. Timoney, KY
Charles D. Vail, CO
James A. Watson, MS
Gary M. Weber, MD
William C. Wilson, WY
David W. Winters, TX
Richard W. Winters, Jr., TX
Cindy B. Wolf, MN
COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS
Chair: Howard D. Lehmkuhl, Ames, IA
Vice Chair: James F. Evermann, Pullman, WA

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
Darla R. Ewalt, IA
Bob Frost, CA
Robert W. Fulton, OK
Jennifer L. Greiner, DC
Dale M. Grotelueschen, NE
Burke L. Healey, NC
Del E. Hensel, CO
David L. Hunter, MT
John C. Lawrence, ME
James W. Leafstedt, SD
Janet E. Maass, CO
Chuck E. Massengill, MO
Annette M. O’Connor, IA
Jeanne M. Rankin, MT
Julia F. Ridpath, IA
Les C. Stutzman, NY
R. Flint Taylor, NM
George A. Teagarden, KS
Susan W. Tellez, TX
Robert M. S. Temple, OH
Marsharee Wilcox, MD
Brad L. Williams, TX
William C. Wilson, WY.

COMMITTEE ON INFECTIOUS DISEASES OF HORSES
Chair: Peter J. Timoney, Lexington, KY
Vice Chair: James A. Watson, Jackson, MS

Helen M. Acland, PA
Debbie Barr, CAN
Derek J. Belton, NZ
Carter Black, GA
Shane A. Brookshire, GA
Jones W. Bryan, SC
Clarence L. Campbell, FL
Craig N. Carter, KY
Tony A. Caver, SC
Max E. Coats, Jr., TX
Timothy R. Cordes, MD
Ed Corrigan, WI
Stephen K. Crawford, NH
Leonard E. Eldridge, WA
Dee B. Ellis, TX
J Amelia Facchiano, TX
Dave E. Fly, NM
W. Kent Fowler, CA
Tony G. Frazier, AL
Paul Gibbs, FL
Keith N. Haffer, SD
Nancy E. Halpern, NJ
Steven L. Halstead, MI
Jeffrey J. Hamer, NJ
Greg N. Hawkins, TX
Burke L. Healey, NC
Carl Heckendorf, CO
Steven G. Hennager, IA
Michael E. Herrin, OK
Robert B. Hillman, NY
Don P. Knowles, WA
Ralph C. Knowles, FL
Maxwell A. Lea, Jr., LA
Donald H. Lein, NY
Mary J. Lis, CT
Martha A. Littlefield, LA
Amy W. Mann, VA
MaryAnn T. McBride, NC
Patrick L. McDonough, NY
Richard D. Mitchell, CT
Donald S. Munro, PA
Lee M. Myers, GA
Sandra K. Norman, IN
Don L. Notter, KY
Eileen N. Ostlund, IA
Robert E. Pitts, WV
Jewell G. Plumley, WV
Jeanne M. Rankin, MT
Keith Roehr, CO
Earl Rogers, UT
Michael A. Short, FL
Shari C. Silverman, NJ
Robert C. Stout, KY
David Thain, NV
COMMITTEE ON INFECTIOUS DISEASES OF HORSES (continued)
Belinda S. Thompson, NY
Kerry Thompson, DC
H. Wesley Towers, DE
Susan C. Trock, NY
Charles D. Vail, CO
Taylor H. Woods, MO
Ernest W. Zirkle, NJ

COMMITTEE ON INTERNATIONAL STANDARDS
Chair: Richard D. Willer, Kahului, HI
Vice Chair: Norman G. Willis, Ottawa, ONT
Joan M. Arnoldi, WI
Corrie C. Brown, GA
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
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. Salman, CO
Larry A. Schuler, ND
Peter J. Timoney, KY
Alfonso Torres, NY
Jesse L. Vollmer, ND
Stephen E. Weber, CO
Rob S. Williams, DC

COMMITTEE ON JOHNE’S DISEASE
Chair: Andy L. Schwartz, Austin, TX
Vice Chair: Elisabeth Patton, Madison, WI
John B. Adams, VA
J. Bruce Addison, MO
Paul L. Anderson, MN
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
Robert A. Cook, NY
Ed Corrigan, WI
Stephen K. Crawford, NH
Ned A. Cunningham, OH
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
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
Steven G. Hennager, IA
Donald E. Hoenig, ME
Sam D. Holland, SD
John P. Honstead, CO
Ernest P. Hovingh, PA
David L. Hunter, MT
Lee C. Jan, TX
Jamie S. Jonker, VA
Karen R. Jordan, NC
Susan J. Keller, ND
Mark Kinsel, WA
Bruce L. Lamb, IN
John C. Lawrence, ME
Donald H. Lein, NY
Tsang Long Lin, IN

24
## COMMITTEE ON JOHNE’S DISEASE (continued)

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary J. Lis</td>
<td>CT</td>
</tr>
<tr>
<td>Laurent O’Gene Lollis</td>
<td>FL</td>
</tr>
<tr>
<td>Vader M. Loomis</td>
<td>PA</td>
</tr>
<tr>
<td>Gordon ‘Cobbie’ Magness</td>
<td>SD</td>
</tr>
<tr>
<td>Beth E. Mamer</td>
<td>ID</td>
</tr>
<tr>
<td>Chuck E. Massengill</td>
<td>MO</td>
</tr>
<tr>
<td>Chris W. Murdock</td>
<td>MO</td>
</tr>
<tr>
<td>Dustin P. Oedekoven</td>
<td>SD</td>
</tr>
<tr>
<td>Kenneth E. Olson</td>
<td>IL</td>
</tr>
<tr>
<td>Lanny W. Pace</td>
<td>MS</td>
</tr>
<tr>
<td>Elizabeth J. Parker</td>
<td>DC</td>
</tr>
<tr>
<td>Boyd Parr</td>
<td>SC</td>
</tr>
<tr>
<td>Janet B. Payeur</td>
<td>IA</td>
</tr>
<tr>
<td>Kristine R. Petrini</td>
<td>MN</td>
</tr>
<tr>
<td>Jewell G. Plumley</td>
<td>WV</td>
</tr>
<tr>
<td>Michael R. Pruitt</td>
<td>OK</td>
</tr>
<tr>
<td>Sebastian Reist</td>
<td>NJ</td>
</tr>
<tr>
<td>Suelee Robbe-Austerman</td>
<td>IA</td>
</tr>
<tr>
<td>Paul E. Rodgers</td>
<td>CO</td>
</tr>
<tr>
<td>Allen J. Roussel, Jr.</td>
<td>TX</td>
</tr>
<tr>
<td>Patty B. Scharko</td>
<td>KY</td>
</tr>
<tr>
<td>Sarah B. S. Shapiro Hurley</td>
<td>WI</td>
</tr>
<tr>
<td>William P. Shulaw</td>
<td>OH</td>
</tr>
<tr>
<td>Marilyn M. Simunich</td>
<td>ID</td>
</tr>
<tr>
<td>Shri N. Singh</td>
<td>KY</td>
</tr>
<tr>
<td>Ben Smith</td>
<td>WA</td>
</tr>
<tr>
<td>Judith R. Stabel</td>
<td>IA</td>
</tr>
<tr>
<td>Les C. Stutzman</td>
<td>NY</td>
</tr>
<tr>
<td>Cleve Tedford</td>
<td>TN</td>
</tr>
<tr>
<td>Robert M. S. Temple</td>
<td>OH</td>
</tr>
<tr>
<td>Deepanker Tewari</td>
<td>PA</td>
</tr>
<tr>
<td>Charles O. Thoen</td>
<td>IA</td>
</tr>
<tr>
<td>John “Brad” Thurston</td>
<td>IN</td>
</tr>
<tr>
<td>Michele Vise-Brown</td>
<td>KY</td>
</tr>
<tr>
<td>Jesse L. Vollmer</td>
<td>ND</td>
</tr>
<tr>
<td>James A. Watson</td>
<td>MS</td>
</tr>
<tr>
<td>Gary M. Weber</td>
<td>MD</td>
</tr>
<tr>
<td>Scott J. Wells</td>
<td>MN</td>
</tr>
<tr>
<td>Diana L. Whipple</td>
<td>IA</td>
</tr>
<tr>
<td>Robert H. Whitlock</td>
<td>PA</td>
</tr>
<tr>
<td>George O. Vinegar</td>
<td>MI</td>
</tr>
<tr>
<td>Michael J. Wood</td>
<td>VT</td>
</tr>
<tr>
<td>Ching-Ching Wu</td>
<td>IN</td>
</tr>
<tr>
<td>Ria de Grassi</td>
<td>CA</td>
</tr>
</tbody>
</table>

## COMMITTEE ON LIVESTOCK IDENTIFICATION

**Chair:** Bob R. Hillman, Austin, TX  
**Vice Chair:** Kevin D. Maher, Ames, IA

<table>
<thead>
<tr>
<th>Name</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>J Lee Alley</td>
<td>AL</td>
</tr>
<tr>
<td>Joan M. Arnoldi</td>
<td>WI</td>
</tr>
<tr>
<td>Carter Black</td>
<td>GA</td>
</tr>
<tr>
<td>John L. Braly</td>
<td>CO</td>
</tr>
<tr>
<td>Richard E. Breitmeyer</td>
<td>CA</td>
</tr>
<tr>
<td>Paul W. Brennan</td>
<td>IN</td>
</tr>
<tr>
<td>Becky L. Brewer-Walker, OK</td>
<td>CA</td>
</tr>
<tr>
<td>James T. Case</td>
<td>CA</td>
</tr>
<tr>
<td>Karen Conyngham</td>
<td>TX</td>
</tr>
<tr>
<td>Anita J. Edmondson</td>
<td>CA</td>
</tr>
<tr>
<td>James J. England</td>
<td>ID</td>
</tr>
<tr>
<td>J Amelita Facchiano</td>
<td>TX</td>
</tr>
<tr>
<td>Glenn K. Fischer</td>
<td>CA</td>
</tr>
<tr>
<td>Robert H. Foudraine</td>
<td>WI</td>
</tr>
<tr>
<td>W. Kent Fowler</td>
<td>CA</td>
</tr>
<tr>
<td>Tony G. Frazier</td>
<td>AL</td>
</tr>
<tr>
<td>L. Wayne Godwin</td>
<td>FL</td>
</tr>
<tr>
<td>Randy R. Green</td>
<td>DC</td>
</tr>
<tr>
<td>Jennifer L. Greiner</td>
<td>DC</td>
</tr>
<tr>
<td>Steven L. Halstead</td>
<td>MI</td>
</tr>
<tr>
<td>Jeffrey J. Hamer</td>
<td>NJ</td>
</tr>
<tr>
<td>Neil E. Hammerschmidt</td>
<td>MD</td>
</tr>
<tr>
<td>William L. Hartmann</td>
<td>MN</td>
</tr>
<tr>
<td>Greg N. Hawkins</td>
<td>TX</td>
</tr>
<tr>
<td>Bill Hawks</td>
<td>DC</td>
</tr>
<tr>
<td>E. Ray Hinshaw</td>
<td>AZ</td>
</tr>
<tr>
<td>Sam D. Holland</td>
<td>SD</td>
</tr>
<tr>
<td>Jodi A. Hoynoski</td>
<td>VT</td>
</tr>
<tr>
<td>Joseph N. Huff</td>
<td>CO</td>
</tr>
<tr>
<td>Jon G. Johnson</td>
<td>TX</td>
</tr>
<tr>
<td>Susan J. Keller</td>
<td>ND</td>
</tr>
<tr>
<td>Cleon V. Kimberling</td>
<td>CO</td>
</tr>
<tr>
<td>Terry L. Klick</td>
<td>OH</td>
</tr>
<tr>
<td>Ralph C. Knowles</td>
<td>FL</td>
</tr>
<tr>
<td>Maxwell A. Lea, Jr., LA</td>
<td>LA</td>
</tr>
<tr>
<td>James W. Leafstedt</td>
<td>SD</td>
</tr>
<tr>
<td>Jim R. Logan</td>
<td>WY</td>
</tr>
<tr>
<td>Laurent O’Gene Lollis</td>
<td>FL</td>
</tr>
<tr>
<td>Kelli S. Ludlum</td>
<td>DC</td>
</tr>
<tr>
<td>Amy W. Mann</td>
<td>VA</td>
</tr>
<tr>
<td>Brett D. Marsh</td>
<td>IN</td>
</tr>
<tr>
<td>David T. Marshall</td>
<td>NC</td>
</tr>
<tr>
<td>John Maulsby</td>
<td>CO</td>
</tr>
<tr>
<td>MaryAnn T. McBride</td>
<td>NC</td>
</tr>
<tr>
<td>Terry R. Menlove</td>
<td>UT</td>
</tr>
<tr>
<td>Douglas H. Metcalf</td>
<td>IN</td>
</tr>
<tr>
<td>Ernie A. Morales</td>
<td>TX</td>
</tr>
<tr>
<td>Henry I. Moreau</td>
<td>LA</td>
</tr>
</tbody>
</table>
COMMITTEE ON LIVESTOCK IDENTIFICATION (continued)

Jim Niewold, IL
Kenneth E. Olson, IL
Elizabeth J. Parker, DC
Boyd Parr, SC
Holly J. Pecetti, NV
John R. Ragan, MD
Valerie E. Ragan, MD
Jeannette M. Rankin, MT
Tom Ray, NC
Nancy J. Robinson, MO
Joe D. Ross, TX
Bill Sauble, NM
Shawn P. Schafer, ND
Charly Seale, TX
Mark J. Shaw, TX
Rick L. Sibbel, IA
Glenn N. Slack, KY
Bob Smith, OK

Glenn B. Smith, GA
Mark Spire, KS
Joe Starcher, WV
Robert C. Stout, KY
Scott Stuart, CO
Paul L. Sundberg, IA
Kerry Thompson, DC
Victor L. Velez, CA
Liz K. Wagstrom, IA
Rick Wahlert, CO
Patrick Webb, IA
Gary M. Weber, MD
Ross Wilson, TX
Josh L. Winegarner, TX
Cindy B. Wolf, MN
Taylor H. Woods, MO
John F. Wortman, Jr., NM

USAHA/AAVLD COMMITTEE ON NAHLN
Chair: Richard E. Breitmeyer, Sacramento, CA
Barbara E. Powers, Fort Collins, CO
Vice Chair: David T. Marshall, Raleigh, NC
Terry F. McElwain, Pullman, WA

Bruce L. Akey, NY
Bill Barton, ID
Tammy R. Beckham, TX
James T. Case, CA
Tony A. Caver, SC
Patrick G. Halibur, 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
George A. Teagarden, KS

COMMITTEE ON NOMINATIONS AND RESOLUTIONS
Chair: Bret D. Marsh, Indianapolis, IN

J Lee Alley, AL
Philip E. Bradshaw, IL
Jones W. Bryan, SC
Clarence L. Campbell, FL
Karen Conyngham, TX
Stephen K. Crawford, NH
Joe B. Finley, TX
Dave E. Fly, NM
Tony M. Forshey, OH
Bob Frost, CA
Thomas J. Hagerty, MN
Bob R. Hillman, TX
John F. Hudelson, CO
Maxwell A. Lea, Jr., LA

Donald H. Lein, NY
Michael R. Marshall, UT
Richard H. McCapes, CA
Lee M. Myers, GA
John R. Ragan, MD
Glenn B. Rea, OR
J C. Shook, PA
Robert C. Stout, KY
H. Wesley Towers, DE
Max A. Van Buskirk, PA
Richard D. Willer, HI
Larry L. Williams, NE
Ernest W. Zirkle, NJ
COMMITTEE ON PARASITIC DISEASES
Chair: Joseph L. Corn, Athens, GA
Vice Chair: J. Mathews Pound, Kerrville, TX

Bob H. Bokma, MD
Corrie C. Brown, GA
A. A. Cuthbertson, NV
Dee B. Ellis, TX
John E. George, TX
Chester A. Gipson, MD
Larry L. Hawkins, MO
Bob R. Hillman, TX
Thomas J. Holt, FL
Lee C. Jan, TX
Ralph C. Knowles, FL
Ulysses J. Lane, NC
Linda L. Logan, TX
Terry F. McElwain, WA

Daniel G. Mead, GA
Andrea Mikolon, CA
Ernie A. Morales, TX
Don L. Notter, KY
James E. Novy, TX
Jack L. Schlater, IA
Robert C. Stout, KY
Lee Ann Thomas, MD
Paul O. Ugstad, TX
Sherrilyn H. Wainwright, CO
Kenneth Waldrup, TX
James A. Watson, MS
John B. Welch, TX
David W. Winters, TX

COMMITTEE ON PHARMACEUTICALS
Chair: James R. Bradford, Kalamazoo, MI
Vice Chair: Liz K. Wagstrom, Des Moines, IA

Tom Burkgren, IA
Richard L. Dutton, NE
William H. Fales, MO
Jennifer L. Greiner, DC
Larry L. Hawkins, MO
Richard E. Hill, IA
Donald E. Hoenig, ME
Philip M. Maynard, AR
Patrick L. McDonough, NY

Valerie H. Patten, NY
M. Gatz Riddell, Jr., AL
A. David Scarfe, IL
Mike K. Senn, KS
Paul L. Sundberg, IA
R. Flint Taylor, NM
Deepanker Tewari, PA
Ellen M. Wilson, CA

COMMITTEE ON PROGRAM
Chair: Donald E. Hoenig, Belfast, ME
Vice Chair: Richard E. Breitmeyer, Sacramento, CA

Bruce L. Akey, NY
J Lee Alley, AL
James R. Bradford, MI
Charles E. Brown, II, WI
Kathleen M. Connell, WA
Joseph L. Corn, GA
Francois C. Elvinger, VA
Mark J. Engle, TN
J Amelita Facchiano, TX
John R. Fischer, GA
Bob Frost, CA
Andrew E. Goodwin, AR
Steven L. Halstead, MI
William L. Hartmann, MN
Bob R. Hillman, TX
Daniel E. LaFontaine, SC

James W. Leafstedt, SD
Howard D. Lehmkuhl, IA
Jim R. Logan, WY
Bret D. Marsh, IN
David T. Marshall, NC
Patrick L. McDonough, NY
Gavin Meerdink, IL
Michele A. Miller, FL
Lee M. Myers, GA
Bennie I. Osburn, CA
James E. Pearson, IA
Bob E. Pitts, GA
Glenn E. Plumb, WY
Keith Roehr, CO
John P. Sanders, WV
Andy L. Schwartz, TX
COMMITTEE ON THE PROGRAM (continued)
Marilyn M. Simunich, ID
John A. Smith, GA
Kevin R. Snekkvik, WA
Peter J. Timoney, KY
Alfonso Torres, NY
Richard D. Willer, HI
Cindy B. Wolf, MN

COMMITTEE ON PUBLIC HEALTH AND RABIES
Chair: John P. Sanders, Kearneysville, WV
Vice Chair: Nancy A. Frank, Lansing, MI
Helen M. Acland, PA
Sarah L. Babcock, DC
Sue K. Billings, KY
Shane A. Brookshire, GA
Charles S. Brown, NC
William H. Clay, DC
Joseph L. Corn, GA
Donald S. Davis, TX
Thomas J. DeLiberto, CO
Leslie A. Dierauf, WI
Michael R. Dunbar, CO
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
Sandra K. Norman, IN
Marguerite Pappaioanou, DC
Kristine R. Petrin, MN
Leon H. Russell, Jr., TX
Tom J. Sidwa, TX
Robert H. Singer, CA
Dennis Slate, NH
Paul L. Sundberg, IA
Belinda S. Thompson, NY
Liz K. Wagstrom, IA
Margaret A. Wild, CO
Ignacio T. dela Cruz, MP

COMMITTEE ON SALMONELLA
Chair: Patrick L. McDonough, Ithaca, NY
Vice Chair: Doug Waltman, Oakwood, GA
Deanna L. Baldwin, MD
Marilyn F. Balmer, MD
Richard E. Breitmeyer, CA
John G. Brown, GA
Max Brugh, GA
Jones W. Bryan, SC
Tony A. Caver, SC
Yung Fu Chang, NY
Stephen R. Collett, GA
Kevin G. Custer, IA
Sherrill Davison, PA
John I. Enck, Jr., PA
James M. Foppoli, HI
Rose Foster, MO
Tony G. Frazier, AL
Richard K. Gast, GA
Eric N. Gingerich, PA
Randy R. Green, DC
Jean Guard-Bouldin, GA
Chris S. Hayhow, KS
Ruud G. Hein, DE
Bill W. Hewat, AR
Tom Holder, MD
Heidi D. Kassenborg, MN
Hailu Kinde, CA
Dale C. Lauer, MN
Elizabeth A. Lautner, IA
Howard M. Magwire, MD
Jerry D. Maiers, KS
Edward T. Mallinson, MD
Beth E. Mamer, ID
Sarah J. Mason, NC
Philip M. Maynard, AR
James D. McKean, IA
COMMITTEE ON SALMONELLA (continued)
Hugo Medina, MN
David L. Meeker, VA
Donald S. Munro, PA
Thomas J. Myers, MD
Kakambi V. Nagaraja, MN
Steven H. Olson, MN
Robert L. Owen, PA
Stephen Pretanik, DC
John P. Sanders, WV
H. L. Shivaprasad, CA
Philip Stayer, MS
Bruce N. Stewart-Brown, MD
Hilary S. Thesmar, DC
H. Fred Troutt, IL
Bob Tully, KS
Liz K. Wagstrom, IA
Gary L. Waters, MT
Scott J. Wells, MN
Nora E. Wineland, CO
Ching-Ching Wu, IN

COMMITTEE ON SCRAPIE
Chair: Jim R. Logan, Cheyenne, WY
Vice Chair: Charles Palmer, Redding, CA
Deborah L. Brennan, MS
Shane A. Brookshire, GA
Beth W. Carlson, ND
John R. Clifford, DC
Thomas F. Conner, OH
Walter E. Cook, WY
Linda A. Detwiler, NJ
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
Burke L. Healey, NC
Susan J. Keller, ND
James W. Leafstedt, SD
Mary J. Lis, CT
Michael R. Marshall, UT
Cheryl A. Miller, IN
Alecia L. Naugle, MD
Brian V. Noland, ID
Kristine R. Petrini, MN
Jewell G. Plumley, WV
Michael R. Pruitt, OK
Paul E. Rodgers, CO
Joe D. Ross, TX
Larry A. Schuler, ND
Ben Smith, WA
Diane L. Sutton, MD
Lynn Anne Tesar, SD
Delwin D. Wilmot, NE
Nora E. Wineland, CO
Cindy B. Wolf, MN

COMMITTEE ON SHEEP AND GOATS
Chair: Cindy B. Wolf, St. Paul, MN
Vice Chair: Don P. Knowles, Pullman, 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
William F. Edmiston Jr. DVM, TX
Anthony M. Gallina, FL
Chester A. Gipson, MD
Jeffrey J. Hamer, NJ
Steven G. Hennager, IA
Joseph N. Huff, CO
Paul L. Jones, OR
Cleon V. Kimberling, CO
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
Michael W. Miller, CO
Ron C. Miller, PA
Alecia L. Naugle, MD
Charles Palmer, CA
COMMITTEE ON SHEEP AND GOATS (continued)

Kristine R. Petrini, MN
Michael R. Pruitt, OK
Sebastian Reist, NJ
Anette Rink, NV
Suelee Robbe-Austerman, IA
Paul E. Rodgers, CO
Gary S. Ross, PA
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
Ellen M. Wilson, CA
George O. Vinegar, MI
Nora E. Wineland, CO
David W. Winters, TX

COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY
AND OTHER AVIAN SPECIES

Chair: John A. Smith, Baldwin, GA
Vice Chair: Julie D. Helm, Columbia, SC

Bruce L. Akey, NY
Alex A. Ardans, CA
John K. Atwell, NC
George P. Badley, AR
Deanna L. Baldwin, MD
Marilyn F. Balmer, MD
Sue K. Billings, KY
Richard E. Breitmeyer, CA
Deborah L. Brennan, MS
Paul W. Brennan, IN
John G. Brown, GA
Max Brugh, GA
David M. Castellan, CA
Tony A. Caver, SC
Bruce R. Charlton, CA
Steven R. Clark, NC
Max E. Coats, Jr., TX
Stephen R. Collett, GA
Charles M. Corsiglia, CA
Debra C. Cox, MD
Sherrill Davison, PA
Thomas J. DeLiberto, CO
Richard L. Dutton, NE
Aly M. Fadly, MI
Tony M. Forshey, OH
Rose Foster, MO
Joseph P. Garvin, VA
Eric N. Gingerich, PA
Eric C. Gonder, NC
Randy R. Green, DC
James C. Grimm, TX
Scott J. Gustin, AR
Nancy E. Halpern, NJ
Jeffrey J. Hamer, NJ
William L. Hartmann, MN

Chris S. Hayhow, KS
Burke L. Healey, NC
Fidelis N. Hegngi, MD
Ruud G. Hein, DE
Michael E. Herrin, OK
Bill W. Hewat, AR
Donald E. Hoenig, ME
Frederic J. Hoerr, AL
Guy S. Hohenhaus, MD
Tom Holder, MD
Floyd P. Horn, MD
Dennis A. Hughes, NE
John P. Huntley, NY
Mark W. Jackwood, GA
Eric L. Jensen, AL
Hailu Kinde, CA
Daniel J. King, GA
Patrice N. Klein, MD
Stanley H. Kleven, GA
Spangler Klopp, DE
Paul E. Knepley, PA
Kyle Kohlhagen, IN
Michael D. Kopp, IN
Shannon M. Kozlowicz, NC
Ulysses J. Lane, NC
Hiram N. Lasher, DE
Dale C. Lauer, MN
Chang-Won Lee, OH
Randall L. Levings, IA
David J. Ligda, IN
Tsang Long Lin, IN
Jose A. Linares, TX
Mary J. Lis, CT
Martha A. Littlefield, LA
Howard M. Magwire, MD
COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY
AND OTHER AVIAN SPECIES (continued)

Jerry D. Maiers, KS
Edward T. Mallinson, MD
David T. Marshall, NC
Sarah J. Mason, NC
Philip M. Maynard, AR
MaryAnn T. McBride, NC
Robert G. McLean, CO
Andy McRee, NC
Hugo Medina, MN
Thomas R. Mickle, GA
Andrea Mikolon, CA
Andrea M. Miles, NC
Gay Y. Miller, IL
Ricardo A. Munoz, TX
Donald S. Munro, PA
Lee M. Myers, GA
Thomas J. Myers, MD
Steven H. Olson, MN
Robert L. Owen, PA
Kristy L. Pabilonia, CO
Mary J. Pantin-Jackwood, GA
James E. Pearson, IA
Jewell G. Plumley, WV
James T. Rankin, Jr., PA
Willie M. Reed, IN
Sebastian Reist, NJ
Donald L. Reynolds, IA
G. Donald Ritter, DE
Thomas J. Roffe, MT
A. Gregorio Rosales, AL
Michael L. Rybolt, DC
Y.M. Saif, OH
John P. Sanders, WV
David D. Schmitt, IA
Andy L. Schwartz, TX
Jack A. Shere, NC
H. L. Shivaprasad, CA
Shari C. Silverman, NJ
Marilyn M. Simunich, ID
Joe Starcher, WV
Bruce N. Stewart-Brown, MD
David L. Suarez, GA
Seth R. Swafford, CO
David E. Swayne, GA
Hilary S. Thesmar, DC
H. Wesley Towers, DE
Deoki N. Tripathy, IL
Susan C. Trock, NY
Patricia S. Wakenell, CA
Don W. Waldrip, GA
Doug Waltman, GA
Gary L. Waters, MT
James A. Watson, MS
Michael J. Wood, VT
Ching-Ching Wu, IN
Ernest W. Zirkle, NJ

COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
Chair: Mark J. Engle, Hendersonville, TN
Vice Chair: Harry Snelson, Burgaw, NC

Paul L. Anderson, MN
Marianne Ash, IN
John K. Atwell, NC
Lisa Becton, IA
Carter Black, GA
Philip E. Bradshaw, IL
Becky L. Brewer-Walker, OK
Corrie C. Brown, GA
Tom Burkgren, IA
Max E. Coats, Jr., TX
Jim E. Collins, MN
Fred L. Cunningham, MS
Gene A. Erickson, NC
James M. Foppoli, HI
Nancy A. Frank, MI
Michael J. Gilsdorf, MD
Thomas J. Hagerty, MN
Edwin C. Hahn, IL
Rod Hall, OK
Greg N. Hawkins, TX
Michael E. Herrin, OK
Sam D. Holland, SD
Ken Horton, TX
Elizabeth A. Lautner, IA
James W. Leafstedt, SD
Donald H. Lein, NY
Bret D. Marsh, IN
David T. Marshall, NC
Chuck E. Massengill, MO
MaryAnn T. McBride, NC
James D. McKeen, IA
Jim Niewold, IL
COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
(continued)

David A. Nolan, KS
Sandra K. Norman, IN
Gary D. Osweiler, IA
Kristine R. Petrini, MN
Tom Ray, NC
Kurt D. Rosso, MN
Mo D. Salman, CO
David D. Schmitt, IA
Jeff Schnell, IA
Rick L. Sibbel, IA

Dennis Slate, NH
James E. Stocker, NC
Paul L. Sundberg, IA
Paul O. Ugstad, TX
Patrick Webb, IA
Margaret A. Wild, CO
Larry L. Williams, NE
George O. Vinegar, MI
Nora E. Wineland, CO
Paul Yeske, MN

COMMITTEE ON TUBERCULOSIS
Chair: Kathleen M. Connell, Olympia, WA
Vice Chair: Michael S. VanderKlok, Grand Rapids, MI

John B. Adams, VA
Bruce L. Akey, NY
Wilbur B. Amand, PA
Robert D. Angus, ID
Matthew M. Ankeny, MI
Joan M. Arnold, WI
Daniel R. Baca, TX
Lowell R. Barnes, IN
Bill Barton, ID
Derek J. Belton, NZ
Warren Bluntzer, TX
Bob H. Bokma, MD
Steven R. Bolin, MI
Richard E. Breitmeyer, CA
Becky L. Brewer-Walker, OK
Shane A. Brookshire, GA
Charles S. Brown, NC
Charles E. Brown, II, WI
Scott W. Bugai, TX
Erika A. Butler, ND
Mike Chadlock, DC
John R. Clifford, DC
Thomas F. Conner, OH
Robert A. Cook, NY
Walter E. Cook, WY
Ed Corrigan, WI
Daniel T. Crowell, NV
Donald S. Davis, TX
Anthony A. DiMarco, ME
Jere L. Dick, MD
Leah C. Dorman, OH
Phil T. Durst, MI
Michael T. Dutcher, WI
Reta K. Dyess, TX
Anita J. Edmondson, CA

Dee B. Ellis, TX
Steven R. England, NM
Donald E. Evans, KS
John R. Fischer, GA
Dave E. Fly, NM
James M. Foppoli, HI
W. Kent Fowler, CA
Nancy A. Frank, MI
Bob Frost, CA
Tam Garland, DC
Michael J. Gilsdorf, MD
Linda Glaser, MN
Lawrence R. Green, WA
Velmar Green, MI
Jennifer L. Greiner, DC
Thomas J. Hagerty, MN
Steven L. Halstead, MI
Timothy J. Hanosh, NM
Beth Harris, IA
William L. Hartmann, MN
Burke L. Healey, NC
Del E. Hensel, CO
Bob R. Hillman, TX
E. Ray Hinshaw, AZ
Donald E. Hoenig, ME
Sam D. Holland, SD
James H. Hollis, IN
Fred Huebner, IA
Dennis A. Hughes, NE
John P. Huntley, NY
Billy G. Johnson, AR
Jon G. Johnson, TX
Shylo R. Johnson, CO
John B. Kaneene, MI
Susan J. Keller, ND
COMMITTEE ON TUBERCULOSIS (continued)

Karl G. Kinsel, TX
Terry L. Klick, OH
Paul Kohrs, WA
Carolyn Laughlin, OH
Steve K. Laughlin, OH
John C. Lawrence, ME
Maxwell A. Lea, Jr., LA
Rick Linscott, ME
Sharon L. Lombardi, NM
Konstantin Lyashchenko, NY
Stephen Maddox, CA
Phillip M. Mamer, ID
Daniel M. Manzanares, NM
Bret D. Marsh, IN
Chuck E. Massengill, MO
John Maulsby, CO
Robert M. Meyer, CO
Andrea Mikolon, CA
Susan K. Mikota, TN
Tom L. Mikulka, ME
Michael W. Miller, CO
Michele A. Miller, FL
Ernie A. Morales, TX
Henry I. Moreau, LA
Jeffrey T. Nelson, IA
Pauline Nol, CO
Dustin P. Oedekoven, SD
Bruno Oesch, CH
Kenneth E. Olson, IL
Kathleen A. Orloski, CO
Mitchell V. Palmer, IA
Janet B. Payeur, IA
Kristine R. Petroun, MN
Laurie S. Prasnicki, WI
Michael R. Pruitt, OK
Chris V. Rathe, WA
Anette Rink, NV
Nancy J. Robinson, MO
Earl Rogers, UT
Enrique A. Salinas, MEX
Mo D. Salman, CO
Bill Sauble, NM
Shawn P. Schafer, ND
Galen H. Schalk, MI
David D. Schmitt, IA
Dennis L. Schmitt, MO
Stephen M. Schmitt, MI
Larry A. Schuler, ND
Andy L. Schwartz, TX
Charly Seale, TX
Sarah B. S. Shapiro Hurley, WI
Anne L. Sherwood, WA
Les C. Stutzman, NY
R. Flint Taylor, NM
George A. Teagarden, KS
Cleve Tedford, TN
Tyler C. Thacker, IA
David Thain, NV
Charles O. Thoen, IA
Lee Ann Thomas, MD
Kenneth J. Throlson, ND
Paul O. Ugstad, TX
Ray Waters, IA
Scott J. Wells, MN
Diana L. Whipple, IA
Dave Whittlesey, CO
Richard D. Willer, HI
Brad L. Williams, TX
Delwin D. Wilmot, NE
Kyle W. Wilson, TN
Ross Wilson, TX
George O. Vinegar, MI
Josh L. Winegarner, TX
David W. Winters, TX
Jill Bryar Wood, TX
John F. Wortman, Jr., NM
Glen L. Zebarth, MN

COMMITTEE ON WILDLIFE DISEASES
Chair: John R. Fischer, Athens, GA
Vice Chair: Stephen M. Schmitt, Lansing, MI

Wilbur B. Amand, PA
Neil J. Anderson, MT
Robert D. Angus, ID
Marianne Ash, IN
Mark W. Atkinson, NV
Daniel R. Baca, TX
Scott C. Bender, AZ
Warren Bluntzer, TX
Charles S. Brown, NC
Kristina Brunjes, KY
Scott W. Bugai, TX
Erika A. Butler, ND
Robert A. Cook, NY
Walter E. Cook, WY
Joseph L. Corn, GA
Todd Cornish, WY
COMMITTEE ON WILDLIFE DISEASES (continued)

Daniel T. Crowell, NV
Donald S. Davis, TX
Thomas J. DeLiberto, CO
Leslie A. Dierauf, WI
Mark L. Drew, ID
Tim J. Feldner, MT
Bob Frost, CA
Frank D. Galey, WY
Robert F. Gerlach, AK
Paul Gibbs, FL
Colin M. Gillin, OR
Linda Glaser, MN
Dean Goeldner, MD
Greg N. Hawkins, TX
Donald E. Hoenig, ME
Sam D. Holland, SD
David L. Hunter, MT
Sherman W. Jack, MS
Kevin Keel, GA
Susan J. Keller, ND
Karl G. Kinsel, TX
Patrice N. Klein, MD
Terry L. Klick, OH
Terry J. Kreeger, WY
Jim R. Logan, WY
Phillip M. Mamer, ID
Kristin Mansfield, WA
Chuck E. Massengill, MO
Leslie A. McFarlane, UT
Robert G. McLean, CO
Daniel G. Mead, GA
Robert M. Meyer, CO
Michael W. Miller, CO
Michele A. Miller, FL
Pauline Nol, CO
Mitchell V. Palmer, IA
Glenn E. Plumb, WY
Michael R. Pruitt, OK
Thomas J. Roffe, MT
Emi K. Saito, CO
Shawn P. Schafer, ND
Sarah B. S. Shapiro Hurley, WI
Jonathan M. Sleeman, VA
David E. Stallknecht, GA
Joe Starcher, WV
Cynthia M. Tate, WY
Cleve Tedford, TN
Robert M. S. Temple, OH
Charles O. Thoen, IA
John "Brad" Thurston, IN
Kenneth Waldrup, TX
Diana L. Whipple, IA
Dave Whittlesey, CO
Margaret A. Wild, CO
Richard D. Willer, HI
David W. Winters, TX
Cindy B. Wolf, MN
Jill Bryar Wood, TX
Taylor H. Woods, MO
Scott D. Wright, WI
Martin A. Zaluski, MT
Glen L. Zebarth, MN
II. 2008 Annual Meeting Proceedings
   A. USAHA/AAVLD President’s Reception and Dinner
   B. USAHA/AAVLD Scientific Session
   C. USAHA Scientific Papers
   D. USAHA Membership Meeting
   E. Committee Business
      1. Committee Reports
      2. Time-Specific Scientific Papers
      3. Related Papers
   F. Other Reports
      1. 2008 USDA-ARS Research Review
Our members who have passed away since the 111th Annual Meeting. In their death we are again reminded of the shortness and uncertainty of human life and the frailty of the ties that bind us to this earth. We recall with deep affection their friendship and with great respect, their contributions to our common life. We lift up our hearts to God on their behalf that they may find rest in the other world to which they have been called.

Please bow for a moment of silent prayer.

Our deep sympathy and affectionate goodwill we express to their families. We pray that God may give them the blessing of peace.

Dr. Harold Chute, Maine
Dr. Brian Espe, Arkansas
Dr. Thomas C. Jones, New Mexico
Dr. Robert B. Mericle, Iowa
Dr. William E. Pace, Florida
Dr. Donald E. Pietz, Iowa
Dr. Robert L. Pyles, New Mexico
Dr. Arnold S. Rosenwald, California
Dr. Ernest E. Saulmon, Virginia
Dr. Arthur P. Schneider, Idaho
Dr. Daryl K. Thorpe, South Dakota
Dr. John L. Van Aken, Ohio
Dr. Ronald B. Wilson, Tennessee
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

PRESIDENT’S DINNER SPONSOR RECOGNITION

William B. Goodspeed
IDEXX Laboratories
On behalf of Commissioner of Agriculture Steve Troxler, welcome to North Carolina. We are currently in the midst of our annual State Fair in Raleigh, and Commissioner Troxler sends his regrets for being predisposed serving an event that by end will host close to 1,000,000 fairgoers at our state’s largest celebration of North Carolina agriculture.

I am delighted that you have again selected this wonderful facility in North Carolina for your Annual Meeting. I’d like to formally recognize Mr. Jim Leafstedt, President of the U.S. Animal Health Association, and Dr. Grant Maxie, President of the American Association of Veterinary Laboratory Diagnosticians. Thank you Mr. Leafstedt and Dr. Maxie and all of your organization’s members for your dedication to animal agriculture and food safety.

Agriculture is very important to the economic well being of North Carolina. Agriculture and agribusiness contribute over $60 billion to our state’s economy. However, our agriculture is in transition. The recent tobacco buyout means we are going through a few years of uncertainty as tobacco farmers work through the process of securing alternative ways to earn a living. Under those conditions, the importance of animal agriculture continues to expand and we expect the pace to accelerate.

I’m sure you are expecting me to recite our agricultural ranking for the major commodities. Please don’t be disappointed if I skip that information. Rather, I would prefer to mention our goals for the future.

North Carolina has the fourth most diversified agricultural industry in the country. Only California, Florida, and Texas are more diversified. We’d like to move up that list because more diversification means more
opportunities for our producers.

North Carolina hopes to maintain our current Class Free status in all major program livestock and poultry diseases, and continue to expand current efforts in the surveillance, biosecurity, and outreach areas in order to minimize disease issues as an obstacle to trade and commerce and competition in a global market.

We want to continue to elevate the role of veterinarians and our Veterinary Division into areas not traditionally recognized for the skills that this group of professionals has to offer; in particular to the food safety, public health, and emergency response arenas.

We want to expand our involvement with our state Wildlife Resources Commission and USDA's Wildlife Services in addressing our mutual interest in diseases such as Chronic Wasting Disease and Tuberculosis that can impact animal agriculture and wildlife resources.

We’d like to expand our role as a leader in technological capabilities regarding animal disease surveillance, disease response, mapping, and GIS technology. I would be remiss if I didn’t mention the formation of our Emergency Programs Division. We have assembled a group of highly motivated professionals who are dedicated to monitoring animal health and responding quickly in the event of natural and man-made disasters.

We would also like to continue to develop our collaborative relationship with our USDA-APHIS, university, and industry counterparts as we realize that a strong national program is dependent on a seamless cooperative relationship.

Thank you again for selecting North Carolina for your meeting. Our State Veterinarian, Dr. David Marshall, and his staff are ready to assist you in any way to ensure a successful event. Please don’t hesitate to call on them for assistance. I’m confident that the discussions and decisions made this week by this outstanding group of professionals will further strengthen and secure our nation’s animal agriculture heritage and abundant and wholesome food supply. Best wishes for a successful meeting and visit us again in the near future.
It has been a privilege to serve as the President of the American Association of Veterinary Laboratory Diagnosticians for the past year, and an honor to have been elected as only the second Canadian president in the Association’s 50-year history.

My thanks to the other members of our AAVLD Executive Committee - Drs. Barb Powers (immediate past-president), David Steffen (president-elect, and program chair), Gary Anderson (vice-president), and Sharon Hietala (secretary treasurer), and of course Vanessa Garrison (administrative assistant). We are also indebted to the various committees and their chairs for their efforts over the past year, particularly Dr. Terry McElwain and his accreditation committee. Also, my thanks go out to my understanding wife, Dr. Laura Smith-Maxie, who was also able to join me at this meeting.

How have we advanced the discipline of veterinary laboratory medicine in the past year? Highlights of AAVLD activities this past year:

- Formed with USAHA a Special Joint NAHLN committee.
- Appointed a new Laboratory Technology Committee.
- Began generating a White Paper on a microbial repository or registry.
- Held a Strategic Planning session in July that led to drafting of a Vision, Mission, and Goals for AAVLD, as the foundation for a marketing and business plan.
- Further to this activity, we will be discussing enhance administrative collaboration with USAHA at the joint Executive Committee meeting on Monday afternoon.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

- Communications have continued as one of our strong suits, with the Journal of Veterinary Diagnostic Investigation growing again this year.
- Conducted a veterinary laboratory workforce study that has documented the shortage of, and the need for training of, more diagnosticians.
- Completed the first round of audits of AAVLD-accredited laboratories under our new standard that is based on the OIE and ISO 17025 standards.

Thank you and my best wishes for the rest of the meeting.
USAHA PRESIDENT’S REMARKS

Rick Warren writes in his book, “The essence is not what we think, or do, or provide for others, but how much we give of ourselves.” The greatness of this organization is because of that willingness of so many of you to give of yourselves for this cause.

I thank you for giving me this opportunity to serve my chosen industry of livestock production. You have honored me not only with this responsibility, but your friendship and good will.

To say the last five years have been eventful and exciting would be an understatement. I hope history will judge we have made a positive difference that will serve the animal industry for time to come.

This is not a job you accomplish on your own, and I want to thank several who have made a difference.

First, our staff, Ben Richey, Kelly Janicek and Linda Ragland.

Secondly, the rest of the executive committee who have been capably ready to help in the past year.

I need to recognize the National Pork Board whom I have represented at USAHA for the past 20 years. Thank you for the support of my travel associated with this position. Thanks also to the many of you for being my friends and willing to share advice and encouragement along the way.

Lastly I want you all to recognize my wife, Melva, who has traveled thousands of miles with me and supported this part of my life. I’d also like you to recognize the rest of my family who have traveled here to see just what it is Grandpa has been doing for the last many years.

Best wishes to our future leadership and I promise my commitment to continued support of USAHA and its challenges.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

RECOGNITION OF MEETING SPONSORS

Allflex, USA
Applied Biosystems
BioMed Diagnostics
Bio-Rad Laboratories, Inc.
Bio-Trove
Colorado Serum Company
Computer Aid, Inc.
Enfer Diagnostics
Global Animal Management
GlobalVetLink, LC
Hydro-Pro Technologies, Inc.
IDEXX Laboratories
Key Scientific Products, Inc.
Merial
Prionics, USA
Qiagen, Inc.
Reindeer Owners and Breeders Association
Safe Supply of Affordable Food Everywhere
Trek Diagnostic Systems
VMRD
Ventana, a member of the Roche group
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 selected a most deserving candidate.

We are honored to have the 2008 Medal of Distinction join us this evening, though it has been a few years since he has attended a USAHA meeting. On behalf of the United States Animal Health Association, we are pleased to present the 2008 Medal of Distinction to Dr. John C. Shook.

John Shook graduated from the University of Pennsylvania’s School of Veterinary Medicine in 1948, after receiving his Bachelor’s Degree from Penn State University. Immediately after graduation, he was employed by the University of Pennsylvania’s School of Veterinary Medicine as an Associate Professor of Veterinary Science, a position he continued until mid-1952.

After leaving the University of Pennsylvania, Dr. Shook started a private veterinary practice in Pennsylvania. He continued in that role until becoming a Field Veterinarian of the Pennsylvania Department of Agriculture in 1957. Dr. Shook was named Chief of the Meat Hygiene Division in 1958. By 1964, Dr. Shook became Pennsylvania’s State Veterinarian and Director of the Department of Animal Industry.

In 1971, Dr. Shook moved to Maryland to serve as the Director of Maryland’s Diagnostic Laboratory. He became the Assistant Chief of Maryland’s Animal Health Division in 1979. He was appointed Maryland’s State Veterinarian and Chief of the Department of Animal Health Division in 1982. Dr. Shook served in that capacity until his retirement in 1986.

Dr. Shook first joined the United States Animal Health Association in 1962. He became an officer in 1969, when he was elected Third Vice President. He became USAHA’s 76th President in 1972.

During USAHA’s Annual Meeting in 1974, Dr. Shook was elected Treasurer and became the Association’s Treasurer and Secretary in 1979. The combination of these positions made Dr. Shook responsible for the day-to-day operation of USAHA. He effectively managed the Association’s activities in these two positions until his second retirement, in 1999.

For 37 years, Dr. Shook was an active member of USAHA. He was part of 49 different standing and special committees and working groups. He has chaired the Committee on Rabies, Animal Welfare, Tuberculosis, State and Federal Relations, and Resolutions and Nominations. He was

Dr. Shook also served as the USAHA Delegate to the American Association of Veterinary Laboratory Diagnosticians from 1975 until 1999. During these years as an Animal Health Official, he maintained membership in the American Veterinary Medical Association, the National Assembly of State Animal Health Officials, where he served as Secretary/Treasurer from 1979 to 1999; American Association of Veterinary Laboratory Diagnosticians, Pennsylvania Veterinary Medical Association; and the Maryland Veterinary Medical Association.

Dr. Shook’s leadership and dedication has been instrumental in strengthening the statue and renown of USAHA, and its efforts to accomplish its mission in the protection of animal and public health.

Dr. Shook is joined this evening by his son, Terry. Let us recognize Dr. John Shook as the 2008 Medal of Distinction honoree.

At this time I wish to introduce Dr. J Lee Alley to read congratulatory letters from Dr. Shook’s colleagues who were unable to join us this evening.

Dr. John Shook has been my friend since my first USAHA meeting in October 1984 in Fort Worth, Texas.

John had the capability of including newcomers to USAHA as if he had known them for a long time. He shared his knowledge and his expertise with everyone he worked with and he respected the positions of everyone including those he differed with while still maintaining his point of view.

His knowledge and history of the organization was essential to the operation of the USAHA. John served tirelessly and well for many years.

Dr. Shook is a worthy recipient of this award. My thanks to all he has done for the organization and for what he has done for me.

- Dr. Tom Hagerty, President, 1993.

Although it is not possible for me to be in Greensboro this week, I do want to let you know that I am thinking of you and to congratulate you on your having been selected as a recipient of the prestigious USAHA Medal of Distinction in 2008. There is no one more deserving of this honor than you, a man who untiringly gave of his time and labor on behalf of the betterment of our organization and its membership for more than two decades-- as its Secretary! I am extremely proud to be numbered among the many who have benefited thusly, as an associate and close friend.

I can well remember the late October, 1978, Sunday afternoon meeting in Buffalo, New York, between Bill Bendix, you and me in Bill’s suite. Bill told us that he would be stepping down as Secretary and we discussed what direction the Association might take in the future.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

It is history that the Executive Committee chose the proper course in hiring you as his successor, and you began your new term of office the following year – to the pleasure of the entire organization!

It goes without further saying – that you have been one of the stalwarts who has shaped the future of the United States Animal Health Association!!

My heartiest thanks and congratulations!!!

-Dr. Clarence L. Campbell, President, 1966

Dr. John C. Shook (r), pictured with his son Terry
Thank you. I am very happy to be here with you today and to have
the honor of presenting the APHIS Administrator’s award.
When we give an award like this one, and, in so doing, articulate
what is best within a profession, there is a side benefit: We also reinforce
the pride all of us can take in doing our jobs well.
If you look back at the past recipients of this award, you’ll notice
that they are all very different. They may be researchers or regulators,
educators or advisors, program directors or program developers. But
what all the past recipients of the APHIS Administrator’s award have
in common is that they have each made a significant difference in
protecting and improving the health of agricultural animals.
Tonight’s recipient is no exception. All of us at APHIS take special
pride in bestowing this honor upon Dr. Claude Barton for his 38 years of
service to the Agency.
Since his days at Auburn University, Claude has made it his mission
to excel. In addition to serving as President of Auburn’s senior class,
Claude was a member of Phi Zeta—the honor society of veterinary
medicine—and Alpha Zeta—the honor society of the agricultural field.
While he was still working towards his doctor of veterinary medicine,
Claude enlisted in the United States Air Force and embarked on a long
and distinguished military career. From serving as a veterinary officer in
the Air Force to joining the Air Force reserves and then the Tennessee Air
National Guard, Claude’s has served his country’s military for more than
25 years.
But he’s served his country in other ways too. I’m referring, of
course, to Claude’s extensive service to the veterinary field and to the
Nation’s agricultural animals.
For a number of years, Claude and his brother-in-law worked side by
side in a private veterinary practice, serving their community by caring for
its animals.
While I’m sorry that Tennessee lost one of its best when Claude left
his private practice, I’m proud to say that APHIS gained an exceptional
veterinarian and a committed advocate for protecting animal health.
As a veterinary medical officer and then a veterinary epidemiologist,
Claude demonstrated his tireless work ethic, his dedication to excellence,
and his superior medical abilities. Time and again he rose above and
beyond, providing service that exceeded expectations and improving the
health and well-being of the Nation’s agricultural animals.
After serving as a veterinary medical officer, Claude spent
many years at APHIS in key leadership roles, notably as a regional
epidemiologist and as the National Brucellosis Program Director.
During his time as the Brucellosis Program Director, Claude oversaw
APHIS’ efforts to eradicate brucellosis and to maintain effective and efficient surveillance for the diseases.

He also worked closely with Federal and State agencies to manage livestock, wild bison, and elk in the Greater Yellowstone Area and played a key role in training employees in the field and articulating program content to the livestock industry.

One of the ways Veterinary Services protects U.S. agriculture from foreign animal disease is by assisting foreign countries in developing veterinary infrastructure. Claude’s work with APHIS included important overseas assignments, as a negotiator, consultant, and trainer.

During his career, Claude found time to publish a number of research papers on brucellosis and tuberculosis.

And somehow, Claude also found the time to be a member of the U.S. Animal Health Association (USAHA), the National Association of Federal Veterinarians, the Tennessee Veterinary Medical Association, and the Alliance of Environmental Health Professionals, among other professional organizations. (One has to wonder how many other APHIS vets are members of the Alliance of Air National Guard Flight Surgeons.) Even more remarkable, Claude has acted in an executive capacity for each of these groups.

After his retirement from APHIS almost ten years ago, Claude continued his work in the field of animal health. Today he works closely with the Tennessee Department of Agriculture on their avian influenza program and serves as Vice-Chairman of USAHA’s Brucellosis Committee.

As you can see, Claude’s career in animal health is long and outstanding. His achievements and his leadership make him uniquely deserving of this award. But in honoring Claude today, we are also honoring him as a friend and a mentor.

Throughout his professional career, Claude has built strong relationships with his colleagues in the veterinary community and imparted his knowledge to them. Many of APHIS’ best and brightest have benefited from working with Claude and learning from his experience. He has supported them and guided them and he has always helped when called upon.

As I said before, the giving of this award honors not only the direct recipient. It brings honor to all of us, and to our safeguarding mission. So I hope you will share the pride I take in saying this:

Claude, thank you for all of your hard work over the years and for sharing your knowledge with so many of us in this room. You have made great contributions to animal health, to APHIS, and to your friends and colleagues. Please join me in congratulating Dr. Claude Barton, this year’s winner of the APHIS Administrator’s Award.
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Dr. Claude Barton (l) with Mr. Kevin Shea
II.A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

AAVLD AWARDS
Barbara Powers

AAVLD Lifetime Membership
Lifetime Membership is awarded to any member of the AAVLD who has made an outstanding contribution to veterinary diagnostic laboratory medicine or to the Association. This year we honor two individuals with this award:
  Dr. Ed Dubovi
  Dr. Rich Jacobsen

Graduate Student Awards
Best Oral Presentation was presented to Dr. Joshua Daniels.
Best Poster Presentation was presented to Dr. Jolade Sansi

AAVLD Travel-Trainee Awards are based on competitive applications from eligible graduate students. The following are the 2008 recipients:
  Dr. John Prickett
  Dr. Alexandre Loretti
  Dr. Charles Halsey, AAVLD Pathology Committee Award
  Dr. Grant Burcham, Toxicology, Award
  Dr. Charles Halsey, AAVLD/ACVP Award
  Dr. Aline Rodrigues, ACVP/AAVLD Award

Journal of Veterinary Diagnostic Investigation Manuscript Awards
Each year, AAVLD honors two papers judged to be the best of those published that year in the Journal of Veterinary Diagnostic Investigation (JVDI). The journal is an important centerpiece of AAVLD activity and recognition of those who excel in informing their colleagues about new knowledge is a strong endorsement of the scholarship of AAVLD members.
  Best Full Manuscript was presented to Dr. William C. Stoffregen et al., Agriculture Research Service/USDA, for “Diagnostic Characterization of a Feral Swine Herd Enzootically Infected with Brucella”
  Best Brief Communication was presented to Cathy A. Brown et. al., University of Georgia, for “Outbreaks of Renal Failure Associated with Melamine and Cyanuric Acid in Dogs and Cats in 2004 and 2007”

Pioneers in Virology Award
This award is presented to Dr. Robert Kahrs.

Distinguished Service Award
Dr. Leon Thacker, Purdue University, was presented the for over 25 years of dedicated service to AAVLD, especially for expertise in Quality Assurance.
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 2008 E. P. Pope Memorial Award was presented to Dr. Willie M. Reed on October 6, 2008 during the 51st Annual Meeting of the AAVLD in Greensboro, North Carolina. Dr. Reed received his DVM degree with high honors from Tuskegee University in 1978. He then performed residency training in pathology and graduate studies at Purdue University and received his PhD in Veterinary Pathology in 1982. He specialized in poultry diseases and is a charter Diplomate of the American College of Poultry Veterinarians. He is also a Diplomate of the American College of Veterinary Pathologists (ACVP). Dr. Reed remained at Purdue after receiving his PhD as an Assistant Professor and then Associate Professor of avian pathology, and eventually Assistant Director of the Animal Disease Diagnostic Laboratory. He was also the Chief of Avian Diseases. In 1990, Dr. Reed moved to Michigan State University and became Director of the Animal Health Diagnostic Laboratory and Professor of veterinary pathology. He became Acting Chairperson of the Michigan State University Department of Pathobiology and Diagnostic Investigation in 1997, and then in 2001, became the Chairperson until 2006. During his tenure at Michigan State University, he promoted the need for a new laboratory facility in the state and helped secure funding for the new laboratory that was finally built and dedicated in 2004. In 2007, Dr. Reed returned to Purdue University to become the Dean of the School of Veterinary Medicine.

Throughout Dr. Reed’s career, he has been extremely active in various state and national associations. In 1999 and 2000, he was President of the American Association of Avian Pathologists. From 1999 to 2003, he was President of the Tuskegee Veterinary Medical Alumni Association. In 2001, he was elected Vice President of the AAVLD and became President in 2003 and 2004. Prior to becoming President of AAVLD, he served on a number of AAVLD committees including the Accreditation Committee since 1998, the Long-Range Planning, Government Relations, and Pathology Committees, and continued on the Strategic Planning Committee. He was formerly Vice-Chair of the Transmissible Diseases of Poultry for the U.S. Animal Health Association. In addition, especially during his tenure as an officer of AAVLD, he worked closely with the USDA and was a member of
the Steering Committee of the National Animal Health Laboratory Network and the Centers for Disease Control and Prevention. He also served as the Liaison to the Food Emergency Response Network. He has been an invaluable advocate for the collaboration of state and federal resources to achieve common goals for animal health and veterinary diagnosticians, and has worked innumerable hours to advance the quality of science and diagnostics.

Dr. Reed has also served in other organizations. He was a member of the panel on euthanasia of the American Veterinary Medical Association (AVMA), has served on the AVMA Council on Research, and was elected chair of the Council in 2003. He currently serves as secretary of the American Association of Veterinary Medical Colleges and has been active in various committees of the ACVP, especially regarding education and training activities. Throughout his career, Dr. Reed has educated numbers of veterinary students and graduate students, engaged in research mostly regarding avian diseases, received numerous grants, given many presentations, and has had over 80 articles published in refereed scientific journals.

Dr. Reed has served the American Association of Veterinary Laboratory Diagnosticians in a tremendous fashion over the past years, and has contributed to the veterinary profession extensively. We are honored to present him with the 2008 E. P. Pope Award.

Dr. Willie Reed
The National Assembly Award is presented each year by the National Assembly of State Animal Health Officials (NASAHO). The award is presented to an individual that is active in the field of state regulatory veterinary medicine and animal health, and continues to make significant contributions to this nation’s animal health programs.

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, 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 the United States Animal Health Association, to name a few of his leadership positions.

Even as a student Dr. Marsh demonstrated leadership qualities and was recognized in his senior year by being awarded the Large Animal Proficiency Award. Close associates of Dr. Marsh inform me that early on in veterinary school his classmates recognized qualities that many of his associates continue to appreciate today by assigning him the nickname of “smooth.”

Dr. Marsh is held in high regard by federal and state government regulatory officials, academia, Ag industry leaders, and especially by his colleagues – members of the National Assembly.

It is with honor that I present the 2008 National Assembly Award to Dr. Bret Marsh.
Thank you Mr. Isley for that warm welcome to North Carolina. Once again, Greensboro is providing an excellent venue for our joint meeting and we are honored to be in your fine State.

It is rare opportunity for a State Veterinarian to provide a welcome to this prestigious audience on three separate occasions; but that is exactly what I am privileged to do this evening. It is truly my honor to welcome to California next year, all members and guests, to the 52nd Annual Meeting of AAVLD and the 113th Annual Meeting of the United States Animal Health Association.

Once again we invite you to the Town and Country Hotel in the beautiful city of San Diego. If you were with us in 1999 and 2003, you will remember the beautiful weather and the unique setting of the conference center that allows you to spend a significant amount of time outdoors. The average high temperature in San Diego during October is 74 degrees and the low 61, ideal for both work and play.

San Diego is an outstanding city, one I know you will enjoy. It is the second largest city in California and the seventh largest in the U.S. Downtown, and the beautiful San Diego Harbor are a short distance from our hotel and provide a spectacular setting for dining, shopping and sightseeing.

I encourage all of you to come next year and to consider combining this meeting with a family vacation; after all, by next year, our state budget may still be several billion dollars in the red – so please – come early, stay late and spend often! All kidding aside, it will truly be our honor to host all of you next year. See you in San Diego.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Section II
B. USAHA/AAVLD Scientific Session

Foot-and-Mouth Disease: If “When” Happened
Monday, October 27, 2008

Don Hoenig, USAHA Co-Chair
David Steffen, AAVLD Co-Chair

Alfonso Torres, Moderator
II.B. USAHA/AAVLD SCIENTIFIC SESSION

STATUS OF THE NATIONAL FMD RESPONSE PLAN: COORDINATION WITHIN THE ANIMAL HEALTH COMMUNITY

José R. Díez
Emergency Management and Diagnostics
USDA-APHIS-Veterinary Services

Robert Hooks
Department of Homeland Security

Summary
Foot-and-mouth disease (FMD) is an acute infectious viral disease that causes blisters, fever, and lameness in cloven-hoofed animals such as cattle and swine. It spreads rapidly and can cause tremendous production losses. In responding to an FMD outbreak in the U.S., both USDA and DHS will have important roles and responsibilities. A clear understanding of these roles and responsibilities will promote an effective and coordinated emergency response. The National Response Framework (NRF) is the primary mechanism for coordination of the U.S. Government (USG) roles in support of State level responses to terrorist attacks, major disasters, and other emergencies including outbreaks of agriculturally significant diseases like FMD. DHS and USDA have been working to clearly define the roles and responsibilities of each agency in the event of an outbreak of FMD. The results of these efforts will be presented as will an overview of the (draft) National FMD Response Plan.

DHS- OHA core responsibilities regarding food and animal health include:
- Serve as Secretary’s and FEMA Administrator’s principal medical (veterinary) advisor
- Coordinate DHS biodefense (including agrodefense) activities
- Ensure internal/external coordination of DHS’ medical (veterinary) preparedness activities
- Serve as primary DHS point of contact for Federal/State/local/tribal governments and the private sector on medical (veterinary) and public health issues

National Response Framework guides DHS’ response. DHS coordinates between and among Federal, State, local, and tribal governments and the private sector during an incident response. The response is built on the following doctrines:
- engaged partnerships;
- tiered response;
- scalable, flexible and adaptable operational capabilities;
- unity of effort through unified command; and
- readiness to act.

DHS coordination is focused on the coordination of DHS assets.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Coordination revolves on three tiers of escalating involvement:
- Tier 1: Situational awareness
- Tier 2: Facilitation of interagency support
- Tier 3: Coordination authority

DHS coordinates between and among Federal, State, local, and tribal governments and the private sector during an incident response. Mobilization of resources through DHS component engagement, FEMA, CBP, I&A, Centers of Excellence and NPPD are in place to mitigate impacts of incidents. OHA serves as food, agriculture and veterinary advisor to the DHS Secretary and FEMA Administrator and as an advocate for the Agriculture and Food Sector within DHS.

Table 1. Evolving emergency landscape

<table>
<thead>
<tr>
<th>TRADITIONAL INCIDENT LANDSCAPE</th>
<th>EVOLVING INCIDENT LANDSCAPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Versed in specific disasters in singular Agency/Department focal area such as program diseases</td>
<td>Versed in all-hazards including CBRNE</td>
</tr>
<tr>
<td>Efforts focused on accidental/ naturally occurring incidents</td>
<td>Expanded efforts to include intentional and catastrophic incidents</td>
</tr>
<tr>
<td>Skilled in localized incidents (contained outbreaks)</td>
<td>Skilled in wide-spread incident (lacking discrete incident site and multiple incident sites)</td>
</tr>
<tr>
<td>Able to respond with single agency capabilities</td>
<td>Events of magnitude that overwhelm individual agency and demand large scale interagency coordination</td>
</tr>
<tr>
<td>Limited media coverage of events</td>
<td>Aggressive incident media coverage requiring a joint information approach</td>
</tr>
<tr>
<td>Reactive surging of capabilities</td>
<td>Proactive inter-agency coordination of capabilities</td>
</tr>
</tbody>
</table>

RESPONSE ORIENTED

PREVENTION & PREPAREDNESS - MITIGATION & RECOVERY ORIENTED
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Table 2.

Incident Management Levels

<table>
<thead>
<tr>
<th>Tier 1</th>
<th>Tier 2</th>
<th>Tier 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>L/S Execution &amp; Lead</td>
<td>L/SEF Execution</td>
<td>US/IF Execution</td>
</tr>
<tr>
<td>Sector Facilitation</td>
<td>Sector Technical Lead and</td>
<td>Sector Technical Authority</td>
</tr>
<tr>
<td></td>
<td>Coordination</td>
<td>Lead</td>
</tr>
<tr>
<td>DHS Situational Awareness</td>
<td>DHS Facilitation of</td>
<td>DHS Coordination Authority</td>
</tr>
<tr>
<td></td>
<td>Interagency Preparations to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Support</td>
<td></td>
</tr>
</tbody>
</table>

- Sector emergency declaration
- Sector Secretary requests DHS support
- Presidential declaration

Table 3

Incident Management Level: Tier 1

- Screwworm detection
- Overturned livestock truck
- Tornado
- Exposure due to animal product import from country with active FMD outbreak
Federal coordination during an FMD incident: USDA

USDA Coordinates incident management teams, manages incident response, manages public relations, and takes measures to control and eradicate the disease for the Agriculture and Food Sector. USDA Provides on-scene support and response capability in collaboration with State partners. Provides interagency coordination during a Tier 2 incident necessary to respond to and control a disease event. USDA is the sector technical lead and coordinator during a Tier 2 incident. USDA operates the National Veterinary Services Laboratories (NVSL) for identifying and confirming FADs and provides Federal funding to cooperating States to control and eradicate animal diseases and pests.

Federal coordination during an FMD incident: DHS

DHS Coordinates Federal-to-Federal support as outlined in the NRF. DHS acquires, integrates, and reports interagency biosurveillance information to NBIC. This action facilitates awareness of interagency cross-domain (human, animal, plant) biosurveillance and response activities. DHS also coordinates between and among Federal, State, local, and tribal governments and the private sector during an incident response.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Status of National FMD Response Planning – Joint CONOPS

DHS and USDA are currently cooperatively engaged in development of a joint CONOPS that will:

- Address Federal/State/local partnerships
- Include Private Sector contribution
- Describe essential functions

Figure 1: USDA National FMD Response Plan: FAD-PReP


- FAD Preparedness and Response Plan (FAD-PReP)
- Summary National Response Plans (Disease specific)
- FAD-PReP Checklists
- FAD-PReP Standard Operating Procedures
- NVS Planning GUIDe for Federal, State and Local Authorities
- NVS Countermeasure Working Group Documents
- Industry Sector-Facility Manuals
- NAHEMS Guidelines
- Emergency Management Response System (EMRS)
II.B. USAHA/AAVLD SCIENTIFIC SESSION

THE NATIONAL ANIMAL HEALTH LABORATORY NETWORK (NAHLN): LABORATORY RESPONSE AND SURGE CAPACITY

Barbara M. Martin
National Veterinary Services Laboratories
USDA-APHIS-VS

The National Animal Health Laboratory Network (NAHLN) was established in 2002 to enhance the early detection of, response to, and recovery from animal health emergencies, including bioterrorist events, newly emerging diseases, and foreign animal disease outbreaks that threaten the Nation’s food supply and public health. The NAHLN is a collaborative effort between the United States Department of Agriculture (USDA) and the American Association of Veterinary Laboratory Diagnosticians (AAVLD). From an initial group of 12 laboratories the NAHLN has expanded to 54 laboratories in 45 states.

To ensure that the NAHLN mission can be achieved, there must be a high level of confidence in the quality of NAHLN laboratories and associated test results. The NAHLN founding principles were established to provide the guidelines necessary to accomplish the mission and include:

- Standardized, rapid diagnostic techniques
- A secure communications, alert, and reporting system
- Modern equipment and trained personnel
- Training, proficiency testing, and quality assurance programs
- Facilities that meet biocontainment and security requirements
- Scenario testing in support of regional and national training exercises

The NAHLN has strategically combined the infrastructure and expertise in the state and university veterinary diagnostic laboratories and the National Veterinary Services Laboratories to establish the animal health laboratory backbone of the United States emergency response and recovery program.

The presentation will focus on how NAHLN resources will be utilized in foreign animal disease investigations and during an outbreak of a foreign animal disease. Updates on the changes to VS Memo 580.4 (Procedures for the Investigation of Potential Foreign Animal Disease/Emerging Disease Incidents (FAD/EDI), scenario testing, and modeling will be provided.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

AN OVERVIEW OF THE DIAGNOSTIC AND MOLECULAR EPIDEMIOLOGY DATA FROM THE 2007 OUTBREAKS OF FOOT- AND-MOUTH DISEASE IN THE UK

Donald P. King*, Eleanor M. Conan, Scott M. Reid, Katja Ebert, Jemma Wadsworth, Nigel P. Ferris, Nick J. Knowles and David. J. Paton
Institute for Animal Health, United Kingdom

Daniel T. Haydon
University of Glasgow, United Kingdom

This presentation outlines the role played by molecular assays (for detection and characterization of foot-and-mouth disease virus: FMDV) to test samples arising from the outbreaks of FMD that occurred in the United Kingdom (UK) during 2007. These outbreaks were in two distinct phases (August and September) affecting eight separate, premises, situated in the north and west of the county of Surrey in southeast England.

In terms of virus detection, a laboratory-based real-time RT-PCR (rRT-PCR) was used to test a total of 3216 samples, including clinical material from all eight infected premises. Using a 96-well automated system to prepare nucleic acid template, it was possible to process up to 84 samples within 5 hours of submission, and up to 269 samples were tested per working day. A conservative cut-off was used to designate positive samples: during the outbreaks, the specificity of the assay was estimated to be 99.9 percent or 100 percent using negative control material or samples collected from negative premises respectively. For the first time, rRT-PCR results were used to recognize preclinical FMD in a cattle herd. Furthermore, during the later stages of the outbreaks, this rRT-PCR assay also supported an active surveillance program within high-risk cattle herds.

Nucleotide sequencing of viruses recovered from field cases also played an important role during these outbreaks. Within 24 hours of the first case, FMDV sequence data were obtained showing that the outbreak virus had a VP1 gene-identity of 99.8 percent to FMDV 0, British Field Sample 1860; a widely used reference and vaccine strain, originally derived from an outbreak of FMD in the UK in 1967. RT-PCR protocols were developed to allow the complete genomes of FMDV to be sequenced within 24-48 hours of sample receipt for the subsequent cases. These data were used to determine the most likely source of the outbreak and to track FMDV movement from farm-to-farm in real-time, assisting the field epidemiological investigations.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Key conclusions:

- In contrast to the 2001 epidemic, diagnostic support for the 2007 outbreaks was characterized by the use of rRT-PCR as a principal tool for decision making.
- Full-genome sequencing conducted in real-time identified the initial and intermediate sources of these outbreaks, providing valuable support to field epidemiological investigations.
NEW FOOT-AND-MOUTH DISEASE VACCINE AND COUNTERMEASURE RESEARCH

Luis L. Rodriguez* and Marvin J. Grubman
Foreign Animal Disease Research Unit (FADRU)
USDA-ARS

Foot-and-mouth disease (FMD) is a highly contagious and economically devastating disease of cloven-hoofed animals that can spread rapidly in unprotected animal populations. Outbreaks of FMD have serious consequences on the economies of affected countries because of restrictions in trade and also due to loss of animals and animal productivity. Currently licensed FMD vaccines consist of inactivated whole virus antigens that require the growth of large volumes of infectious virus in expensive bio-containment facilities for manufacturing. Although effective, this vaccine has several shortcomings including the risk of live virus escaping from manufacturing facilities (hence its production is not allowed in the U.S.), lack of cross protection (7 serotypes and many virus subtypes circulating around the world), short duration of immunity (6 months), short shelf life of the formulated product requiring “banking” of multiple frozen antigen concentrates, and difficulty to distinguish vaccinated from infected animals. Scientists at Agricultural Research Service (ARS)-Plum Island are carrying out basic and applied research on improving current vaccine production platforms utilizing rationally designed foot-and-mouth disease viruses (FMDV) that are not transmissible to animals but grow well in cell cultures and when inactivated are as effective as current vaccines. Furthermore, this platform contains genetic markers that allow easily differentiation of infected from vaccinated animals (DIVA) utilizing serological tests. In addition, ARS scientists have carried out research resulting in the first molecular vaccine that is effective in cattle and swine. This novel vaccine is based on a defective human adenovirus 5 vector (Ad5) that is innocuous to man and animals but delivers the genetic information of FMD virus proteins relevant to induce protection in animals. This novel vaccine prevents disease and transmission in cattle and swine with one dose in seven days post vaccination and represents the first major breakthrough innovation in FMD vaccinology since oil-adjuvant vaccines were introduced in the 1960’s. This experimental vaccine is now under advanced development by the Department of Homeland Security (DHS) in collaboration with ARS and private industry and this vaccine is expected to be the first licensed molecular vaccine for FMD. These two vaccine approaches described above address many, but not all, of the gaps of current FMD vaccines. Major challenges remain such as improving cross protection among FMDV serotypes, duration of immunity, vaccine stability, onset of immunity, and prevention of the carrier state in vaccinated animals. Some promising research by ARS has also shown that biotherapeutics such as interferon delivered utilizing the Ad5 vector...
II.B. USAHA/AAVLD SCIENTIFIC SESSION

can induce protection against FMDV infection in swine as early as 24 h post vaccination. However, a similar approach does not fully protect cattle. These challenges require significant increased investment in basic and applied research not only in vaccine development but also in better understanding disease mechanisms and the protective immune response against FMDV. We believe that the combination of molecular vaccines and biotherapeutics provide for the first time feasible tools to rapidly stop and control FMD outbreaks and allow for rapid recovery and return to trade.
II.B. USAHA-AAVLD SCIENTIFIC SESSION

AGRICULTURE DEFENSE COUNTERMEASURES

Tam Garland
Science and Technology Directorate
Department of Homeland Security

The Department of Homeland Security’s (DHS) agricultural security program objectives are focused on the expansion of current and next generation agricultural biological countermeasures for foreign animal diseases (FAD) and zoonotic diseases. The objectives include:

- **Foot-and-mouth disease (FMD)**
  - new serotype- and subtype-specific, marked, molecular vaccines
  - novel, broad acting biotherapeutics for rapid, short-lived protection against clinical disease
  - enhanced characterization of current vaccine antigens in North American FMD vaccine bank
- **Rift Valley fever (zoonotic)**
  - New, live attenuated vaccines
- **Initiation of biotherapeutics basic research program**

The primary impact is on the National Veterinary Stockpile (NVS) emergency preparedness against foreign animal diseases. The goal is to achieve:

- licensed products available for specific high priority FAD pathogens
- capability for rapid (24 hr.) deployment
- capability to use countermeasures in ‘vaccinate to live’ as an outbreak control strategy option.

The overarching transition strategy is to identify and develop vaccine and biotherapeutic technology platforms designed to meet desired product profiles. DHS will foster development partnership with industry for regulatory licensure (USDA-CVB) to meet end user needs of NVS. A technology transfer agreement will need to be in place with NVS.

The technical approach to FMD vaccines includes first generation FMD molecular vaccines, with a goal to identify FMD live virus-free vaccine platform compatible with ‘must have’ product profile attributes:

- single dose, protection in 1 week,
- DIVA,
- U.S. manufacturer,
- deployable in 24 hrs

This will allow the application of a platform to drive vaccines for 1st subtype through development and product licensure – establishes roadmaps for subsequent candidates. In parallel, DHS will apply platform to conduct pivotal go/no go efficacy studies on 2nd, 3rd, 4th, 5th, etc.
vaccine serotypes/subtypes to build deep pipeline. That will be followed by active scientific and product development partnership between DHS S&T and industry from first step (vaccine design) to last step (product licensure).

FMD vaccine candidate product profile for conditional license can be characterized by the following components:

- Replication deficient human adenoviral platform
- Prevents FMDV subtype specific clinical disease
- Provides onset of protective immunity at 1 week post-vaccination following single vaccination
- 2-ml dose, administered IM (nonadjuvanted)
- DIVA compatible (e.g., Ceditest® FMDV-NS ELISA)
- Frozen liquid (-90°C to -10°C)
- Ready to use
- Intended for procurement by USDA-APHIS for the National Veterinary Stockpile

Adenovector(Ad)-FMD vaccine candidate safety has been addressed. Following 2 mL IM dose, there has been 0% (0/82) incidence of adverse events (injection site reactions, febrile response) up to 72 hours post-immunization. In all Ad-FMD vaccine studies conducted to date (several serotypes), no adverse events have been observed in Ad-FMD vaccinated animals (>200 cattle). Cattle are non permissive hosts for human adenovirus serotypes. There is 0% seroconversion (0/22) of sham-vaccinates that were co-mingled with Ad-FMD vaccinates for 21 days post-vaccination. In all Ad-FMD vaccine studies conducted to date (several serotypes), no sham-vaccinated animal co-mingled with Ad vector vaccinates has seroconverted to the Ad-vaccine vector (>50 cattle). Collectively, results to date support no serological evidence of vaccine shed/spread.

In order to characterize current generation inactivated FMD vaccines, the following process takes place:

- Bulk, antigen concentrates are currently purchased and held by the North American FMD Vaccine Bank (APHIS – PIADC).
- Off-shelf, ready-to-use vaccines produced by foreign commercial manufacturers and licensed for permittee importation
- Test final formulated vaccine for efficacy at 7 days post-vaccination (single dose)
- Benchmark against 1st generation molecular vaccines.

FMD Biotherapeutics is a second component of the technical approach. For this, we must identify FMD biotherapeutic platform compatible with ‘must have’ product profile attributes (single dose, rapid protection - 18 hrs. to 7 days, U.S. manufacturer, deployable in 24 hrs).
II.B. USAHA/AAVLD SCIENTIFIC SESSION

This includes:

- Compatible with 1st generation FMD vaccine platform
- Focus on biological-based (CVB regulated) vs. antiviral drugs (FDA regulated)

We also apply basic research-focused approaches (swine, cattle) to address current gaps, and can then apply similar development/regulatory model being used successfully for 1st generation FMD molecular vaccines. This includes two sectors, the adenovector platform and other viral-vectored platforms.

The technical approach taken with Rift Valley fever includes modified-live vaccines, such as MP-12 (select agent exempt), clone 13 and rationally-designed, gene deleted (reverse genetic vaccine platform). Viral-vectored vaccines include attenuated vaccinia-vectored.

Interagency coordination is an important part of the success. The roles of agencies involved is outlined as follows.

USDA-ARS
- FMD
  - Scientific participation in GenVec Research and Development Meetings
  - IAA SOW focused on swine biotherapeutics – standardized model and lead candidate confirmation
  - IAA SOW focused on swine and cattle innate immune cells – biotherapeutic lead candidate discovery
  - Scientific collaboration on back-up vaccine and biotherapeutic platform
- RVF
  - IAA SOW focused on enhanced characterization of two lead vaccine candidates (MP-12, Clone 13)

USDA-APHIS
- Sample testing from DHS clinical studies to aid development of a FMD DIVA (differentiate infected from vaccinated animal) test for next generation molecular FMD vaccines
- Coordination of testing FMD vaccine antigen concentrates in NAFMDVB and commercial FMD vaccines
- Semi-annual meeting with National Veterinary Stockpile for progress update on FMD molecular vaccine program.
- Implementation of short and long-term recommendations endorsed by National Veterinary Stockpile Technical Steering Committee for FMD and RVF programs
- Coordination with CVB regarding vaccines
II.B. USAHA/AAVLD SCIENTIFIC SESSION

USDA (ARS, APHIS, International Services)

- Integrated teams to assess foreign opportunities (RVF-South Africa; African Swine Fever virus – Republic of Georgia)

FMD Countermeasure Program continually faces residual risk. The next generation FMD molecular vaccines will require us to balance funding, resources and timelines for delivery of full development vaccine candidate versus vaccine candidates further back in pipeline. Additionally, it will be vital to maintain focus on full development activities and leverage findings to accelerate progress of vaccine candidates further back in pipeline.

To address biotherapeutics, we must determine if there is technical do-ability (can the science work) and resources. Currently, funding USDA-ARS to standardize swine challenge model; lead candidate confirmation as well as new lead candidate seeking will be important.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

FMD ERADICATION EFFORTS IN SOUTH AMERICA, CURRENT STATUS OF THE DISEASE: VACCINATION STRATEGIES IN COUNTRIES THAT ARE VACCINATING

David Ashford
International Services, Brazil
USDA-APHIS

Disease overview. FMD can for weeks in water and on surfaces, depending on temperature and humidity. For example, it can survive up to 168 days in manure, 200 days in hay and 60 days in water. It withstands pH 5-12 and is transmitted by direct contact and aerosol.

Within 24-72 hours of FMD infection, it spreads to several tissues/ organs and viremia starts. Within 72-96 hours clinical signs are present, including fever and vesicles in mouth, feet and udder. At 120 hours the vesicles erode, viremia goes down and antibodies go up. On the 10th day lesions heal, and by the 15th day the virus is seldom found in organs, except oro-pharynx. Carriers can exist and are defined as animals with persistence beyond one month, though they are not a source of outbreaks.

There are seven different Foot-and-Mouth Virus Serotypes: A, O, C, Asia 1, SAT-1, SAT-2 and SAT-3. There is no cross protection among serotypes. The FMD vaccine is a crude vaccine made by separation of the capsid antigens from the nonstructural protein (NSP) antigens. It was defined in the late 1970s and early 1980s at PANAFTOSA-PAHO. It can contain multiple subtypes in one vaccine.

Why eradicate. FMD was targeted for hemispheric eradication in 1987. But with a mortality of less than 1 percent, why do we care? Production loss is very high; for the dairy industry it’s in the neighborhood of 70 percent to 90 percent reduction in milk production, and potentially a lost year of productivity per dairy cow. For the beef industry, there are massive production impacts through effects on growth and reproduction. Combined with FMD’s nearly 100 percent attack rate, this means the disease is one of the most costly to bovine production systems.

It is the primary disease of concern for international trade in animal products. Trade restrictions for countries with endemic FMD include potentially millions of dollars of lost exports, as well as a large public welfare impact. The UK’s outbreak cost $20 billion and estimated costs for a U.S. outbreak are up to $50 billion.

Globalization of markets is another important reason to eradicate FMD. South America is and will be the largest exporter of animal protein in the world. Brazil is currently number one in exportation of beef, chicken and pork, with 41 percent of the world beef export market in 2005.

Eradication strategy. There are four pillars to the eradication strategy: 1) vaccination twice per year, matching the serotype and
II.B. USAHA/AAVLD SCIENTIFIC SESSION

reaching as close to 100%, 2) maintenance of effective surveillance, reporting and response to vesicular disease, 3) removal of FMD confirmed and/or exposed livestock, and 4) control of movement of diseased or potentially incubating animals (or animal products). There are three remaining areas of focus for eradication: Ecuador, Venezuela and the Chaco Region.

**History of Elimination in South America.** PANAFTOSA was created in 1951 and the first projects with organized activities occurred in the 1960s. There were substantial advances in the vaccine and its coverage from the 1960s to the 1980s. During the 1980s the National Programs of Control and Eradication in weakened in some counties. In 1987 the Hemispheric Plan for Eradication (PHEFA) was signed. During the 1990s incidence was reduced to tens of outbreaks per year. By the early 2000s the program was fatigued, and so the GIEFA was formed to be the Inter-American Working Group for the Eradication of FMD. It consists of 12 members, six COHEFA’s regions, plus four members: Paraguay, Bolivia, Ecuador and Venezuela. GIEFA was formed to strengthen private-public support of eradications.

**GIEFA.** The first task was to evaluate the gaps in the three areas of continued concern and determine funds needed to fill the gaps. The original budget called for the U.S. to contribute $48,323,000 for a five-year project or $9,665,000/year. Such resources should be complementary to each country’s FMD eradication project. Resources from donors or sponsors are to supplement federal and producer contributions. Donors or sponsors can choose their partners to receive and to manage funds. Progress in eradication of FMD depends on international cooperative assistance.

**USDA-APHIS Collaboration within the Hemispheric Eradication Program.** The USDA-APHIS team consists of nine professionals working with the national veterinary programs. The team works together to create an annual APHIS South American plan for supporting the FMD Eradication, including coordinating with international organizations in planning and reducing duplication of effort and increasing socio-political support and resources. APHIS has been working in Colombia for 30 years, Ecuador and Venezuela for 5 years, Bolivia for 7 years and Paraguay for 1 year.

In Colombia in 2007, we strengthened 16 surveillance units and offered support for the investigation of 400 suspect vesicular disease outbreaks, purchased real time PCR, and supported the APHIS trade team visit to evaluate the northern zone for export. In Bolivia from 2001 – 2007, we supported the initial project of eradication of FMD in the Beni y Pando with $3 million. In 2007 we initiated a project to strengthen the services in the Chaco Region, sent personnel to assist in the outbreak investigation and containment, completed a national survey for viral circulation, completed a study of eco-production and purchased rapid PCR. In Ecuador in 2007, we hired a Program Co-director, supported the
II.B. USAHA/AAVLD SCIENTIFIC SESSION

Vaccination Campaigns, initiated a pilot program in the Northern Frontier Zone with Columbia and Southern Frontier with Peru, and strengthened the Vet Surveillance at Trade Fairs. In Venezuela, we've had 5 years of collaboration with the private and public sectors, including a pilot project in the frontier region with Columbia, strengthening seven veterinary Surveillance units, GPS training, and established vaccine bank. In Paraguay, we started the first successful APHIS project in 2007, which includes the construction and equipping of three veterinary offices in the Chaco, GPS machines and training, and participation in a full-scale FMD exercise.

**USDA Activities on FMD in South America.** In the last 30 years we have invested about $60 million (U.S.D.) in eradication. We work through bilateral agreements and strong strategic alliances with IICA, FAO, OIE, PANAFTOSA. We work through the National Programs only. The fundamental strategy is to leverage a relatively small investment into more funds and social support.

**Summary.** FMD remains a costly disease for the world and a high potential cost for countries free without vaccination. There are 7 subtypes of FMD virus, immunity is subtype specific, and vaccination strategies must consider this factor. The existing vaccine is based on a whole viral (crude) antigen and it has proven effective in the eradication of FMD. The hemispheric eradication program has made great progress and vaccination (twice a year of bovines only) is the keystone of the current program. Challenges remain in Ecuador, Venezuela and the Chaco. GIEFA with the help of the Hemispheric Center of Excellence and Secretariat (PANAFTOSA) works to increase private sector support, define gaps, and attract resources. APHIS has worked for 30 years in supporting the eradication effort and supports the PHEFA and GIEFA efforts. International assistance must be well coordinated with a single working group and GIEFA must be supported. Sociopolitical commitment to the eradication of Foot-and-Mouth Disease remains our greatest challenge and is critical to success. This is the most difficult phase of the eradication program. We need your support and assistance.
The dairy industry is diverse, with configuration varying greatly from California to Wisconsin. On a state level, progress has been good in accepting the proposed standardized biosecurity protocol and vaccination strategies. PCR bulk tank milk sample tests, tank filters and vaccines offer a promising look toward the future, but farms are probably no more secure today than they were in 2001. However, farmers are more educated and the time to effect biosecurity measures is shorter.

**Challenges.** Of all species, dairy has greatest need to move product. But during an outbreak the political climate will be pushed by the media, USDA and State Officials may not be in agreement as to whether milk will be able to move in FMD-negative areas. Severe weather may add additional challenges to biosecurity efforts, such as the need to power wash equipment during the winter months. Eradication also comes with the challenges of milk and mortality disposal, as well as the lost production.

**Future steps.** Our next steps should include: continuing to work on eradication issues; planning based on latest technologies; capitalizing on industry expertise and interest; utilizing industry leaders to gain industry buy-in and implementation; and, utilizing state-led regional groups to facilitate understanding of industry interstate movement. The “Dairy Industry Biosecurity Train the Trainer Program” has also been developed for the dairy industry by the dairy industry.

On a state level, three stages of preparation exist: 1) standardized biosecurity, 2) proof of status testing, and 3) vaccination.

**Conclusions.** Ultimately, our response to an FMD outbreak needs to focus on “business continuity,” getting our producers and industry back in the business of feeding the nation and the world. Most dairy farmers would lose a whole year’s net profit after only 5-13 days of a stop movement order during an FMD outbreak due to the costs associated with dumping milk and still caring for the cows. It is critical to get FMD tested-free farms moving milk again. However, it will be hard as officials will be scared to allow movements if the disease is spreading.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

ISSUES FOR THE BEEF INDUSTRY IN A FOOT AND MOUTH DISEASE OUTBREAK

Elizabeth Parker
National Cattlemen’s Beef Association

America’s cattle producers have been concerned about and working on FMD eradication for decades. They have identified the following as areas to work on in the short term: early detection and surveillance; stop movement orders; allow slaughter for recovery of salvage value; laboratory capacity and capability; depopulation and disposal; vaccines as an alternative to depopulation; indemnity procedures; business continuity; consumer confidence and trading partners’ confidence; and, communication and coordination.

Training. Private practitioners and producers need to be aware of the clinical signs of the disease. It sounds easy, but it takes a lot of work and education to be consistent. It also requires adequate numbers of foreign animal disease diagnosticians to be trained and be available. It will require more capacity than we currently have at Plum Island’s training courses. Our goal is to not only increase the training of government vets in those courses, but also to allow for private practitioners to be trained.

Testing. We need to use epidemiological guidelines and strategies to identify the animals to be tested and determine the frequency of surveillance within and outside the zones formed. We need to explore the use of pen-side testing. This could be used during initial outbreaks to identify additional premises. Currently, there is no definitive USDA guidelines for pen-side testing and they have not been validated in the U.S. The sensitivity and specificity of the pen-side tests need to be verified. Policy should define how and when pen-side testing should be used. Regionally, this type of test could allow resources to be freed up and decrease the area of the stop movement order.

Movement. FMD response plan to should clarify the roles of the different entities making decisions related to stop movement orders and quarantine zones, especially when it comes to interstate and intrastate movement. We also need really good coordination at the federal, state and local levels, as well as improved communication with trucking companies, packing plants and renderers. We also need predetermined feed availability and delivery mechanisms for animals that were stopped on the road. Facilities also need to have necessary supplies and feed on hand to survive the five days that they would likely be shut down. We also need to determine the amount of disinfectant needed to keep commodity trucks moving. There also needs to be plans in place regarding how to restart movement through a permitting process. It must be systematic, science based, practical and manageable.

Laboratories. We need enough approved laboritories in the network
to allow for increased volume in testing. They also need to be scattered around the country so that samples don’t have to be shipped long distances, which saves time and also helps alleviate potential biosecurity concerns. As events come back under control, there needs to also be a plan for recovery testing and monitoring capability.

**Depopulation and disposal.** Logistically, these are the biggest hurdles due to the potential volume of animals involved. Technology limitations, manpower and environmental issues must be considered. We need to establish realistic assumptions for the time need for depopulation and disposal. The 72-hour to 96-hour goal is just not feasible at this point, and we need to come to reality on that. We need to consider unconventional forms of euthanasia, and have a multifaceted approach to disposal: rendering, landfill burial, incineration. We need to really push the research and technology in the area of disposal.

**Vaccination.** Vaccination needs to be an alternative to depopulation, but much more research is needed, requiring more money and a concerted effort over the long haul. It is still a challenge for us to be able to make enough vaccines quick enough. A process for making vaccination decisions is needed: when to vaccinate, what animals to vaccinate, policy discussions on vaccinate to kill versus vaccinate to slaughter. We must also consider the trade implications of vaccination.

**Business continuity.** We need to return to normal as quickly as possible. Our government must continually communicate without customers and trading partners, informing them of what is going on and reassuring them. Industry must prepare public service announcements in advance that are specific to FMD.

**Coordination and communication.** Information sharing is a challenge, but coordination and communication are key. There is no room for jurisdictional struggles. Our goals are to quickly diagnose, contain, eradicate and move on as quickly as possible.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

ISSUES FACING THE SWINE INDUSTRY

Patrick Webb
National Pork Board

Introduction

The introduction of Foot and Mouth Disease (FMD) into the U.S. swine herd will have an immediate and drastic effect due to the loss of all export markets for pork and pork products. In addition, aggressive disease control measures enacted to prevent further spread of the disease will affect the movement of live pigs, fresh pork and pork products within the United States.

The adage that all disasters start local and end local identifies the starting point for response activities on which the maintenance or rapid resumption of commerce and international trade will be built. The ability for animal health authorities and industry to mitigate an outbreak relates to the robustness of the animal health infrastructure that has been built. This forces the question, is the infrastructure today where it needs to be to support disease response and the resumption of commerce and trade?

Disease Response Issues

Rapid detection and response to an FMD event is critical to limiting the scope of an outbreak and supporting efforts to maintain or rapidly reestablish business continuity of pork producers during an outbreak. During an event, industry must work with animal health authorities to accomplish the following actions to contain, control and eradicate an incursion.

Action #1: Set up the appropriate control area and surveillance zone around the infected farm to define the area in which disease control measures and resources should be targeted.

Action #2: Identify and classify farms with susceptible species and identify industry assets in the control area.

Action #3: Communicate disease control measures, regulatory information, disease identification and reporting pathways, and biological risk management protocols (biosecurity) to producers for implementation.

Action #4: Increase targeted surveillance in affected areas to identify new cases of disease, prove a disease is contained and to prove disease freedom in unaffected areas.

The pork industry’s primary concerns in this situation are supporting actions that facilitate producer awareness, rapid disease diagnosis, containment and control in affected areas and stepping up surveillance programming to quickly identify free and affected areas. The ability to facilitate this is directly related to the ability to maintain and/or re-establish business and eventually international trade.
Domestic Commerce Issues

The pork industry today is an industry on wheels. The predominance of multisite production has made moving swine a necessity and those movements are carefully coordinated to insure delivered feed is utilized, facilities are cleaned, disinfected and ready for the next incoming group. Conservative estimates place on average over 624,000 pigs on the road moving through the production chain on any given day. Any event that disrupts that movement for a prolonged period of time can have significant ramifications. An outbreak of FMD would represent such an event. While it is common to focus on the importance of export markets, the maintenance or resumption of domestic commerce in free areas for swine, pork and pork products represent a crucial first step in that process. If interstate commerce cannot be reestablished then what hope is there for promoting the reestablishment of international trade?

More importantly, intrastate and interstate commerce in free areas are critical to business continuity for pork producers by providing the means to continue to move negative animals through production systems.

International Trade Issues

The pork industry has been experiencing a growing dependence on international trade to increase the value of U.S. hogs. According to a recent Pork Checkoff-funded economic analysis the value of pork and pork byproduct exports has grown from $1.97 per hog harvested in 1986 to $28.91 per head harvested in 2007. From a production standpoint, in 2007, 16 percent of U.S. production went to export markets. In 2008, that percentage is projected to exceed 30 percent. With the current dependence on international trade, the U.S. pork industry is at risk for adverse economic effects with any event that disrupts exports.

Once there is a confirmed case of FMD, it has been estimated by Steve Meyer of Paragon Economics that the price of pigs would drop 80 percent in the United States. This would result from the loss of added value from export markets and from the excess pork and pork product supply suddenly available in the U.S. market, as well as from losses in the commodity markets.

The maintenance or rapid resumption of international trade in pork and pork products during an FMD outbreak remains a priority. Efforts to support market access are best done prior to an event through the process of compartmentalization which requires enhancements to the swine health infrastructure, increased planning efforts with USDA and cooperation with trading partners.

Summary

Issues surrounding infrastructure, response capabilities, and business continuity in regards to commerce and trade are all critical to the swine industry in efforts to adequately prepare for the introduction of FMD into the United States. Of these issues, the robustness of the animal health
II.B. USAHA/AAVLD SCIENTIFIC SESSION

infrastructure remains the most important issue that should be addressed as it directly influences how the other issues are mitigated.
Good morning, and thanks very much for inviting McDonald’s to share our perspectives on consumers and Foot and Mouth Disease.

I congratulate the USAHA on tackling the implications of this issue in spite of the fact that we have not had an incident reported in this country for the past eight decades or so. So why am I here?

I suspect that many of you feel like Paul Newman and Robert Redford in “Butch Cassidy and the Sundance Kid” when they were pursued by that mysterious posse they couldn’t shake – “Who are those guys?” I mean, after all, my boss is a clown! But the fact of the matter is that our interests are inextricably tied together in several ways.

First, when there’s a food safety incident, consumers don’t differentiate among links in the supply chain … they stop buying, period. Second, McDonald’s has skin in the game. As a major purveyor of beef and pork products, to the tune of two billion pounds of beef … 1.2 billion pounds of chicken … 500 million pounds of pork … and 200 million gallons of milk each year. And third, we believe we have something to contribute about consumer insights, because we serve nearly 56 million people every day – more than 20 billion face-to-face customer contacts every year.

So we appreciate the opportunity to participate in this discussion because the quality and safety and continuity of supply of animal proteins are of the utmost importance to the world’s biggest hamburger company. We have a lot at stake … and we believe that we can contribute to this discussion.

We have learned two things in our experience at McDonald’s. First, it’s never a question about if something bad might happen, but when it will take place. If you’re talking about a “one in a million” incident, we can expect it to happen 56 times a day. And second, you never make friends in a crisis.

So it’s important that we spend the time to prepare ourselves for various contingencies because when something goes “bump in the night,” you ask yourself: What do I wish I had done yesterday?

Here’s what I’d like to share with you today:

- A look at consumer attitudes toward food safety, and specifically, FMD.
- An example of how we earned back consumer trust in France after the BSE and FMD scares.
- A look at best practices in the U.S. that averted widespread panic when BSE was discovered in 2003.
And a prescription for how we can work together to be prepared for FMD in the U.S.

Let’s start with consumers because, as the title of my remarks imply, they are always right … even when they’re wrong.

According to a Datamonitor survey into consumer insights, food safety has been a growing consumer concern over the past ten years as one of the most basic factors driving food purchasing behaviors. Informed consumers worldwide share a common interest in seeking accurate information about food safety, expanded food choices, and a balanced diet.

In the U.S., a Roper Poll in 2004 reported that seven in 10 consumers expressed concerns about the health risks of pesticides, hormones, antibiotics, and other chemicals used in food production. In addition, concerns over residues in meats are high among U.S. consumers, even if knowledge is not.

For example, a 2003 survey commissioned by Whole Foods showed that 74 percent of U.S. consumers are concerned about the presence of antibiotics in meat production, even though only 48 percent were aware that the meat they buy is commonly raised on feed that contains antibiotics. And food safety incidents clearly influence purchase decisions.

Research released in 2007 by advertising agency JWT found that if a consistently purchased food product had a contamination issue, 20 percent of U.S. respondents said that they “would never buy it again.”

When we look at FMD specifically, there is a very distinct lack of understanding about the threat to human health indicated among the American public, according to two surveys of consumers in North Carolina in 2001 and 2003. When respondents were asked if they would eat meat from FMD infected animals, 91 percent said they would not in 2001 and 82 percent said the same in 2003. More than two thirds of the people surveyed believe that animals with FMD are killed to protect human health. There are very serious implications to these findings.

While those of us in this room know that FMD is a serious agricultural and economic issue, the North Carolina survey strongly suggests the general public perceives it as a human health issue. In this case, perception is more important than reality, because people act on their perceptions whether they are accurate or not.

We learned a number of valuable lessons about the negative effects of food safety concerns in France early this century, and how to restore consumer trust following a series of incidents, including FMD. By way of background, McDonald’s France had historically maintained a “bunker-like” mentality toward communications, not unlike our approach in the U.S. for many years. In other words, our marketing efforts concentrated on building our brand through the appeal of our products and the fun of our experience. The halo of the brand was always considered sufficient to build the business and insulate McDonald’s from outside influences.
However a number of food safety issues in Europe – including Coca Cola contaminated with Dioxin in 1999 … a BSE crisis in continental Europe in 2000 … and the outbreak of FMD in early 2001 – changed all that. The insight that led to our new communication strategy was that we could not expect people to love our brand if they didn’t trust the company.

Our goal was to assure the public that McDonald’s was accountable to all its stakeholders … and to do that, we determined to make our internal policies on food quality issues public. Our first step in this transparency campaign was a bold one – participation in the French International Agricultural Show, one of the pillars of French culture devoted to excellence in farming. Once again, it was a “who are these guys” moment -- our display in the meat section was totally unexpected … and many people were surprised to hear the facts on the extent of our measures to assure the safety of our beef.

The Quality Charter we presented included traceability … concern for public safety … respect for the environment … animal welfare … and specific McDonald’s expectations. We followed that opening salvo with what we called “Open Doors Days,” the first time a major brand and its suppliers opened their doors to the public. Consumers, government officials, and the media were invited into our restaurants and our suppliers’ plants to see first-hand how we managed the safety and quality of our products. We then established a Quality Auditors program, enabling members of the public to test our quality procedures at all levels of our supply chain and post their comments, photos, and videos on our website.

Today, we have extended our transparency campaign into a permanent dialogue with French consumers through a website devoted to answering any and all questions about our food … advertising that repeats the most common Q&A about safety and quality … and live Internet chats with the CEO of McDonald’s France.

What were the results? As you will remember, the consumption of beef dropped significantly throughout Europe following these beef safety incidents – however, McDonald’s overall fell less, and recovered faster, than our competitors. And within our system, France led the way. In 2001, for example, France reported a 1.7 percent gain in comparable sales for the year … contrasted with a minus 7.4 percent in the U.K., a minus 8.3 percent in Spain, and a minus 12.9 percent in Italy. The following year, France recorded a 6.3 percent gain, while the other countries all returned to positive gains at more modest levels.

This case study in France shows that proactive communication that begins with transparency and leads to an ongoing public dialogue is the best way to prepare for … and to survive … a food safety crisis.

The obvious question is – if this is true, then why doesn’t the rest of the McDonald’s system adopt this posture? And the answer is – we have, here in the U.S., throughout Europe and Asia, and in every major
market we serve. In the U.S., for example, we have not only adapted and built upon many of France’s best practices, but we have reached out to our government and scientific counterparts to assure that we are all on the same page.

Our research has shown that U.S. consumers, unlike people in many other areas of the world, trust the scientists and our government agencies like the USDA, the FDA, and regulatory officials such as State Veterinarians. However, the most trusted source of information comes from: Recent data suggests that this trust might be waning, so it’s important that we do not take this for granted.

I would suggest that business can contribute significantly to understanding this area of consumer insights – developing and testing messages and analyzing consumer responses – before … during … and after specific incidents. That’s why the coordinated preparation we did enabled this country to avoid a massive drop in consumer confidence in beef products after the December 2003 BSE incident here in the U.S.

Our government and scientific leaders were able to act swiftly and aggressively to give the public the information they needed to put their minds at ease and to maintain confidence in our beef supply. Our research at McDonald’s showed that when Ann Veneman, the Secretary of Agriculture at the time, addressed the public regarding BSE just days after it was discovered, consumer confidence skyrocketed.

In fact, within two weeks of the incident, nearly 70 percent of the people felt they had enough information to determine that American beef was safe. Many of the trade associations also acted quickly and decisively to help get the facts out to the public.

And beef sales at McDonald’s, and our counterparts, were virtually unaffected because we were transparent about the risks … we talked about the appropriate interventions … and we followed up with action. None of this happened by accident.

The message points and action steps had all been put into place well before there was a problem … right down to messages to our employees and customers that were posted in our restaurants. And we learned that government also must be transparent … project a confident and commanding presence … and be supported by media-trained experts to allay unnecessary gears and actions by the public.

An example of where this did not occur was the outbreak of Salmonella St. Paul in the U.S. this past April, where the inability of the FDA to identify the source failed to meet consumer expectations. Consumers did not understand the complexities and difficulties in obtaining dietary data and conducting case control surveys … there were no messages of the time involved because of these complexities … and consumers were instead set up to have optimistic expectations. This shows how a lack of command, and unmet consumer expectations of what an epidemiological study can deliver, caused concern for the public … not to mention millions of dollars of losses for the tomato industry.
II.B. USAHA/AAVLD SCIENTIFIC SESSION

And that brings me to my concluding recommendation regarding FMD. I would urge everyone in this room to commit themselves to the same levels of preparedness and transparency as we did for BSE before we are visited by an unexpected incident in the U.S. As the consumer research shows, the public is largely unaware of what FMD is, and people have the perception that there is a danger to human health. Those of us in this room know better ... but we must guard against arrogance and share what we know with the average consumer – because we won’t like what happens if we ignore their ignorance.

The time to start their education is now, not later. The time to prepare a coordinated response is now, not later. The time to decide who says what to whom when, and to what purpose, is now, not later:

In other words –
- Who among the regulators and scientific experts should be the spokespeople?
- What are the key messages, supported by market insights, should they deliver?
- Whom are the appropriate consumer and media audiences?
- When do they communicate, and I suggest sooner than later?
- And to what purpose, which is transparency so people can understand the risk and make a rational response?

Finally, I hope you will accept our offer, as a retailer who deals with millions of consumers every day, to help in the preparation process. We are not experts in animal disease, you are ... but we do know a great deal about how consumers think, how they react, and how to communicate effectively with them. We are all in this together – a supply chain is only as strong as its weakest link – and we are eager to help.

Here’s my call to action – a prescription for crisis preparation.

First, we need leadership, and I would suggest that you, the USAHA, has both the standing and the credibility to convene a working group to address this issue. Second, who are the stakeholders who should be at the table?
- We need agriculture, both the producers and the processors.
- We need the scientific experts in both animal and human health, both government and private, who can translate the science to key audiences.
- We need communications and marketing expertise from the commercial sector to help shape the messages.
- And we need the means to deliver the messages from the retail sector to opinion leaders like the media and academics.

Finally, we need the finished product – a communication plan that assures alignment on education and delivering the facts upfront to eliminate confusion and panic if and when there is a need.

As I mentioned earlier, this model worked for the potential BSE crisis in 2003 ... and it can work for a potential FMD crisis in the future.
II.C. USAHA SCIENTIFIC PAPERS

Section II

C. USAHA Scientific Papers, Posters and Abstracts

Presented at the AAVLD Joint Scientific Sessions
II.C. USAHA SCIENTIFIC PAPERS

ACCURATE DIAGNOSTIC TESTS THAT EFFICIENTLY IDENTIFY JOHNE’S DISEASE POSITIVE SHEEP AND GOATS

Beth E. Mamer*, M. Wayne Ayers, Marie S. Bulgin
Caine Veterinary Teaching Center
University of Idaho, Department of Animal and Veterinary Science,

The bacteria that causes Johne’s disease, *Mycobacterium avium* subspecies *paratuberculosis* (MAP), is shed very late in the clinical disease of infected sheep and goats. This is a cell-mediated disease; therefore antibody is produced late in the infected animal. Animals infected with MAP develop chronic wasting and, death after this bacterium target’s mesenteric lymph nodes and intestines of animals. Adults transmit the MAP bacteria to their fetus in utero or young via colostrum, milk and feces.

This diagnostic testing was initiated to accurately and efficiently identify Johne’s disease positive small ruminates from positive flocks and herds for eventual elimination of these positive animals and offspring.

Four antemortem and two postmortem tests for detecting MAP-positive animals are being compared:

- the bovine serology Enzyme-Linked ImmunoSorbent Assay (ELISA) (IDEXX Herdchek) using 0.250 S/P cutoff on sheep and goat serum, plasma and milk samples;
- the bovine serology ELISA (IDEXX Pourquier) using 0.300 S/P cutoff on the above sheep and goat samples;
- culture of feces, milk and colostrum samples;
- the johnin intradermal skin test for status of cell-mediated immune response to MAP infection.
- culture and histopathology of tissues.

An increased sediment inoculum and time in culture is being used on liquid culture media: BACTEC™ MGIT™ para TB liquid medium with the fluorometric manual read method; and all acid-fast positive tubes are subcultured to Herrold’s egg yolk agar (HEYA) with or without mycobactin J (to determine if the isolate is MAP or the MAP bovine strain).

Our samples are coming from three cooperator producers, each with one MAP culture positive index animal. The producers include a 2000 ewe range flock, a 40 ewe farm flock, and one 20 doe farm herd. At this time 137 serum samples and 44 milk samples have been assayed with the two bovine serology ELISA tests. IDEXX Herdchek ELISA identified 51 MAP antibody positive serum samples and IDEXX Pourquier identified 33, with 29 samples positive with both tests. Herdchek identified 14 Johne’s antibody positive milk samples, and Pourquier 11 positive milk samples, with agreement on seven samples. The Herdchek test identifies positive animal samples (15) earlier in infection; the Pourquier test identifies positive animals (3) later in the course of the disease. Both tests identify
positive serum samples from lambs or kids (colostral antibodies) up to three months of age from culture positive dams. At this time 36 of 180 culture samples are positive for MAP. All of the positive samples originated from antibody positive animals. The average time in culture until identified as acid-fast is 2.6 months (range -two weeks to 10 months). Seventy-five of 180 culture samples were set up from tissues, fecals and milk pellets from thin antibody positive animals. Only one of 26 milk pellets is culture positive. Fecals from two lambs (3 and 4 months of age) are culture positive. Both asymptomatic lambs are from culture positive ewes. A johnin positive test indicates an animal’s exposure to MAP. This test is more easily used on a small number of animals that can be confined for several days. This test can be used to identify lambs and kids (6/6) that are exposed from their dams, or environmental exposure. This test becomes negative as the animal becomes clinical (15/15). Eleven of fifteen animals’ tissues were acid-fast positive on histopathology. The four paucibacillary animals were thin with serum S/P’s greater than 1.00. At certain times, milk samples are more easily collected and tested if serum samples are not available. Antibody ELISA tests are the most efficient and accurate tests for both the serum and milk samples from adults and, serum from young offspring from known culture positive herds and flocks.
Abstract:
Bovine tuberculosis (bTB) is a contagious disease caused by the bacterium *Mycobacterium bovis* capable of infecting humans, wildlife and livestock. While once common in US cattle, the disease has historically been rare in wildlife. However, in 1994 bTB was found to be endemic in free ranging white tailed deer (*Odocoileus virginianus*) populations in northern Michigan and evidence suggests transmission to cattle. A key component to transmission of bTB between deer and livestock appears to be shared resources, such as livestock feed. To evaluate the extent to which deer and livestock share resources, we fitted 27 deer with GPS collars programmed to record locations every 2 hours for one year. Capture locations were 4 beef cattle farms in and around the bTB infected zone in Michigan’s Northeastern Lower Peninsula. In addition, data has been collected on farming practices employed by study sites and nearby farms that may be frequented by deer. To date 11 collars have been recovered, with a total of over 36,000 data points. Analysis is underway to describe co-use of pasture by deer and cattle, and proximity of deer habitat use to stored cattle feed. Preliminary results indicate up to 30% of recorded deer locations are in areas of cattle use, cultivated crops and hay fields. In addition, approximately 2.25 percent of locations were within farm yards, near buildings or fenced feed. Further analysis is pending to determine overlapping seasonal and daily use of habitat by cattle and deer. We hope to use the final results to recommend mitigating measures for livestock owners to reduce the risk of exposing livestock to bTB.
II.C. USAHA SCIENTIFIC PAPERS

DETECTION OF BRUCELLOSIS FROM SWINE MEAT JUICE SAMPLES

Jeffrey Nelson*
National Veterinary Services Laboratories
USDA-APHIS

Lowell Anderson, David Pyburn
USDA-APHIS-VS

Introduction
Meat juice, a liquid released from a meat sample after it is frozen and allowed to thaw at room temperature, contains antibodies that may reflect the individual disease status of the animal from which it was derived. Detection of antibodies from swine meat juice is currently used to determine exposure status to trichinae, pseudorabies, toxoplasma, PRRS, salmonella and, experimentally, to mange. The objective of this project was to compare meat juice samples to serum samples using several brucellosis serology tests in order to investigate the possibility of utilizing meat juice samples for brucellosis surveillance in swine.

Materials and Methods
Diaphragm and serum samples from 35 swine were collected from depopulated herds in Iowa and Georgia that were declared positive for *Brucella suis* biovar 1. These samples remained frozen until analyzed. Bacterial culture for *Brucella suis* was performed on a variety of tissues to confirm the disease status of the individual animals from which the diaphragm and serum samples were collected. The frozen diaphragm samples were allowed to thaw at room temperature, and the juice that accumulated in the plastic bags in which they were frozen was harvested. A portion of this meat juice was filtered using a .22µM filter to remove any potential *Brucella* organisms so that further testing could be conducted outside of a biosafety level 3 laboratory. The serum, filtered meat juice, and unfiltered meat juice were tested and compared using the fluorescence polarization assay (FPA), particle concentration fluorescence immunoassay (PCFIA), and complement fixation (CF) serology tests.

Results
A sample was called positive if it was positive on at least one of the three serology tests and negative if it was negative on all three tests. When these criteria were utilized, the meat juice and serum results matched 80.0 percent of the time with sensitivity and specificity both at 80.0 percent. The positive predictive value (PPV) and negative predictive value (NPV) were 96.0 percent and 40.0 percent respectively. Using the 21 Iowa samples and comparing only the CF and FPA tests, the results
II.C. USAHA SCIENTIFIC PAPERS

matched 81.0 percent of the time with sensitivity and specificity at 82.4 percent and 75.0 percent respectively. The PPV and NPV of the Iowa samples were 93.3 percent and 50.0 percent respectively.

**Discussion/Conclusion.**

Serum is the ideal ante mortem sample to test for brucellosis. However, if serum could not feasibly be collected, meat juice could be utilized as an alternative post mortem sample to assess the brucellosis status of swine. A reduction in the detection of brucellosis was noticed in the meat juice samples when comparing it to serum, but this could be attributed to a dilution effect because of the increased amount of extracellular fluid in this sample type. Positive swine with low serum titers may not be detected and could be classified falsely as negative because of this potential dilution effect.

PCFIA was run only on filtered meat juice and not the unfiltered since the reader for this test was not located in a biosafety level class 3 laboratory. The PCFIA test often gave results of negative or suspect on samples that were positive on the CF or FPA. Utilizing only the results of the CF and FPA tests did not appear to reduce the effectiveness in the detection of brucellosis in the meat juice when the PCFIA results were not utilized.

Meat juice could be utilized on a limited basis for brucellosis surveillance in commercial, transitional or feral swine, when serum samples are not able to be collected.
II.C. USAHA SCIENTIFIC PAPERS

DIAGNOSTIC INVESTIGATION OF ACUTE RESPIRATORY SYNDROME IN ALPACAS

Beate Crossley*, Bradd Barr, Alex Ardans, Sharon Hietala
California Animal Health and Food Safety Laboratory System

Richard Mock
Texas Veterinary Medical Diagnostic Laboratory

In the spring of 2007 alpaca producers began noting cases of an acute respiratory disease affecting alpacas nationally. The clinical presentations ranged from mild upper respiratory disease with influenza-like presentation to severe respiratory disease resulting in death. Though referred to as a viral disease, an etiologic agent was not identified. The syndrome is variously referred to as Acute Respiratory Syndrome (ARS), Acute Respiratory Distress, or “the snots” within the alpaca industry. In the fall of 2007, a cluster of cases were reported, anecdotally linked to alpacas returning to home farms from one or more regional shows. The disease at that time included respiratory signs affecting females in contact with the alpacas returning from shows, increased severity with high mortality among pregnant females, with some associated stillbirths or premature deliveries. In the spring of 2008, reports of abortion and weak births in females that had reported cases of ARS in the prior year began surfacing. Full-diagnostic work-ups were performed on cases submitted to the California Animal Health and Food Safety Laboratory during the fall outbreak. Necropsy findings, generally reported marked diffuse acute to subacute bronchointerstitial to interstitial pneumonia with hyaline membrane formation, marked terminal airway and alveolar epithelial hyperplasia, interstitial lymphocytic infiltrates. Microbial and Mycoplasma cultures were negative. A combination of immunohistochemistry, PCR, and serology were used to rule-out BVD viruses, BRSV, Bovine Herpesvirus, Bovine Coronavirus, Bluetongue virus, Influenza virus, Equine herpesvirus 1 and 4, West Nile virus, Paramyxovirus, and Chlamydia. Though micro-array analysis was attempted, insufficient quantity and/or quality of RNA and DNA were available from the tissue samples available, and no results were obtained. A Coronavirus was recovered from lung tissue using CRFK cell cultures. The virus was not recovered using any of the equine, bovine, human, primate, rabbit, and camelid cell lines attempted. The virus was identified by transmission Electron Microscopy, and confirmed as a Coronavirus by sequence analysis of the RNA dependent RNA polymerase. The Coronavirus recovered is genetically distinct from the Coronavirus previously reported to cause diarrhea in New World camelids. In the absence of fulfilling Koch’s postulates, and to test for an association between antibody response and disease, serum was obtained from alpacas in ARS affected-herds (n= 37) and alpacas (n = 144) in herds
II.C. USAHA SCIENTIFIC PAPERS

with no history of ARS. Serum virus neutralization antibody titers, using the isolated alpaca Coronavirus as virus, demonstrated that animals in herds with a reported history of ARS are approximately 50-fold more likely to be positive for antibody to the Coronavirus (OR = 49.3, 95 percent CI: 18.127,134.097, p<0.001). Though this work is preliminary, and the recovered Coronavirus has not been definitively linked to ARS or possible-associated reproductive risks, the virus recovered is reported here to generate interest in additional diagnostic investigation and epidemiologic follow-up, ultimately to assist in the understanding and future diagnosis of ARS in alpacas.
Introduction

Foot and mouth disease (FMD) is an extremely contagious, acute viral disease of all cloven-footed animals and is characterized by fever and vesicular eruption in the mouth and on the feet. FMD was eradicated in the United States in 1929; however, the disease is endemic in many parts of the world and an outbreak in the US could occur. Early detection of the disease may reduce economic loss and loss of susceptible wildlife. We evaluated the use of infrared thermography (IRT) to detect signs of FMD in experimentally infected mule deer (Odocoileus hemionus), and pronghorn antelope (Antilocapra americana).

Materials and Methods

Animals were either experimentally inoculated intradermally in the tongue with 10,000 lesion forming units of FMD virus (O1 Manisa strain) or exposed to the disease through inter- or intra- species contact. Thermal images were taken of the animals using Forward Looking Infrared camera (FLIR) Thermcam EX60 or E65. Images were taken of the head, rear feet, and front feet. Some of the animals had VHF temperature transmitters surgically implanted into the abdomen to recorded body temperature. The animals were examined daily for lesions.

Results

Early vesicular lesions were observed within 24 hours post-inoculation (PI) for the two inoculated mule deer and for the mule deer exposed through contact (n=12), the first lesions either on the mouth and/or the feet were observed 48-96 hrs PE. On the day before, the day of, and the day after first lesion occurrence, the daily maximum body temperatures were significantly different (P ≤ 0.002) from the pre-infection maximum body temperatures. Eye thermal temperatures were compared with body temperatures and were found not to be significantly different. For feet thermal images, three methods were examined: 1) visual changes, 2) temperature change in the maximum foot temperature, and 3) temperature difference among the four feet. Visual changes from dark gray (cool) to
II.C. USAHA SCIENTIFIC PAPERS

white (hot) over the course of the infection were observed. The maximum foot temperature rose significantly (P= 0.017) from two days before (27.3°C ±1.9°C SE) to two days after (33.0°C ±2.0°C SE) first foot lesion occurrence. The differences between maximum and minimum foot temperatures were significant from each other on the day of (P=0.002) and one day after (P=0.046) lesion occurrence when they plateaued at a difference of 5.4°C. For pronghorns, increased foot temperatures were observed 22 hours PI, up to 20 hours before clinical signs were observed.

Discussion/Conclusion

The rise in foot temperature may be a sign attributable to FMD and thus IRT may be a noninvasive method to help detect FMD. The current screening method for FMD is a labor intensive process requiring the restraint of the animals for clinical examination. Depending on the stage of the infection, clinical signs may not yet be apparent and animals may need to be re-screened. This research indicates the potential of IRT as a rapid, remote surveillance technique that can detect suspect animals for clinical testing. This may reduce the number of capture events for wild animals, decrease labor and costs associated with the clinical examinations and allow for more rabid detection to help control the spread of the disease.
EXPERIMENTAL INOCULATION OF COYOTES WITH *MYCOBACTERIUM BOVIS*: SUSCEPTIBILITY AND SHEDDING

Shylo R Johnson*, Mike R Dunbar,  
National Wildlife Research Center  
USDA-APHIS-WS

Lorene Martinez, Robert L Jones,  
Microbiology, Immunology and Pathology  
Colorado State University

Richard Bowen, Paul Gordy  
Biomedical Sciences  
Colorado State University

Abstract

Several wildlife species have tested positive for bovine tuberculosis in Michigan and may potentially transmit the disease to other animals. Coyotes have the highest known prevalence in the endemic area and thus, our objective was to investigate the shedding of *Mycobacterium bovis* by coyotes. Four coyotes were orally inoculated with 1 ml of 1 x 10^5 CFU/ml of *M. bovis*. Oral and nasal swabs, and feces were collected regularly and tested by culture. Fecal samples were also tested by exposing guinea pigs to the coyotes’ feces. All animals were necropsied to determine if infection occurred. All swabs, feces and tissues were negative on culture. The dosage of *M. bovis* given to these coyotes was considered biologically relevant, but was insufficient for causing infection. Due to the lack of infection, we still do not know the risk coyotes pose for shedding *M. bovis*.

Introduction

Bovine tuberculosis (bTB), caused by *Mycobacterium bovis*, is a contagious bacterial disease that can affect both humans and animals, including domestic and wild. Because of this, human-wildlife-livestock interactions resulting from actual or potential disease transmission has become an area of increasing concern. In 1975 and again in 1994, bTB was discovered in Michigan’s white-tailed deer (*Odocoileus virginianus*). Since then, the disease has become endemic in deer in the northeast corner of Michigan’s Lower Peninsula as indicated by follow-up surveillance in 1995 and later (Schmitt et al., 2006). While no additional reservoir host has yet been identified, spillover infections have been identified in at least six other wildlife species. Bovine TB has been found in black bears (*Ursus americanus*), bobcats (*Felis rufus*), coyotes (*Canis latrans*), raccoons (*Procyon lotor*), red fox (*Vulpes vulpes*), and North American opossums (*Didelphis virginiana*)
II.C. USAHA SCIENTIFIC PAPERS

(Bruning-Fann, 2001, Witmer, 2006). Of these wildlife species, coyotes are infected with an average prevalence of 33 percent in the endemic area (VerCauteren et al., 2008). If coyotes shed the infectious organism coupled with the high prevalence, the potential of serving as a transmission host to other animals is also high. The objective of this study was to investigate the susceptibility of coyotes to bTB and the coyotes’ potential for shedding the organism.

Materials and Methods

Four captive-raised coyotes from USDA-APHIS-WS-NWRC Logan Field Station, Utah, consisting of two females and two males, eight to nine years old, were used. They were housed at Colorado State University (CSU), Animal Disease Building, Fort Collins, Colorado in individual cages within the same room. The cage size was 3’x6’x6’h and clear acrylic glass separated adjacent cages. They were fed Mazuri Canine Diet (PMI Nutrition International, LLC, P.O. Box 19798, Brentwood, Missouri 63144, USA) and given water ad libitum. Eight guinea pigs (Harlan Sprague Dawley Inc, Indianapolis, IN) were located in an adjacent room to the coyotes. They were housed two to a cage, which had clear polycarbonate sides and flooring and a wire lid meeting Institute for Laboratory Animal Research (ILAR) guidelines. They had food and water ad libitum. Bedding for the guinea pigs was changed every other day. A protocol detailing experimental procedures and animal care was approved by the CSU Institutional Animal Care and Use Committee prior to the experiment.

The coyotes were orally inoculated with 1 ml of $1 \times 10^5$ CFU/ml of deer-origin \textit{M. bovis} on Day 0 of the study. We received 6 isolates cultured from Michigan white-tailed deer (Tuberculosis Laboratory, Michigan Department of Community Health (MDCH) Lansing, Michigan, USA) which were pooled and grown to reach the counts necessary for the inoculums. Pre-inoculation oral and nasal swabs, and fecal samples were also collected on Day 0. We anesthetized the coyotes with 5:1 mixture of ketamine: xylazine for inoculation and collection of swab samples. Starting on Day 10, fecal samples were collected weekly from the coyote cages for culture and PCR testing. Oral and nasal swabs were collected fortnightly starting on Day 17. Two sets of oral and nasal swabs were collected from each coyote. Oropharyngeal and nasal swabs were pooled separately and placed in 35ml of DNA/RNA free water. The swab and fecal samples were cultured for \textit{M. bovis} at the biosafety level (BSL) 3 labs at CSU using a modified version of the protocol from Whitlock and Rosenberger (1994) to reduce bacterial contamination growth. Positive and negative controls were included at each culture timepoint and plates were checked for growth up to eight weeks.

On Day 24, we started exposing the guinea pigs to the coyote feces. Coyote feces were crumbled on the bedding and replaced every other day after the bedding was cleaned. A pair of guinea pigs only received feces from one coyote for the duration of the study.
II.C. USAHA SCIENTIFIC PAPERS

The coyotes were euthanized and necropsied on Day 10 while the guinea pigs were euthanized and necropsied on Day 15. For the coyotes, multiple tissues were collected in neutral-buffered formalin for histology: lung, liver, spleen, pancreas, kidney, brain, sections of digestive track, tonsil, and the lymph nodes: retro-pharyngeal, parotid, adrenal, pre-scapula, mediastinal, hepatic and mesenteric. Similar tissues from the coyotes were collected for culture: lung, liver, spleen, pancreas, tonsil, and lymph nodes: retro-pharyngeal, parotid, adrenal, pre-scapula, mediastinal, mesenteric and hepatic. Sections of lung, liver and spleen were collected from the guinea pigs for culture and histology. The mesenteric and ileum lymph nodes were also collected for histology. The tissue cultures were performed in the same lab as the fecal and swab culture, utilizing the same protocol modified from Whitlock and Rosenberger (1994). Culture samples were examined for growth on weekly basis for up to 10 weeks.

Results

Ten sets of swabs and 19 fecal samples were collected from each coyote over the 20 weeks. Swabs and feces were negative for M. bovis on culture. Tissues samples of coyotes and guinea pigs were also negative for M. bovis on culture. For histology, the retropharyngeal lymph node from one coyote had a lesion and a single acid fast bacillus. All other tissues from coyotes and guinea pigs were negative.

Discussion

A single dose of $1.0 \times 10^5$ CFU/ml of M. bovis did not result in infection in these coyotes. Due to the lack of infection, we do not know the risk coyotes pose for shedding M. bovis. The dosage used in this study may not be comparable to what may actually occur in the field where a coyote may feed multiple times from an infected deer or other animal with unknown number of bacteria. The results of this study indicate that dosages of higher concentration or multiple dosages may be necessary to study the pathogenesis of bTB in coyotes. Conducting this additional research will help in assessing the role of coyotes in the spread of bTB.

Acknowledgments

This study was a cooperative effort between NWRC and CSU. A special thanks to Dr. Randall Basaraba for conducting the necropsies and for examining the histology slides. We would also like to thank Dale Berry of the Michigan Department of Health for supplying the isolates for the inoculum, the animal care staff of NWRC Fort Collins, and the staff of NWRC Logan Field Station. Funding for this study was provided by USDA-APHIS-Wildlife Services-National Wildlife Research Center.


II.C. USAHA SCIENTIFIC PAPERS

References


II.C. USAHA SCIENTIFIC PAPERS

EXPOSURE OF AMERICAN BLACK VULTURES (CORAGYPS ATRATUS) TO SELECT VIRUSES IN MISSISSIPPI

Richard B. Minnis*, Sherman Jack, Amanda Deese
Mississippi State University

Danny L. Magee
Mississippi Poultry Research and Diagnostic Laboratory

Kyle VanWhy
USDA-APHIS-Wildlife Services

Abstract

The black vulture, Coragyps atratus, is an important scavenger in the Southeast United States. As a scavenger, they have contact with many species, potentially being exposed to numerous diseases. Little research has been conducted on exposure to diseases in black vultures. As part of a damage removal program, 498 birds (19% males, 81% females) were collected from a roost in Columbus, MS in 2007. Birds were sampled and necropsied to determine exposure to pathogens. Forty five randomly selected serum samples from each sex were submitted to the Mississippi Poultry Diagnostic Lab for testing of Newcastle disease (NDV), infectious bronchitis virus (IBV), Reovirus, infectious bursal disease (IBD), chick anemia virus (CAV), Mycoplasma gallisepticum, and M. synoviae. All 498 samples were submitted to the National Wildlife Research Center in Fort Collins for testing of Avian Influenza, and West Nile Virus. Forty (20 each males and females) were also tested for Laryngotracheitis. Exposure rates ranged from 0-16%, with all positive samples being from males, except one. A total of 10 birds seroconverted to these diseases, with 3 birds having exposure to 4 diseases (IBV, IBD, Reo, and NDV), 2 exposed to 2 (IBD and Reo) and 5 others showing titers to 1 pathogen. Multiple exposure individuals mirrored vaccination practices in poultry production. Low numbers of male birds and their higher exposure rates point to a potential sexual selection pressure due to current poultry practices. The impact of this reduced male population needs to be examined.
Abstract
The Asian H5N1 highly pathogenic avian influenza (HPAI) viruses have changed from producing mild respiratory infections in ducks, to some strains producing severe disease and mortality. The objective of this study was to examine the differences in host response to infection with H5N1 HPAI viruses with different pathogenicity in ducks by determining gene expression in tissues of infected ducks using a chicken genome microarray. The use of cDNA microarrays offers a highly effective system to study transcriptional responses during host-pathogen interaction. By using genomic interspecies microarray hybridization we can detect a large number of genes, provided that the microarray for a fully sequenced genome of a close relative is available. A 44K, 60-mer oligonucleotide, whole chicken genome microarray was used to compare gene expression in spleens from Pekin ducks infected with two different HPAI viruses, A/Ck/HK/220/97 and A/Egret/HK/757.2/02. An important number of differentially expressed genes associated with infection were detected and demonstrated the complexity of the patterns of gene expression in ducks in response to HPAI. Semi-quantitative RT-PCR was used to confirm the regulated expression of several of the differentially expressed genes. The results obtained suggest that different mechanisms are potentially induced by avian influenza viruses to modulate the host response to infection. The differentially expressed genes identified in this study are candidates for further hypothesis-driven investigation of the mechanisms involved in resistance to AI viruses in ducks.
Abstract

Raccoon variant rabies occurs throughout the eastern and northeastern United States. Since the mid 1990’s an oral rabies vaccination (ORV) program has been in place to prevent the westward spread of the disease.

In 2004 raccoon variant rabies was found in northeastern Ohio, representing a localized breach in the ORV barrier. Previous modeling research suggests the topography of Ohio could lend itself to rapid westward spread of raccoon variant rabies if unimpeded by vaccinations or physical barriers.

We are radio tracking raccoons in rural and suburban areas of Cleveland, Ohio to evaluate whether barriers or corridors to raccoon movements exist. Preliminary results suggest that raccoons are remaining within their home ranges within greenbelts, although some have moved up to 2 km, crossing major highways, before returning. In addition, we are conducting genetic analysis on tissue samples from 180 raccoons in seven counties. The degree of relatedness and distance between raccoon populations will allow us to estimate movement rates, and thus the potential for rabies spread. A more complete understanding of raccoon movements in rural, suburban and urban environments will allow researchers to make recommendations to Wildlife Services Operations as to the location of ORV bait distribution and trap-vaccinate-release (TVR) strategies. The locations of barriers or corridors to raccoon movement may provide focal points for rabies management. The current study has been extended through September, 2009 with expanded objectives to include abdominal VHF transmitter implants in juveniles and GPS collars on adult raccoons in heavily urbanized areas. Furthermore, genetic sampling will be expanded to include raccoons from counties outside the initial 7-county sampling zone.
The comparative cervical test (CCT) is a critical component of the Cooperative State–Federal Tuberculosis Eradication Program. To conduct the test, the animals are handled two times. The first is for the veterinarian to measure the skin and to give the tuberculin injections, which consist of an avian purified protein derivative (PPD) and a bovine PPD. The second time the animals is at 72 (± 6) hours after the injections for reading the test results by palpation and by measuring for changes in skin thickness. An animal that has been exposed to *Mycobacterium bovis* or *M. avium* will respond with swelling and induration at the corresponding injection site. This swelling may be associated with inflammation and thus, skin temperature changes. Infrared thermography (IRT) remotely measures skin surface temperatures and may be an alternative technique to reading the CCT that reduces the need to handle the animals. The objective of this study was to determine if IRT could be used to correctly classify cattle that were sensitized to *Mycobacterium bovis* or *M. avium* through their responses to the avian and bovine PPDs.

Over 90 days before conducting the CCT and taking any IRT images, 15 domestic cattle (*Bos taurus*) received one of three treatments: sensitization to *M. bovis*, sensitization to *M. avium*, or nothing (control). Thermal images, using a Forward Looking Infrared camera, were taken at the time of the injections of the avian and bovine PPDs and at 24 ±3 hr intervals until 72 hours after the PPD injections. The animals were restrained in a chute for images taken at 0 hours and 48 hours, but for images at 24 hours and 72 hours, the animals were loose in their pen. The images taken at 72 hours were used to classify the animals. To classify an animal, both injection sites were identified in the same image, and the area max measurement mode was used to cover both sites. A reactor classification for *M. bovis* was given to the animal if the max temperature was located within the shaved area of the bovine PPD injection site and the temperature was above the temperature cut-off of 37°C. If the max temperate was above the cut-off, but located at the avian PPD injection site, the animal was classified as a reactor to *M. avium*. If the max temperature was under 37°C, the animal was classified as non-reactor to both injections. Results from the traditional method of palpation and skin thickness measurements were also collected and compared to the IRT.
results.

Using IRT, 86 percent of cattle were correctly classified to the sensitization treatment the animals' received. From the traditional skin thickness measurements, 80 percent of the cattle matched the sensitization received by the animal. The bovine sensitized cattle and control cattle could also be correctly classified at 24 hrs using IRT if the temperature cut off was raised to 37.5°C. One avian sensitized animal was not correctly classified at 24 hours using IRT.

Infrared thermography was able to correctly classify over 86 percent of the animals and all of the bovine sensitized cattle were correctly classified. These results indicate that IRT may be a non-invasive and objective way to read the CCT. It may also provide results for the CCT within 24 hours instead of the typical 72 hrs. Further research is still needed to understand how other factors, such as weather and breed, may affect skin temperature and influence the process used to identify reactors.
II.D. USAHA MEMBERSHIP MEETINGS

Section II
D. USAHA Membership Meetings

USAHA MEMBERSHIP LUNCHEON AND MEETING
MONDAY, OCTOBER 27, 2008
12:00 p.m.
James W. Leafstedt, USAHA President, Presiding

STATE OF THE ASSOCIATION

James W. Leafstedt

It is my pleasure as president to report on the state of the association. The financial condition of USAHA is strong. Five years ago at my first Executive Board meeting the motion was passed that we manage our finances with a goal of having 2 years of expenses in reserve. Through careful management of the past executives we have met and surpassed that goal. We are fortunate that unless future problems occur we should be able to “hold the line” as far as costs of the meeting and membership.

This year the Executive Committee thought it was important that following last year’s transition and office relocation, we pay particular attention to developing policy and direction for our staff in order to institutionalize the many changes that have been made. To that end, we spent a special time of meeting in St. Joseph at our office and passed several new organizational policies.

In addition this year, thanks to the groundwork of last year’s Executive Committee, we engaged in the process of a new Strategic Operational Plan, which has been presented to the Board of Directors. It is wide ranging, fairly detailed, and attempts to set the course for improved member services, expansion of cooperative opportunities with AAVLD and
II.D. USAHA MEMBERSHIP MEETINGS

continued emphasis on our influence in the sphere of animal health. I want to assure you that the Executive Committee is pleased with the progress made this year by our Executive Director and staff. Anytime you start something for the first time there is a pretty steep learning curve experienced by everyone. Things have gone very well and we can look forward to continued improvement as we learn how to function with these expanding opportunities. I want to say that I have really enjoyed the year as your president. Because of the wise choices of the past, our Executive Committee has been able to function better with the increased level of support staff.

TREASURER’S REPORT
July 1, 2007 to June 30, 2008

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 2008. The Association’s total income for FY 2008 was $753,961. The budget had projected an income of $619,487. The Association’s total expenses for fiscal year 2008 were $563,823. The Association’s budget for FY 2008 had allocated $581,018 for expenses. The expenses were less than what was budgeted. The Association’s income after expenses for FY 2008 was $190,137. A majority of this income was due to the sale of the new 7th Edition of the Foreign Animal Diseases book. During fiscal year 2008 the Association placed $120,000.00 in reserves. On July 1, 2007 the association had $818,393 invested in certificates of deposit and the money market account. Interest of
II.D. USAHA MEMBERSHIP MEETINGS

$44,028.04 was earned during the fiscal year, and was reinvested in certificates of deposit and the money market. The Association's net worth on June 30, 2008 was $1,051,059.76. This includes $989,883.26 in certificates of deposit and the money market account and $61,176.50 checking account balance on June 30, 2008.

A third-party audit of the Association's financial records has been completed by the accounting firm Clifton Gunderson, LLP. The audit report has been received and reviewed by the Audit Committee. The audit committee met, reviewed the audit and found that all financial affairs of the Association are in order.

The fiscal year 2008 financial statements and the report of the audit committee will be provided to the Board of Directors at its first meeting Monday afternoon, October 7, 2008. Ben Richey has a complete set of the monthly chart of accounts for fiscal year 2008. He will be glad to make these available for your review.

Are there questions concerning the Association fiscal year 2008 Treasurer's Report?

Whereas Mr. Leafstedt entertained a motion to accept the treasurer's report, moved by Dr. Mac Lea and seconded by Dr. Bob Hillman. The motion was approved by majority vote.

REPORT OF THE COMMITTEE ON NOMINATIONS

The 2008 slate of officers nominees is as follows: President, Donald Hoenig, Maine; President-Elect, Richard Breitmeyer, California; First Vice President, Steven Halstead, Michigan; Second Vice President, David

Bret D. Marsh, Chair
II.D. USAHA MEMBERSHIP MEETINGS

Marshall, North Carolina; Third Vice President, David Meeker, National Renderers Association; and Treasurer, William Hartmann, Minnesota. The nominees for district delegates are Northeast, John Enck, Jr. Pennsylvania and Ernie Zirkle, New Jersey; North Central, Velmar Green, Michigan and Jay Hawley, Indiana; South, Gene Lollis, Florida and Greg Rosales, Alabama; West, Bill Sauble, New Mexico and Tim Richards, Hawaii.

The slate of officers for 2008 would be posted on the bulletin board and would be presented again for discussion during the Wednesday afternoon Membership Meeting at 1:35 p.m. At that time, members have an opportunity to amend the report by placing an individual’s name on the Committee on Nominations with another name. The nominations report as is or as amended and approved by a majority of the membership present at the USAHA Membership Meeting then goes to the Board of Directors for consideration. Acceptance by the Board of Directors constitutes election.
II.D. USAHA MEMBERSHIP MEETINGS

USAHA MEMBERSHIP MEETING
WEDNESDAY, OCTOBER 29, 2008
1:30 p.m.
James W. Leafstedt, USAHA President, Presiding

I welcome everyone to the second membership meeting of USAHA. At this time I will call on Dr. Bret Marsh, Chair of the Committee on Nominations and Resolutions to read this report. I will also call on Dr. Marsh to assume the duties of the chair for any action on this item.

REPORT OF THE ACTION OF THE COMMITTEE ON NOMINATIONS

Chair: Bret Marsh

This is the second reading of the action on the Committee on Nominations. The report was presented on Monday and the action is to be taken today. The nominations slate is: President, Donald Hoenig, Maine; President-Elect, Richard Breitmeyer, California; First Vice President, Steven Halstead, Michigan; Second Vice President, David Marshall, North Carolina; Third Vice President, David Meeker, National Renderers Association; and Treasurer, William Hartmann, Minnesota. The nominees for district delegates are Northeast, John Enck, Jr, Pennsylvania and Ernie Zirkle, New Jersey; North Central, Velmar Green, Michigan and Jay Hawley, Indiana; South, Gene Lollis, Florida and Greg Rosales, Alabama; West, Bill Sauble, New Mexico and Tim Richards, Hawaii.

That is the Report of the Committee on Nominations. Is there a motion for acceptance of the Report on Nominations?

Whereas Dr. Guy Hohenhaus moved to accept this report, followed by a second from Dr. John Smith. The motion was approved by majority vote. Dr. Marsh yielded the duties of the Chair back to Mr. Leafstedt.

INCOMING PRESIDENT’S ADDRESS

Donald E. Hoenig

“Be brief, be sincere, be seated.” - Franklin Delano Roosevelt

“What long strange trip it’s been.” - Jerry Garcia, Grateful Dead

It’s certainly a tremendous honor and a great privilege for me to accept the presidency of this amazing organization and I am deeply humbled as I take on this role. Sincere thanks go out to my colleagues from the
Northeast who nominated me four years ago to be third vice president and for the confidence they placed in me. Thanks also to the many folks who had a role in putting on this incredibly complicated meeting - our ED, Ben Richey, Kelly Janicek, Linda Ragland, J. Lee Alley and his wife Eleanor and others from the North Carolina Department of Agriculture who helped out. And finally to the members of the Executive Committee who I’ve worked with over the past four years. If there’s a finer group of people around I haven’t yet met them and I’ve learned so much from all of them - Lee Myers, Bill Hartman, Dave Marshall, Steve Halstead, Rich Breitmeyer and Jim Leafstedt. I’d like to single out Jim and Lee in particular for the leadership they’ve demonstrated during their respective presidencies - I only mean this in a positive way - I hope I can be as big a pain in the neck as they’ve been. The reason that’s a compliment is that I believe effective leaders (and parents and teachers and coaches) need to demand excellence and not take the easy way out. Both Lee and Jim have done that. Jim knows how to run a business and he’s been a farmer and he’s brought that experience to his term as your president. Lee knows how to manage people and make them accountable and in her term she helped us implement some procedures and policies that will serve us well in the future.

If you’ll indulge me for just a few minutes, I wanted to give you sense of where I come from, the great State of Maine. When I tell people I’m from Maine they almost universally have a positive reaction - either they had the best vacation/honeymoon/trip to Maine or they’ve never been there but have always wanted to go. Agriculture on the other hand is not the first thing you think of when you mention Maine. Maybe I can change your view on that.

I’m actually the second person from Maine to be President of the USAHA. Francis Buzzell was President 50 years ago.

Let me tell you a little story about my involvement with USAHA. I’m a relative neophyte to this organization. For a variety of reasons, most of which revolved around budget, I didn’t come to my first annual meeting until Hershey in 2001. That year was obviously a significant year in the history of this country but it was also during 2001 that I experienced a life altering event when I was able to go the UK in March in the first group of veterinarians from the U.S. to assist in the foot-and-mouth disease outbreak. I don’t intend to talk about that now but what I remember about my first trip to the Annual Meeting that year is the trip to Hershey. Chip Ridky and I left Maine at 7:30 in the evening on Oct. 31 and at some point during our drive decided to visit the World Trade center site ("ground zero"). We arrived in Manhattan at around 1:00 AM and parked somewhere near the still-smoldering ruins and for the next hour, along with thousands of other silent folks, walked around the entire site. We didn’t say much to each other (what could one say?) and we left Manhattan at around 3:00 AM and arrived in Hershey at dawn. The events of that year had a deep and lasting impact on us all and for those of us in agriculture
II.D. USAHA MEMBERSHIP MEETINGS

and animal health, it dramatically changed the way we viewed the world and how we have done our jobs since then. The cliché “it’s a whole new world order” was thrown around a lot. Our current Committee on Animal Emergency Management, one of our most active committees, really evolved out of the events of 2001.

Something else of significance also happened to me at my first USAHA meeting. There was a disease in farmed salmon called infectious salmon anemia occurring in Maine and New Brunswick waters that was devastating the salmon aquaculture industry. Along with my federal VMO, Dr. Steve Ellis, we wrote a resolution on ISA for me to bring to the USAHA Aquaculture Committee urging the USDA to step in. This resolution was passed by the Board of Directors and then forwarded on to the USDA and I think it was instrumental in influencing the USDA to step in, later that winter of 2002, with a control program for ISA. What that showed me, a newcomer to the scene, was the tremendous respect and high regard that agencies have for our science-based, committee-driven, deliberative process. To rephrase the old E.F. Hutton commercial, when USAHA talks people listen. That was a powerful message for me.

That first meeting I was also in awe of some of the people I met, people whose names I’d read about or heard about, some of you sitting in this room - Bob Hillman, Jones Bryant, Bret Marsh, J. Lee Alley, Rich Breitmeyer who received some awards that year and many others who seemed larger than life to me but who I’ve now come to know are approachable, friendly and who also share all the same problems that I do. So, no more stories! Since I came on the EC four years ago, we have been very busy. In line with the goals set out in the 1997 strategic plan of establishing a year-around presence, we hired our outstanding young Executive Director, Ben Richey two years ago. We’ve also made great progress on the other two goals of expanding communication and information (USAHA News Alert Summaries is a fine example of progress in this area) and third, improving the annual meeting (it has been shortened by a day) and careful evaluation has resulted in continuous improvement as well as configuring it with the AAVLD meeting.

The EC over the past several years, in addition to engaging in the process of hiring an ED, has once again initiated the strategic planning process (is there another term we can come up with that doesn’t make us all cringe when we hear those words?) and the Board approved this plan at last night’s meeting. In a nutshell, the objectives are ambitious but achievable - there are 15 of them and I won’t read them all but they include: enhance member services; develop a plan for exploring joint staffing with AAVLD; continue to improve the annual meeting; enhance communication to members; clarify the organization’s role in or policy surrounding advocacy; improve the visibility and recognition of USAHA at the national level; improve committee effectiveness; engage key federal partners for input into strategic planning and policy implementation; establish national leadership in animal security; and focus efforts on key
II.D. USAHA MEMBERSHIP MEETINGS

resolutions.

I don’t come into this role with any hidden or transparent agenda. My goal is to use the strategic plan as framework for moving the organization in the direction in which the members want it to move. As Bret said so eloquently several years ago, I’m only a caretaker of this organization’s highest office but I do pledge to try to live up to the high standards set by all the hardworking people who have gone before me and on whose shoulders we all stand. Thanks much.

RECOGNITION OF IMMEDIATE PAST PRESIDENT

Lee M. Myers

Thank you, Don. At this time, we recognize and thank the Immediate Past President Jim Leafstedt. On behalf of the Association, we are grateful for your leadership and guidance of the association as USAHA’s 2007-2008 President. To honor you, we present you the President’s Plaque, and your life membership. This is only a small token to express the Association’s appreciation for the hours of dedication and leadership you have provided USAHA. Thank you for your service, Jim.

I would also like to take an opportunity to present Dr. Bret Marsh with a small token of my appreciation for fulfilling the role of Chair of the Committee on Nominations and Resolutions in my stead at this year’s meeting.

EXECUTIVE DIRECTOR’S REPORT

Benjamin D. Richey

Greetings to all the members of the association, and I applaud you for your participation, presentation and discussion over the past several days, it is truly your efforts that make USAHA what it is. We have enjoyed another successful meeting up to this point, and I hope that you have
felt the same. Our attendance has held relatively strong, and I think that speaks to the importance that each of you hold USAHA in your relative priorities.

I would like to first thank Dr. Marshall, Dr. Ray, and the North Carolina Department of Agriculture and staff for your support this week. We could not have such a smooth meeting without you. And I also extend my appreciation to USDA-APHIS-VS for their staff contributions as well in our work room. I wish to recognize Kelly and Linda for their work throughout the year in bringing the meeting together and supporting work, even after everyone leaves. And to Dr. Alley and Eleanor, for their help as well. I would be remiss if I didn’t recognize Kim Sprout, for the clerical work she undertakes with the resolutions here at the meeting and assisting in presenting them today.

Please take a moment to individually thank our sponsors as you see them. They are a vital key to helping USAHA carry out its mission here this week.

Others to recognize include Karen Conyngham, who works tirelessly on collecting stories for the USAHA News Alerts Summaries, truly a nice service thanks to her efforts.

I have enjoyed my work with the Executive Committee this year, and Jim has brought a passion and practical vision to the association, it has been an honor to serve under his direction. I look forward to the coming year with Dr. Hoenig as well, carrying out the work products of this meeting and other issues we face throughout the year.

2009 may provide many challenges and opportunities for USAHA, from resolutions to the newly presented strategic plan, the possible expansion of our office space in to the Science and Technology Incubator in St. Joseph, Missouri, and our continued and expanding partnership with our sister organization, AAVLD.

As always, I welcome comments from all membership in ways that we can improve the association. I anticipate another year of continued success for USAHA. Thank you.

REPORT OF THE COMMITTEE ON RESOLUTIONS
Bret D. Marsh, Chair

A total of 51 resolutions from the committees were submitted to the Committee. The actions for the resolutions by the Committee and United States Animal Health Association members is summarized below.

The following resolutions were combined by the Committee: 2 and 35; 3 and 41; 6, 36, 39 and 46; 15 and 25.

Resolutions were presented to the membership individually for approval. The following resolutions were placed on consent calendar, and approved as submitted: 1-7, 9-12, 19-25, 27, 29-32, 38, 40, 43-49, 51.
II.D. USAHA MEMBERSHIP MEETINGS

The following resolutions were individually approved as submitted: 17, 18, 33, 50.
The following resolutions were individually approved as amended: 8, 13-16, 26, 28, 33, 34.
Resolution 37 was tabled.
Resolution 42 was not approved by the membership.
The complete report of the Committee, including all resolutions in their entirety can be found in the committee reports portion of these proceedings, under Committee on Nominations and Resolutions.
Whereas Dr. Hohenhaus moved to adjourn, seconded by Mr. George Teagarden. The motion passed by majority vote, and the meeting was adjourned.
II.E. COMMITTEE REPORTS

REPORT OF THE USAHA/AAVLD COMMITTEE ON
ANIMAL EMERGENCY MANAGEMENT

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

John B. Adams, VA; Gary A. Anderson, KS; Marianne Ash, IN; Tammy R. Beckham, TX; Pat Blanchard, CA; Bev Byrum, OH; Consuelo Carrillo, NY; Heather Case, IL; David Chico, NY; Greg Christy, FL; Neville Clarke, TX; Matt H. Cochran, TX; Leslie E. Cole, OK; Stephen Crawford, NH; Thomas L. Cropper, TX; S. Peder Cuneo, AZ; Kevin M. Dennison, CO; Orlo R. Ehart, DC; Brigid N. Elchos, MS; Dee B. Ellis, TX; Francois C. Elvinger, VA; Rose Foster, MO; W. Kent Fowler, CA; Tam Garland, DC; Jeffrey J. Hamer, NJ; Greg N. Hawkins, TX; Donald E. Hoenig, ME; Carla Huston, MS; Gregory P. Jillon, NM; Heidi Kassenborg, MN; Brian Kim, CO; Patrice N. Klein, MD; Anthony Knight, CO; Charlotte A. Krugler, SC; Elizabeth A. Lautner, IA; Mary Lis, CT; Randall L. Levings, IA; Martha A. Littlefield, LA; Barbara M. Martin, IA; John Maulsby, CO; Mary Ann McBride, NC; Thomas J. McGinn, III, DC; David L. Meeker, VA; Gay Miller, DC; Lori Miller, DC; Lee M. Myers, GA; Brian V. Noland, ID; Sandra K. Norman, IN; Bethany O’Brien, CO; Ken Olson, IL; Kristy L. Pabilonia, CO; Boyd Parr, SC; Deidre A. Qual, ND; Jeanne M. Rankin, MT; Tom Ray, NC; Mark Robinson, DC; James A. Roth, IA; Mo D. Salman, CO; John Sanders, DC; A. David Scarfe, IL; Gary B. Sherman, MD; Brian T. Smith, DC; David Smith, NY; Julie Smith, VT; Harry Snelson, NC; George A. Teagarden, KS; Kerri Thompson, DC; Dave B. Tomkins, TX; Alfonso Torres, NY; Jesse Volmer, ND; William C. Wagner, VA; Sherrilyn H. Wainwright, CO; Patrick Webb, IA; Brad L. Williams, TX, Michael Wood, VT.

The Committee met on October 25, 2008 at the Sheraton Greensboro Hotel Greensboro, North Carolina, from 8:00 a.m. to 5:00 p.m. There were 33 members and 81 guests present. The Co-Chairs recapped issues and discussion topics from the year’s conference calls which are reflected in today’s presentations and resolutions.

Jose’ Diez, Emergency Management and Diagnostics (EMD), Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA), presented the USDA-APHIS-VS Emergency Management and Diagnostics Update. EMD made revisions to the Operational Guidance and reworked the national response plans and objectives for highly pathogenic avian influenza (HPAI) and foot-and-mouth disease (FMD) (in draft). The plans are National Incident Management System (NIMS) compliant, specific and
comprehensive. Actions and responsible officials are clearly defined. VS Memo 580.4 was revised to clarify priority designations and process and emphasize actions and responsible officials. Contracts have been put in place to fast-track diagnostic laboratory sample delivery to ensure Priority 1 or Priority A laboratory sample delivery in less than eight hours. Priority A is used when there is not high suspicion of a foreign animal disease, but circumstances indicate that it is prudent to obtain laboratory results as rapidly as possible.

Progress has been made in continuity of business planning. Greater emphasis has been placed in response pre-planning to minimize disruptions to business operations in future outbreaks. Commodity-based risk assessments and industry biosecurity programs integrated into Area Command or Unified Command decision making. Movement and permits for animals and animal products, by commodity and biosecurity program in three areas: 1) within control area; 2) into control area; and 3) out of control area. The bottom line is establishing contingency plans for hour-zero forward.

National Veterinary Stockpile (NVS) has expanded capabilities. Diez indicated they will manage vigorous outreach effort. Key efforts include:

- publish the NVS guide to educate States about NVS and recommend actions they need to plan;
- a State/Federal liaison available;
- operate NVS website on www.aphis.usda.gov;
- staff 24/7 emergency hotline for States requesting help; and
- support State exercises to test readiness.

Other activities include:

- international transport of antigen to manufacturers overseas for processing and return of vaccine
- international transport of commercial vaccine from manufacturers overseas
- transport of samples and reagents to laboratories
- 3D contractor large animal handling and depopulation training
- partner with Department of Homeland Security (DHS) to develop and evaluate second generation, US manufactured FMD vaccines for single shot immunity and longer shelf-life

Diez next updated the National Response Preparedness FMD Planning, including upcoming exercises:

- Iowa HPAI exercise (Oct 2008)
- New England FMD exercise (Nov 2008)
- Florida Rift Valley fever (RVF) exercise (Nov 2008)
- NVS Multi-State FMD Exercise (2009)

A number of interagency collaboration efforts are underway, which include:

- DHS FMD Response Planning
Regarding issues of depopulation and disposal, Diez discussed that APHIS, in collaboration with Carcass Disposal Working Group members, has developed online training modules:
- In-House Composting
- Outdoor Composting
- Onsite Treatment/Burial
- Secure Transport
- Offsite Treatment/Burial
- Cleaning and Disinfection

Jessica Fantinato, Homeland Security Office, USDA, provided the Update on Food and Agriculture Sector Coordinating Council’s (FASCC) Activities and the Sector Specific Plan (SSP). The SSP describes how the FASCC will protect its critical infrastructure as directed by the National Infrastructure Protection Plan. Its components include:
- identifying critical assets or systems
- assessing vulnerabilities
- developing protective measures
- conducting research and development
- measuring progress

In 2006, USDA and U.S. Department of Health and Human Services (USDHHS), Food and Drug Administration (FDA) collaborated with Sector partners (Federal, State, Tribal, local, and industry) to write the plans for protecting infrastructure in the sector. However, time and resource limitations impacted Sector input.

In 2008, USDA and FDA developed an SSP update document which outlines changes since the original was released. Food and Agriculture Government and Sector Coordinating Councils (GCC and SCC) meet monthly by conference call.

2008 Sector Goals include:
- Sector Tabletop Exercise using DHS’ Homeland Security Exercise and Evaluation Program (HSEEP)
- Food Agriculture Sector Criticality Assessment Tool (FASCAT) Implementation
- Sector Communications and Homeland Security Information
REPORT OF THE COMMITTEE

Network (HSIN), including a metric to define success for HSIN

- Revision of the Sector Specific Plan to include, at a minimum, FASCAT, the Food Protection Plan, and the Import Safety Plan.

Tom McGinn, Office of Health Affairs (OHA), Department of Homeland Security (DHS), provided the DHS-OHA update. He addressed the FASCAT, which is designed to determine what are the most critical elements, nodes and sub-systems in the food and agriculture infrastructure. The benefits to States includes:

- provide an effective response to future DHS National Data Calls for information on critical infrastructure components for the food and agriculture
- identify sector systems/sub-systems that are both critical to key state commodity chains or food distribution systems
- priority for further state or organizational level vulnerability assessment, protective measures and mitigation strategy development

DHS has identified the following planned goals for Fiscal Year 2009:

- liaison positions between APHIS and Customs and Border Protection (CBP) headquarters
- institutionalize pest risk committees
- integrate systems for data collection and information sharing
- develop a format for Ag-related post-seizure analysis and post-interdiction review
- develop risk-based staffing model, or equivalent, for agricultural canine deployment

Ron DeHaven, American Veterinary Medical Association (AVMA), presented What in the World is Going on Here: The Changing Environment in Veterinary Medicine and Our Future. DeHaven noted that we are at a critical crossroads in veterinary medicine and animal health. Animal welfare concerns are increasing. World demand for protein (meat) are increasing. AVMA policies must be scientific, practical and socially acceptable.

DeHaven next addressed the One Health Initiative, in place for the protection of people, animals and food. The incubation period for most infectious diseases is now longer than the time it takes to transport them across the globe. The issues that create the need for the one health concept are the fact that:

- 60 percent of human pathogens are zoonotic
- 80 percent of animal pathogens are multi-host
- 75 percent of emerging pathogens are zoonotic

Finally, DeHaven stressed that veterinary workforce expansion and education are critical for the future of food safety.

Dave Filson, Penn State Cooperative Extension, Penn State
University, presented Ready Ag: Continuity of Business Planning Project.

Ready Ag is a web-based tool developed to assist farmers and ranchers to become better prepared for any disaster. It will:

- IDENTIFY vulnerable areas of production and management
- PRIORITIZE areas to strengthen
- create an ACTION PLAN specific to your operation
- develop an accurate INVENTORY of your assets
- identify and engage LOCAL CRITICAL SERVICES
- find additional HELP

Modules have been developed for beef cattle, dairy, swine, poultry, crops, and fruit and vegetables.

This multi-state collaborative project has utilized the expertise of Cooperative Extension professionals from multiple Land-Grant universities in the development of a set of disaster planning and continuity of operations modules for each of the major agriculture commodities.

Lee Myers, National Veterinary Stockpile (NVS), VS-APHIS-USDA, presented the National Veterinary Stockpile Strategic Plan and State Planning Template. NVS is a national repository of critical veterinary supplies, equipment, vaccines, and services.

An overview of inventory is as follows:

- large quantities of personal protective equipment and decontamination supplies
- foam/vaccination equipment
- restricted biologicals – vaccines/diagnostics
- commercial services for depopulation, disposal, and decontamination (3D)

Deployable Capabilities include:

- poultry depopulation foaming units
- push packs of personal protective equipment
- PPE individual kits
- antivirals
- AI vaccine
- AI field test kits
- portable satellite communication equipment
- portable vaccine shipment/storage containers
- disinfectants
- 3D commercial services who are:
  - qualified and managed by NVS; services arranged through US Coast Guard basic ordering agreement
  - scalable in response - 3D in total, part, or none
  - self-contained (equipment, supplies, personnel)
  - have large numbers of trained, medically qualified responders starting within 24 hours
  - have expertise in all-hazard response, ICS, C and D, transport of hazardous material, etc.
REPORT OF THE COMMITTEE

States leaders need to understand the following points in order to deploy the NVS.

- Request NVS deployment
- Receive NVS assets (as well as state and local supplies) at the receipt and storage site (RSS)
- Store assets (including temporary refrigeration)
- Stage assets for delivery to multiple outbreak sites
- Manage inventory for efficacy and replenishment
- Deliver assets to outbreak sites
- Recover unused and reusable assets


Zack highlighted the goals of foreign animal disease (FAD) response and preparedness:

- identify the veterinary functions and countermeasures that are necessary to contain and control the outbreak of a foreign animal disease
- integrate these veterinary functions and countermeasures with the emergency management systems and operations that will be conducted in joint and unified operations by local, State and Federal officials

Zack then discussed the NCAHEM FAD preparedness and response efforts, which includes:

- Continuity of Business Planning Strategies;
- National Veterinary Stockpile (NVS);
- National Animal Health Laboratory Network (NAHLN);

Pam Hullinger, Lawrence Livermore National Laboratory, presented Foot-and-Mouth Personnel Resources Estimate Project Update.

National-scale animal disease spread models have been identified by both a Blue Ribbon Panel and the FAD threat working group as critical decision support tools.

One question this model answers is “What resources are necessary over the course of a response and what impact does limited resources have on the outcome?” This model evaluates the feasibility of existing State and Federal FMD response plans with respect to required personnel resources.

Personnel position titles included in the modeling are from the Animal Emergency Response (AER) positions credentials:

- Veterinarian (DVM)
- Animal Disease Epidemiologist (ADE)
ANIMAL EMERGENCY MANAGEMENT

- Animal Technician (AT)
- Animal Handling Specialist (AHS)
- Unskilled Lay Individual (ULI)
  - unskilled lay may be farm employees
  - not included in AER position credentials

For scenarios initiated in a Tulare, California dairy, the DVM resources are overwhelmed about 15 percent of the time, while the AT resources are overwhelmed 100 percent of the time.

Vaccination on first confirmation reduces the number of infected-premises-related resources required for the duration of the outbreak.

Neville Clarke, Director National Center for Foreign Animal and Zoonotic Disease Defense, presented Brief on National Center for Foreign Animal and Zoonotic Disease Defense. Clarke gave a summary of research and education accomplishments for the Center which include:

- development of interstate transportation model for cattle and swine
- development of FASCAT to identify agriculture system critical infrastructure
- creation of National FMD model
- vaccine development and rapid detection field tests for FMD, Rift Valley fever and avian influenza
- training for Avian Influenza Response Personnel

Carla Thomas, National Plant Diagnostic Network, University of California, Davis presented All Hazards Agriculture Emergency Response Plan Template for Counties. Partnerships in the development of the template include:

- California Department of Food and Agriculture (CDFA)
- USDA-APHIS
- State of California Office of Emergency Services (CA OES)
- California Office of Homeland Security (CA OHS)
- National Plant Diagnostic Network

Plan contents include:

- Authorities
- Roles and Responsibilities Matrices
- Activation and Notification Charts
- Detection, Response and Recovery
- Contact Lists and Crisis Communication
- Emergency Declaration Instructions
- Resource Check Lists, Forms and Maps
- Field Operations Guide (FOG)
The Response Template is:

- NIMS compliant
- available for use by others
- All-Hazards Food and Agriculture Emergency Response Plan Workgroup exists in FoodSHIELD.

Request a FoodShield Account from Carla Thomas 530-304-0689 or cthomas@ucdavis.edu.

Tracey Lynn, Center for Emerging Issues (CEI), Center for Epidemiology and Animal Health (CEAH), VS-APHIS-USDA, presented Pro-Active Risk Assessments to Facilitate Emergency Response. Doing risk assessments proactively, in advance of an actual outbreak, allows responders to assess the risk of specific product movements more rapidly during an outbreak.

Designed to bring expertise from government, academia, and industry to develop risk assessments that are:

- usable by incident command
- understood by industry
- aid in capacity-building for risk analysis in academia and industry

Future directions include:

- development of additional analytical tools to estimate risk from spatial models used as data layers in an analysis
- move to compartmentalization
- integration/use of trade data
- develop risk assessments for other diseases and industries

Committee Business:

The Committee approved a Resolution concerning mass depopulation tasking USDA, DHS and AVMA to review mass depopulation methods and collaborate to create operational guidelines for control or eradication of emergency and program diseases.

A second Resolution relative to development of continuity of business plans and response on a regional basis was approved.

The Committee conference call schedule for the following year was established as the last Thursday of each month.

The primary item identified for the Committee’s focus is: Continued efforts to increase and secure funding to State Animal Health officials for emergency management purposes.
REPORT OF THE USAHA/AAVLD COMMITTEE ON
ANIMAL HEALTH INFORMATION SYSTEMS

Co-Chairs: Bruce L. Akey, Ithaca, NY
François C. Elvinger, Blacksburg, VA

Marianne Ash, IN; Laurence J. Berry, CA; Stan D. Bruntz, CO; Craig N. Carter, KY; James T. Case, CA; Max E. Coats, Jr., TX; William L. Hartmann, MN; John Heller, CO; Jodi A. Hoynoski, VT; Paul E. Knepley, PA; Elizabeth A. Lautner, IA; Janet E. Maass, CO; Kevin D. Maher, IA; Larry D. Mark, VA; Michael K. Martin, SC; Michael F. McGrath, IRL; James D. McKean, IA; Andres Perez, CA; Deidre A. Qual, ND; Tom Ray, NC; Stanley R. Robertson, MS; Emi K. Saito, CO; Mo D. Salman, CO; A. David Scarfe, IL; Jack L. Schlater, IA; David Smith, NY; Glenn B. Smith, GA; Victor L. Velez, CA; Patrick Webb, IA; Stephen E. Weber, CO; Jay P. Weidner, WA; Gary W. Wilson, OH; Nora E. Wineland, CO.

The Committee met on October 26, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 12:30 p.m. to 5:30 p.m. Thirteen members signed in along with 21 non-members of which 8 requested membership on the Committee.

Dr. Stan Bruntz, National Surveillance Unit (NSU), Center for Epidemiology and Animal Health (CEAH), Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA), presented the National Animal Health Reporting System (NAHRS) 2008 update. The NAHRS Steering Committee convened May 29, 2008 by teleconference and met August 25-26, 2008 in Fort Collins, Colorado. The following issues were discussed and were brought forward to the Committee: Participation. As of October 2008, forty-eight States (6 States in 2007) are currently reporting to NAHRS. Georgia and Rhode Island began participation in 2008. All 6 participant States reported to NAHRS every month in 2007. NAHRS information continues to be an important source of information used by Veterinary Services to complete US animal disease status reports for the World Organization for Animal Health (OIE). The NAHRS, as a credible source of information to support trade negotiations also provides summary level information on ‘program’ diseases and foreign animal diseases (FADs) and is a national source of information on the confirmed occurrence of endemic OIE-listed diseases. In 2008 there have been requests for NAHRS information during audits by the European Union (EU) and Chile. In 2009 NAHRS will continue its recruitment activities but will increasingly focus on further raising national awareness of NAHRS with continued improvement and validation of NAHRS reporting.

The NAHRS Aquaculture Commodity Working Group recommended to the NAHRS Steering Committee that the current NAHRS list of five reportable diseases for aquaculture (viral hemorrhagic septicemia, spring viremia of carp, infectious hematopoietic necrosis, epizootic
hematopoietic necrosis, and O. masou virus disease) be replaced by the list of fish, molluscan and crustacean diseases notifiable to the OIE (OIE Listed Diseases for these species is provided below), together with the associated OIE definitions and diagnostic criteria as published in the OIE Manual of Diagnostic Tests for Aquatic Animals. This brings NAHRS into harmony with OIE guidelines and allows NAHRS to accurately report OIE notifiable diseases. The request was approved by the Committee.

Fish Diseases
- Epizootic hematopoietic necrosis
- Infectious hematopoietic necrosis
- Spring viremia of carp
- Viral hemorrhagic septicaemia
- Infectious salmon anemia
- Epizootic ulcerative syndrome
- Gyrodactylosis (Gyrodactylus salaris)
- Red sea bream iridoviral disease
- Koi herpesvirus disease

Molluscan Diseases
- Infection with Bonamia ostreae
- Infection with Bonamia exitiosa
- Infection with Marteilia refringens
- Infection with Perkinsus marinus
- Infection with Perkinsus olseni
- Infection with Xenohaliotis californiensis
- Abalone viral mortality (listed as emerging per Article 1.2.2.2.)

Crustacean Diseases
- Taura syndrome
- White spot disease
- Yellowhead disease
- Tetrahedral baculovirosis (Baculovirus penaei)
- Spherical baculovirosis (Penaeus monodon-type baculovirus)
- Infectious hypodermal and hematopoietic necrosis
- Crayfish plague (Aphanomyces astaci)
- Infectious myonecrosis
- White tail disease (listed as emerging per Article 1.2.2.2)

The NAHRS Aquaculture Commodity Working Group also recommended to the NAHRS Steering Committee that the American Fisheries Society Fish Health Section (AFS-FHS) Blue Book be recognized as an alternate to the OIE Manual of Diagnostic Tests for Aquatic Animals for diagnostic criteria and test protocols for NAHRS reporting activities. The primary standard for laboratory testing is the OIE Manual of Standards for Diagnostic Tests and Vaccines, referred to as the OIE Manual. For Aquaculture diseases, the AFS-FHS Blue Book is also acceptable. This request was approved.
The NAHRS On-line Reporting Tool version 2 was released January 2008. The system improves the function and format of the on-line reporting tool. The NAHRS On-line Reporting Tool version 2 also includes requests for expanded equine infectious anemia (EIA) data. The EIA module is optional, but States that utilize it will not have to submit an annual EIA report to VS Equine Program staff. Summary of NAHRS EIA module State EIA reporting: Twenty-three States completed September 2007 – August 2008 EIA data and sixteen began use of NAHRS EIA module in 2008. Equine herpesvirus myeloencephalopathy (EHV1-EHM) was added for collection of qualitative information in addition to the combined EHV-1/EHV-4 information currently reported in NAHRS.

The NAHRS Steering Committee also discussed definitions of compartment/environment and commercial for reporting in NAHRS. The current use of commercial does not fit well with current OIE reporting and the term, although defined in the NAHRS Manual, can be ambiguous. The OIE defines poultry as all domesticated birds, including backyard poultry, used for the production of meat or eggs for consumption, for the production of other commercial products, for restocking supplies of game, or for breeding these categories of birds, as well as fighting cocks used for any purpose. Kleven referred this issue to the USAHA Committee on Transmissible Diseases of Poultry and Other Avian Species.

The NAHRS Steering Committee also approved exploration and possible expansion of NAHRS to collect quantitative information on zoonotic diseases. The Committee recommended starting with anthrax and tularemia. The NAHRS Steering Committee also reconfirmed that reporting of disease can be, at the discretion of the State Animal Health Official, at a presumptive or definitive level. This is primarily related to endemic disease reporting.

Bruntz also followed up on the 2007 Resolution 9 which requested that USDA-APHIS-VS in cooperation with State animal health officials and industry develop a United States National List of Reportable Animal Diseases with appropriate reporting criteria, using the List of Diseases Notifiable to the OIE as a starting point. USDA-APHIS-VS-NSU is drafting a list of diseases that may be considered nationally reportable, using the list of diseases notifiable to OIE as a starting point. To date the NSU has conducted background research of required disease reporting in the Code of Federal Regulations (CFR) and in other pertinent rules, agreements, and memos and reached the conclusion that USDA can, under existing authority, only draft voluntary reporting guidelines and not a mandatory list and protocol.

Discussions following Bruntz's presentation concentrated on the last point, a national list of reportable diseases. Concerns were voiced that such a list needs to be harmonized with other disease lists as dictated by various international trade partners, as is the case for avian diseases. Bruntz was not aware of any resistance to date to such a national list. A working group for establishing such a list and defining diagnostic and
reporting criteria, although proposed, has not yet been put in place and Committee members suggested to use the existing NAHRS Subcommittee to constitute such a workgroup.

Dr. Aaron Scott, CEAH-VS-APHIS-USDA, presented the 2008 update on a Comprehensive, Integrated National Animal Health Surveillance System (NAHSS). He first described the emergence of NAHSS from Principle 1A of the 2001 National Animal Health Safeguarding Review and the development to date of supporting tools, definition of surveillance streams and the integration of surveillance programs, supported by surveillance and data standards. Scott then referred to discussions of the NAHSS Steering Committee face-to-face meeting in August 2008 as to having or not having an ideal surveillance system. He discussed the factors that contribute to ideal surveillance, including awareness and alertness of federal, State and industry stakeholders, availability of state of the art technology, including diagnostic and information technology that allows for real-time data and information movement and assessment for action by decision makers, as well as translation of such information and evaluation to all stakeholders.

Scott introduced the topic of NAHSS in the context of the Veterinary Services 2015 Vision and laid out a framework for the forces of change on which the 2015 NAHSS will continue to develop. Challenges include tight Federal and State budgets that influence preparedness for response, the recognized need for activities at the human animal interface, and especially the requirement for flexibility in an ever changing environment.

Mr. John Picanso, USDA-APHIS-VS, presented Veterinary Services Software Development – Results and Direction. By creating the National Animal Health Information Technology Board, VS and the National Assembly of State Animal Health Officials (NASAHO) renewed their commitment in March of 2008 to work together on enhancing VS information technology systems and streamline the exchange of data flow between systems. Members of the Board include Paul Anderson, Minnesota; Steve Dedaro, Ohio; Steve Halstead, Michigan; Annette Whiteford and Victor Velez, California; Bob Hillman, Texas; Bruce Akey, New York; Paul Knepley, Pennsylvania; Kyle Forrester, North Dakota; Martin Zaluski, Montana; Barb Powers, Colorado; as well as five National Program and CEAH Staff. Through collaboration and more transparency surrounding information technology software development, both at the Federal and State levels, the Board is setting the direction for the future on how animal health surveillance and monitoring information can be more efficiently, effectively and securely shared. VS also has been assembling the Veterinary Services Roadmap Report – A New Direction or Paving the Way for the Future. VS-APHIS-USDA is undergoing an enterprise architecture review to identify processes and methods concerning collection and delivery of mission critical electronic data or information to
ANIMAL HEALTH INFORMATION SYSTEMS

VS systems. This report is to provide executives, industry partners, State cooperators, field personnel and information technology (IT) personnel the ability to learn what the current technical position is within VS and provide technology alternatives to move us into the future.

Dr. Raoul Gonzales, National Biosurveillance Integration Center (NBIC), Department of Homeland Security (DHS), presented a brief on the National Biosurveillance Integration System (NBIS) and the NBIC. Recognizing the need to create a new biological threat analysis capability across multiple sectors, the President of the United States issued two Presidential Directives: HSPD-9: Defense of U.S. Food and Agriculture (January 2004) and HSPD-10 (April 2004): Biodefense for the 21st Century. HSPD-9 directed that: The Secretaries of Interior, Agriculture, Health and Human Services, the Administrator of the Environmental Protection Agency, and the heads of other appropriate Federal departments and agencies are directed to build upon and expand current monitoring and surveillance programs to develop robust, comprehensive, and fully coordinated surveillance and monitoring systems, including international information, for animal disease, plant disease, wildlife disease, food, public health, and water quality that provides early detection and awareness of disease, pest, or poison agents. HSPD-10 further called for the creation of a national bio-awareness system that permits the earliest possible recognition of a biological attack. Based upon these directives, the NBIS program was developed and implemented within the DHS.

NBIS provides a homeland security-relevant biosurveillance common operating picture to senior leaders and partner agencies regarding natural disease outbreaks, accidental or intentional uses of biological agents, and emergent biohazards through the acquisition, integration, analysis and dissemination of information from existing human disease, food, agriculture, water, meteorological, and environmental surveillance systems and relevant threat and intelligence information.

The NBIC is physically located at the Nebraska Avenue Complex, Washington, DC and subordinate to DHS, Office of Health Affairs (OHA). It integrates data and fuses information to provide early cueing and increased situational awareness of natural or man-made biological incidents to senior leaders, NBIS Member Agencies and participating partner organizations. The capabilities of NBIC are to rapidly identify, characterize, localize and track a biological event of national concern by integrating existing public and private surveillance systems from across human health, animal, plant, food, water and environmental domains. The NBIC further leverages intelligence information to provide analysis that can decrease the impacts of biological events. The efforts are led by a team of analysts with multidisciplinary skills including veterinary medicine, human medicine, epidemiology, public health, environmental sciences, clinical and
Dr. David Van Metre, Colorado State University, gave a presentation on Syndromic Surveillance in a Colorado Livestock Auction Market. A variety of livestock species originating from multiple sources are assembled at and distributed from auction markets which therefore could serve as useful locations for conducting local, State or national surveillance programs. Van Metre presented frequencies of clinical disease signs at an auction market, where a veterinarian inspected animals visually from outside of the pens and reported signs categorized into 12 syndromes. Respiratory syndrome was the most common disease syndrome observed, followed by thin syndrome and ambulation/posture syndrome, with the greatest numbers of observed clinical signs occurring on the days of greatest auction market activity. In the follow-up discussion he suggested that through real-time aggregation of such data compiled from multiple auction markets trends and emergence of diseases could be monitored.

Dr. Dustin Pendell, Department of Agriculture and Resource Economics, Colorado State University, presented Control Strategies for a FMD Outbreak: Probability Distributions of Economic Impacts. The objective of this study was to determine the probability distributions of expected economic impacts associated with various emergency management strategies in the event of an FMD outbreak in the U.S. Such impacts are influenced by the region beyond which 95 percent of centrally-originating outbreaks would not spread, the type and location of the introduction herd, the regulatory requirements of quarantine time and scope, and the variety of potential depopulation and vaccination measures and strategies. Pendell described the various models that are used for the work including the North American Animal Disease Spread Model (www.naadsm.org), which is a stochastic temporal and spatial spread model that simulates FMD with its input parameters from published studies and experts’ opinions; an equilibrium displacement model which estimates welfare changes due to exogenous shock estimated from epidemiological models and market parameters obtained from previous literature and estimation; and a system of supply and demand equations on consumer substitutability, farm-retail marketing chain and import and export markets where appropriate. Estimations from such models provide insight to policy makers, government regulatory and research agencies, academic extension and research scientists and the livestock and meat industry.

Dr. Jim Case, University of California, Davis, provided a NAHLN information systems update, in which he described the goals and standards of the NAHLN IT and the current status of messaging, terminology services, and support of documentation. In particular he described the application of NAHLN concepts to the current activities in
California related to bovine tuberculosis, first identified in December 2007, and in which more than 5,400 cattle specimens have been submitted to date for gamma interferon testing. All specimens were submitted with unique, centrally generated barcode identifiers, and barcodes are linked to the NAIS RFID in the field. Producer IDs are also captured and linkage data are transmitted electronically to USDA and the California Department of Food and Agriculture (CDFA), with laboratory results transmitted to CDFA via NAHLN defined message structures. Barcoding reduces time for initial data entry with time savings up to 90 percent, eliminates transcription errors, allows for automated linkage of specimen identification (ID) to the specimen source (NAIS RFID), automates identification of labeling errors by not allowing duplicate specimen IDs, reduces the amount of data collected and provides the ability to automate results reporting.

From this and other events Case explained that initial concepts of the NAHLN architecture have now been applied in a wide variety of scenarios. The robust nature of the NAHLN messaging and vocabulary infrastructure supports maximal reuse with minimal retooling, increases data quality through the unique specimen identifiers and field data collection tools, and allows for immediate data analysis through the use of standardized results terminology. Further work is needed with existing and future APHIS programs to adopt NAHLN-based standards. Participation of NAHLN laboratories in messaging through training and support needs to be increased and NAHLN standards should be extended to additional diseases. He concluded that a long-range plan for a surveillance architecture needs to be developed that embraces the successes of the pilot projects.

Committee Business:

During the Business Section of the meeting the Committee proposed, discussed and approved one Resolution, which was submitted to the Committee on Nominations and Resolutions.

The Committee discussed transition of Committee Co-chairs, Dr. Akey stepping down after 10 years of chairmanship, with the proposal of being replaced by Dr. Jim Case, to be co-chair with Dr. Elvinger, pending approval of USAHA and AAVLD presidents.

The final discussion was related to the name and mission of the committee. The committee name does not currently reflect the increased focus on surveillance, and Dr. Akey proposed to add surveillance to the name of the committee. Therefore Committee members suggested to rename the Committee to Committee on Animal Health Surveillance and Information Systems.

A mission statement for discussion reads as follows:

Animal Health Surveillance and Information Systems are designed and
implemented to solicit, obtain, compile and manage data on animal health and disease and on factors that influence the health status of animals and animal population. Animal Health Surveillance and Information Systems are to provide information to stakeholders with a need, right and obligation to know in order to take action for the maintenance of animal and public health, control and eradication of disease, well-being of animals, profitability of animal industries and animal owners, and for the National and global good. The Committee on Animal Health Surveillance and Information Systems encourages, stimulates and aids the design, development and implementation of such systems; the committee provides a forum for discussion of new developments and facilitates review and oversight of existing systems.
REPORT OF THE COMMITTEE ON ANIMAL WELFARE

Chair: J Amelita Facchiano, Dallas, TX
Co-Vice Chairs: Carolyn L. Stull, Davis, CA
Ria de Grassi, Sacramento, CA

Wilbur B. Amand, PA; Joan M. Arnoldi, WI; Chris D. Ashworth, AR; Sarah L. Babcock, DC; Yvonne M. Bellay, WI; Shane A. Brookshire, GA; Tom Burkgren, IA; Beth W. Carlson, ND; Matt H. Cochran, TX; Leslie E. Cole, OK; Stephen R. Collett, GA; Timothy R. Cordes, MD; Stephen K. Crawford, NH; Ron DeHaven, IL; Kevin M. Dennison, CO; Debra S. Duncan, KS; Reta K. Dyess, TX; Joel K. Espe, WI; Kathy D. Finnerty, NY; W. Kent Fowler, CA; Nancy A. Frank, MI; Chester A. Gipson, MD; Gail C. Golab, IL; Eric C. Gonder, NC; Nancy E. Halpern, NJ; Steven L. Halstead, MI; Marlene Halverson, MN; Jeffrey J. Hamer, NJ; Bill Hawks, DC; Del E. Hensel, CO; Ernest P. Hovingh, PA; Lee C. Jan, TX; Jamie S. Jonker, VA; Terry L. Klick, OH; Anthony P. Knight, CO; Cathy A. Liss, DC; Martha A. Littlefield, LA; Calvin W S. Lum, HI; 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; Sherrie R. Niekamp, IA; Sandra K. Norman, IN; Roger E. Olson, MD; Elizabeth J. Parker, DC; Kristine R. Petrin, MN; John R. Ragan, MD; Sebastian Reist, NJ; 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; 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; Belinda S. Thompson, NY; Kerry Thompson, DC; Bob Tully, KS; Charles D. Vail, CO; Gary M. Weber, MD; Katherine Wetherall, CA; Annette M. Whiteford, CA; Norman G. Willis, ONT; Ellen M. Wilson, CA; Ross Wilson, TX; 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 Wednesday, October 29th, 2008, at the Sheraton Greensboro Hotel at Greensboro, North Carolina. Chair Amelita Facchiano called the meeting to order at 8:00 am with 44 committee members and at least 31 guests in attendance. Chair Facchiano reviewed the activities of the Committee during and following the 2007 Annual Meeting. The mission statement of the Committee was acknowledged in her opening remarks. The three agenda items suggested most by the members for this session were race horse issues, existing programs with farm animal standards, and handling welfare issues at the state level.

Discussion also included the issues of quorum status and proxy voting, both of which are to be addressed by the Board of Directors to provide
clear guidance in the future. Members were asked to provide suggestions
for future meeting agenda topics either directly to the Chair or Vice-Chairs
or by written comment on the attendance sheets being circulated through
the room, and announced that the 113th Annual Meeting would be October
8-14, 2009, at the Town and Country San Diego, California. Facchiano
then reviewed the action taken at the previous meeting before introducing
the first speaker.

Ms. Cathy Liss, Animal Welfare Institute (AWI), spoke on the issue
of humane slaughter. She noted that with meat recalls due to bacterial
contamination and the horrific handling and slaughtering of downer cows
making headlines throughout this past year, consumers are increasingly
aware of some of the problems occurring behind the slaughterhouse
doors. The AWI has released a 150-page report authored by Dena Jones
analyzing humane slaughter enforcement at slaughter plants. Crimes
Without Consequences: The Enforcement of Humane Slaughter Laws
in the United States reveals an ongoing lack of sound enforcement at
plants around the US. Drawing from over 1,000 documents obtained
from sources including 60 public records requests to federal and state
agriculture departments from 2002 to 2007, the book exposes both the
lack of compliance by plants and the lack of sound enforcement at plants
by departments of agriculture.

Only 42 enforcement actions beyond issuances of deficiency reports
for non-compliances with the Humane Methods of Slaughter Act were
taken in the US between 2002 and 2005. Whistleblower accounts
and undercover documentation suggest the majority of crimes are not
observed or recognized by inspection personnel, not reported through
the proper channels, or the appropriate remedial measures are not being
taken. AWI is calling on Congress to: 1) extend the federal slaughter law
to include poultry; 2) assign a minimum of 50 United States Department
of Agriculture (USDA) Food Safety Inspection Service inspectors the sole
task of ensuring the humane handling, stunning and slaughter of animals;
3) reject the notion that sound enforcement can be achieved by use of
cameras in lieu of inspectors; and 4) abandon the notion that industry self-
regulation is adequate. Discussion by a member followed on the need for
USDA to address these challenges at slaughter facilities.

Dr. Gail Golab, Animal Welfare Division, American Veterinary Medical
Association (AVMA), presented AVMA’s animal welfare activities report.
AVMA reported on a number of activities this year in fulfillment of its
strategic goal to be an advocate for and an authoritative science-based
resource on animal welfare. Multiple substantive policy revisions were
adopted (e.g., castration and dehorning of cattle, trapping and steel-
jawed leghold traps, disabled livestock) as were several new policies
(e.g., elephant guides and tethers, humane transport of equines, veal
calf housing). Federal legislative activities focused on responses to
proposals in Congress addressing horse slaughter, horse transport, and private ownership of nonhuman primates by unlicensed individuals, as well as seeking legislation to address unwanted horses and to amend the humane slaughter act to include all species slaughtered for commercial use. At the state level, while acknowledging that a specific response to Proposition 2 was within the purview of the California Veterinary Medical Association (CVMA), the AVMA expressed its desire for a more comprehensive approach to addressing behavioral needs in housing for laying hens, veal calves and gestating sows. On the international level, AVMA representatives attended the 2nd Global Animal Welfare Conference sponsored by the World Organization for Animal Health (OIE) in Cairo, Egypt. The focus was implementation of OIE animal care standards. Other activities included continued development of backgrounders (referenced literature reviews on issues of interest), revised and expanded animal welfare pages on the AVMA Website, production of a new brochure on animal welfare decision-making, and educational initiatives directed toward graduate veterinarians and veterinary students. Notable projects moving forward in 2009 include re-convening the Panel on Euthanasia and an AVMA-Association of American Veterinary Medical Colleges (AAVMC) Animal Welfare Symposium focusing on animal welfare education, research, and advocacy.

Dr. Rachel Cezar, Animal Care (AC), Animal and Plant Health Inspection Service (APHIS), presented the overview of the Horse Protection program including the current specific definitions utilized in the Horse Protection Act (1970). The details of the USDA enforcement program to eliminate the inhumane treatment (action devices, prohibitive substances, shoeing, etc.) of horses through the act of soring were shown in a video and also discussed. Specifically, challenges and statistics for this past year with violations of the Horse Protection Act were highlighted, with 506 shows inspected and 629 violations in 2007. Also, the new technology of thermography and foreign substance testing being utilized during the inspection procedure was described along with their application during inspections.

Dr. Robert Gibbens, AC-APHIS, updated the Committee on the animal care program activities. There are 9,800 active facilities in the US that are regulated by the Animal Welfare Act (AWA). Missouri is the state with the most facilities, mainly dog dealers. There were 100 inspectors performing 16,000 inspections in 2008. The Animal Care Information System is being developed for the on-line licensing, registrations, and inspections reports, and the system should be functioning in the near future. The Office of Inspector General (OIG) just completed the audit of commercial dog breeders with the final report expected in 2009. Another OIG audit is expected in 2009 for exhibitors, including large cats. The newest docket proposed is for development of contingency plans to provide care...
REPORT OF THE COMMITTEE

for animals under the AWA in the event of disaster or emergency. The 2008 Farm Bill had impacts on the importation of large dogs, increased the maximum civil penalty for violation of the AWA, and called for a study on the use of dogs and cats for federally funded research. Animal Care also had activities on pet sheltering and evacuation policies for disasters. The announcement has been disseminated on the development of the Animal Welfare Center for the informational support of AWA and the Horse Protection Act.

Ms. Deb Reinhart, Gold Star Farms, briefed the Committee on the National Dairy Animal Well-being Initiative (NDAWI) which is a dairy producer lead effort to build consumer trust and confidence in the dairy industries with a focused commitment to animal well-being. The NDAWI consists of broad principles and guidelines that any dairy well-being program should include to meet their ethical obligation of providing for the well-being of dairy animals. This is not another on-farm animal well-being program. Many of the co-operatives, associations and independent companies have already established or are in the process of establishing well-being programs. The uniform national dairy animal well-being principles and guidelines will help validate the strength of individual on-farm well-being programs.

This coalition is a broad base group of volunteers from across the country representing every facet of the dairy industry. It includes producers, processors, coops, allied industry, academics, associations and others. Much of the work done by the initiative has been done through volunteers. The Professional Dairy Producers of Wisconsin provided the initial funding to get the initiative off the ground. Other industry stakeholders have provided funding to help launch the initiative publicly. The principles and guidelines were released in 2007 at World Dairy Expo and were available for industry comment and feedback. A final version was unveiled at the 2008 World Dairy Expo. The NDAWI is an ongoing continuous improvement process to provide assurance to national stakeholders that the entire industry is meeting their obligation of providing appropriate care for dairy animals by having a uniform umbrella of national well-being principles and guidelines. There will be third-party verification of the individual programs in the future.

Ms. Nancy Robinson, Livestock Marketing Association (LMA), presented LMA’s new Livestock Auction Market Guide to Animal Handling and Employee Handling (The Guide), an educational approach to enhancing livestock handling at member auction markets throughout the US. Robinson gave a brief outline of LMA’s new guide, as well as the voluntary assessment tool for market animal handling practices that will be offered to their 180 member markets. The Guide is a comprehensive education and training tool for market operators and their employees on the proper handling of livestock at auction markets. The Guide focuses
on eight areas of primary interest in providing proper care and handling of livestock at auction market facilities. Those primary areas of interests covered in The Guide are: 1) the role and responsibilities of the market owner/manager in following proper animal handling procedures and protecting livestock, employees and others from injury; 2) livestock working surfaces and working with gates; 3) managing risks at the market to avoid animals becoming non-ambulatory; 4) the proper handling of animals that become injured or disabled at market facilities; 5) the handling of animals that arrive non-ambulatory; 6) proper movement of non-ambulatory animals; 7) safe and responsible euthanasia of various species of livestock; and 8) development of animal handling guidelines for individual market facilities and self-assessment of market handling practices.

Robinson also discussed the initiation of a new LMA sponsored voluntary assessment of their member markets’ animal handling practices. Under this program, market owners/managers may request an assessment of their facilities by LMA field representatives to determine if proper animal handling practices are being followed by their employees as established by The Guide.

In advance of the Committee’s meeting, all Committee members who have quality assurance program resources on animal care (animal care standards, or animal care guidelines) were invited to bring handout materials for distribution at a display table in the meeting room. The Committee took a break to allow members and guests to peruse the materials, pick up copies, and discuss the information contained within these publications. Many different species were represented and all available hand-out materials were disseminated among the interested Committee members.

Dr. Carolyn Stull, School of Veterinary Medicine, University of California-Davis, presented an overview of a recent extension workshop for the dairy industry on technology transfer that benefits the non-ambulatory bovine. Even though only about two percent of dairy animals become non-ambulatory each year, the public has become aware of the handling and treatment of these animals through news and other media stories. The workshop introduced an educational approach to improving the welfare of non-ambulatory cattle. The lecture portion of the workshop focused on the causes, care, treatment, and handling of the non-ambulatory cattle at commercial facilities and markets, along with the indications and appropriate methods of euthanasia. The hands-on laboratory gave participants the opportunity to interact with the utilization of the large animal sling, which is a rapid and practical on-farm method to lift non-ambulatory cattle. The suitability of floatation therapy following lifting was discussed for the treatment of non-ambulatory cows. Participants also experienced the discharging of the penetrating captive bolt device as an appropriate euthanasia method. Dairy management was encouraged
REPORT OF THE COMMITTEE

to work with their veterinarians to develop welfare and handling plans for non-ambulatory cattle. The workshop was a proactive and practical approach to improving welfare of non-ambulatory cattle, and is expected to be repeated in the near future for various facets of the industry in California.

Dr. Charles D. Vail, Littleton Equine Medical Center, Littleton, Colorado, spoke on the topic of the American Association of Equine Practitioners (AAEP) White Paper on the practice of soring of show horses. A video developed by three Girl Scouts on the practice of soring in Tennessee Walking Horses was shown to the Committee, and is available on the web. The AAEP paper is a classic white paper developed by committee that focused on soring. Soring is purposely and deliberately practiced to exaggerate the gait of the Tennessee Walking Horse and causes pain in their front legs. Vail gave the substance for a resolution which calls for the elimination of soring, with USDA continuing their diligence in enforcing the Horse Protection Act.

Dr. Ernie Zirkle, retired New Jersey State Veterinarian, described the lessons learned from New Jersey on the creation of animal care standards for animals raised for food and fiber. In 1996, the New Jersey legislature mandated that standards be developed for humane care, treatment, raising, keeping, marketing and sales of domestic animals. The New Jersey Department of Agriculture declared that they would develop standards below which conditions would be clearly inhumane. The standards would not be developed as optimum standards or best management practices, but could be used as guidelines in animal cruelty investigations. Delayed for several years by lack of funding appropriations, the standards were finalized and published in May 2003 and adopted in June 2004. A public hearing elicited fierce debate with 100 people testifying both for and against the standards. Additionally, 6,500 written comments were received, mostly negative, from almost all states as well as many foreign countries. Minor amendments were made and the final version was published June 5, 2005. On June 25, 2005 an appeal was filed by a coalition of plaintiffs including The Humane Society of the United States (HSUS), Farm Sanctuary, American Society for the Prevention of Cruelty to Animals, Animal Welfare Institute, Animal Welfare Advocacy, Center for Food Safety, and New Jersey Society for the Prevention of Cruelty to Animals, as well as others. The case was heard before the New Jersey Superior Court in December 2006 which rendered an opinion upholding the Department of Agriculture in February 2007. The animal rightists appealed to the Supreme Court and in a decision published July 30, 2008 the courts again ruled in favor of the Department with the exception of tail docking in cattle. Additionally, the courts charged that the Department keep current with scientific data regarding humane livestock production.
The New Jersey Department of Agriculture defended their obligation to support the ability of animal agriculture to continue the practices of husbandry taught by land grant colleges across the country. Collectively, there has been no national initiative on the part of animal agriculture to scientifically and systematically counter the emotional appeal of the animal rights movement. The Committee on Animal Welfare needs to reach out to organizations that have similar missions and who could benefit from a synergistic relationship. Examples are the National Institute for Animal Agriculture (NIAA) and the National Animal Interest Alliance (NAIA) which deals not only with livestock but with pets, wildlife, and exotics. While New Jersey agriculture has unique pressures, both from population density and a highly educated, liberal citizenry, the challenges New Jersey faced five years ago have surfaced across the country. Zirkle recommended that those committed to the future of animal agriculture must diligently and collectively launch an aggressive public defense with common sense and factual information. Zirkle gave an overview of the impacts of closing the slaughterhouses for equines in the US including the increase in the number of facilities for slaughtering US horses in Canada and Mexico; the number of unwanted horses is increasing the US and a solution should be developed by working together with all concerned to reverse the unintended consequences of the closures of the slaughter facilities in the US.

Committee Business:

The business meeting followed the last presentation. Five resolutions were considered. The first Resolution discussed was to support the AAEP call for the elimination of the abusive practice of soring and requests that the USDA-APHIS-AC, in cooperation with industry, to continue their vigilant monitoring of the Horse Protection Act of 1970. The Resolution passed unanimously.

The second proposed Resolution banned the transport of horses in double-deck trailers was amended; the amended version passed. An amended Resolution on the consistency in guidelines and applications for large scale euthanasia also passed the Committee with a unanimous vote.

Proposed Resolutions which were submitted but failed for further action were on the USAHA proposed response to World Organization of Animal Health (OIE)’s definition of welfare and the call for USAHA to contact the Commission and request an amended report that incorporates the technical committees’ peer-reviewed findings.
Co-Chairs: Andrew E. Goodwin, Pine Bluff, AR
Kevin R. Snekvik, Pullman, WA

Marilyn Blair, ID; Deborah L. Brennan, MS; Stan D. Bruntz, CO; Jones W. Bryan, SC; William W. Buisch, NC; Tony A. Caver, SC; Ria de Grassi, CA; Robert G. Ehlenfeldt, WI; James M. Foppoli, HI; Nancy A. Frank, MI; Suzanne N. Gibbons-Burgener, WI; Burke L. Healey, NC; Donald E. Hoenig, ME; Frederic J. Hoerr, AL; Sherman W. Jack, MS; Myron J. Kebus, WI; Lester H. Khoo, MS; Scott E. LaPatra, ID; Tsang Long Lin, IN; Vader M. Loomis, PA; John R. MacMillian, AR; Phillip M. Mamer, ID; Mr. Larry D. Mark, VA; Otis Miller, NC; Regg D. Neiger, SD; Lanny W. Pace, MS; Charles Palmer, CA; Kristine R. Petrini, MN; Nick Phelps, MN; Jill B. Rolland, MD; James A. Roth, IA; John P. Sanders, WV; A. David Scarfe, IL; Tara J. Schnell, WI; Robert M. S. Temple, OH; Norman G. Willis, ONT.

The Committee met on October 26, 2008 at the Sheraton Greensboro Hotel in Greensboro, North Carolina, from 12:30-5:30 p.m. There were 14 members and 21 guests present. The Committee session opened with introduction of the Co-Chairs.

Dr. Jerry Heidel, Oregon State University, presented the National Animal Health Reporting System (NAHRS) update. The background was discussed. The number of reportable organisms expanded from the original five to include additional pathogens and infectious agents for mollusks and crustaceans. Reference for establishing diagnosis initially the World Organization for Animal Health (OIE) reference manual, this was expanded to include diagnoses established from either OIE or American Fisheries Society (AFS) Blue Book; this change has passed NAHRS steering committee.

Topics for next year include:
- define animal species included in system;
- attempt to work out diagnosis that was similar for OIE and AFS Blue book; and
- get state veterinarians, tribes and private laboratories into reporting system.

Dr. Jill Rolland, Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA), presented the Update on the Interim Viral Hemorrhagic Septicemia (VHS) Federal Rule. She discussed the background of VHS within the Great Lakes, and key points within the interim rule were presented. See the following web site for the complete document: www.nemw.org/vhsinterimrule.pdf.
The comment period will end November 10, 2008 as described in the Federal Register, but the rule will not be implemented on November 10, 2008. There will soon be a notice in the Federal Register delaying the Interim Rule for an additional 60 days. During that period, APHIS will evaluate comments received by the November 10 deadline and anticipates releasing a revised rule some time during the 60 day period. That rule will also include an additional comment period effective from the date of publication of the revised rule in the Federal Register. Most comments received thus far refer to: 1) the requirement for a visual inspection of the fish within 72 hours prior to shipment (too expensive, not enough veterinarians to do the work), 2) the duration of validity test results, especially for farms on unprotected water sources (the test is good for 30 days but the actual testing process often takes at least 30 days to complete), and 3) that temperature requirements make testing impossible during some seasons. The revised interim rule is not expected to go into effect until March 2009.

Dr. Jill Rolland next presented Funding and Implementation of the National Aquatic Animal Health Plan (NAAHP). She shared a background of NAAHP, presented focus areas. Work group notes and additional information can be found at www.aphis.usda.gov/animal_health/animal_dis_spec/aquaculture/naah_plan.shtml.

The draft of NAAHP is complete and currently is in the approval process for publication. Dr. Kevin Snekvik proposed a Resolution entitled, National Aquatic Animal Health Plan. Discussion by the Committee ensued regarding the wording of the Resolution. Agreement on the wording was reached by the Committee. A motion to vote was put forth by Phil Mamer. A vote was taken and there was unanimous approval of the Resolution by the Committee. The Resolution is very similar to one passed by the Committee in 2006, but members felt that it was important to reaffirm their support for this important project.

Dr. Kevin Snekvik, Washington State University, presented information on the Aquatic Animal Diagnostic Laboratory Network.

He discussed the 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. Initial meeting of multiple laboratories involved with fish, shrimp and mollusk disease diagnosis along with representatives from the USDA and National Veterinary Services Laboratory (NVSL) occurred on Friday, October 24, 2008. From this meeting a plan to meet with individuals involved with the National Animal Laboratory Network and the National Plant Laboratory Network in regards to how respective laboratories were conceived and organized.

Dr. Snekvik proposed a Resolution entitled, Federal Funding for an Aquatic Animal Laboratory Network Discussion by the Committee ensued regarding the wording of the Resolution. Agreement on the wording was reached by the Committee. A motion to vote was put forth by Nick Phelps.
A vote was taken and there was unanimous approval of the Resolution by the Committee.

Dr. Rolland and Dr. Don Hoenig, Maine Department of Agriculture presented The Future of the Infectious Salmon Anemia (ISA) Program. They provided a review of an outbreak of infectious salmon anemia virus in Maine and adjacent sites in Canada. January 2006 was the last outbreak in Maine; no clinical cases in approximately 22 months. In July/Aug 2007 there were additional cases in Canada. Presentation of interactions with Cook Industries regarding surveillance for disease and the utilization of epidemiology and arrangement of sites to reduce occurrence of disease were also shared with the Committee.

This year there is reduction in funding for the ISA program to $150,000 which is concurrent with reduction in staff dedicated to the program. There is ongoing work and transfer of ideas regarding containment of ISA and reduction in disease with Chile and their ongoing ISA outbreak.

Members of the Committee expressed interest in as motion to suggest increased support for the ISA program, but Dr. Hoenig felt that support for ISA would be an inevitable result of implementation of the NAAHP and that the Committee previous Resolution in support of the NAAHP was sufficient.

Dr. Ralph Elston, AquaTechnics, discussed Compartmentalization of Farmed Shellfish Operations in the Pacific Northwest. He provided review of Manila clam and Pacific oyster production in the Pacific Northwest and movement of animals along the west coast of the United States and Hawaii. Also he discussed seed export to European Union (EU). The main disease that has been an issue is Denman Island disease. Out of concern regarding this disease arose the EU directive in November 2003 that limited seed export to the EU, and EU Audit in June 2007. The concept of compartmentalization was described and possible ways to utilize compartmentalization in this situation. Industry needs include: 1) the development of specific goals for the industry, 2) the formal unification of federal and state programs, and 3) adjust or augment surveillance. Compartmentalization could be applicable in some cases. Elston expressed his and the industry’s appreciation for support they received from USDA-APHIS in industry’s efforts to deal with the EU audit.

Mr. Nick Phelps, University of Minnesota, presented The Use and Interpretation of Polymerase Chain Reaction (PCR) Testing in Regulatory Fish Health. He gave a brief justification for the integration of PCR testing for viral hemorrhagic septicemia virus included in the third Resolution for the Committee.

Mr. Phelps proposed a Resolution entitled, Use and Interpretation of PCR results for VHSV. Discussion by the Committee ensued regarding the wording of the Resolution and issues of PCR test fitness for purpose.
Agreement on the wording was reached by the Committee. A motion to vote was put forth by David Scarfe. A vote was taken and there was unanimous approval of the Resolution.

Committee Business:
   The Committee approved three Resolutions as outlined in this report, and were forwarded to the Committee on Nominations and Resolutions.
REPORT OF THE COMMITTEE ON
BIOLOGICS AND BIOTECHNOLOGY

Chairman: Bob Pitts, Athens, GA
Vice Chair: Vacant

Gary A. Anderson, KS; Joan M. Arnoldi, WI; Charles A. Baldwin, GA;
Yung Fu Chang, NY; James J. England, ID; William H. Fales, MO;
Robert W. Fulton, OK; Ted Girshick, CT; Keith N. Haffer, SD; Larry L.
Hawkins, MO; Chris S. Hayhow, KS; Ruud G. Hein, DE; Richard E. Hill,
IA; Joseph N. Huff, CO; Majon Huff, CO; Terry L. Klick, OH; Hiram N.
Lasher, DE; Lloyd H. Lauerman, WA; John C. Lawrence, ME; Randall
L. Levings, IA; Robert E. Pitts, WV; Carol L. Rinehart, MO; Deepanker
Tewari, PA; Deoki N. Tripathy, IL; Bob Tully, KS.

The Committee met on October 27, 2008 at the Sheraton
Greensboro Hotel Greensboro, North Carolina, from 7:00 to 10:15
p.m. There were 10 members and 14 guests present. New 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 33 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 Chair asked
that everyone introduce themselves. Chair Pitts expressed pleasure
at the large turnout and interest. The Vice-Chair position is vacant and
applicants were encouraged. The Committee Mission Statement was
reviewed and found compatible with the associations new Strategic
Operational Plan. The Committee mission statement is as follows:

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.

This Committee meeting conflicts with other Committees and
suggestions to alter the time were discussed. Time suggestions were
solicited. Due to limits by United States Department of Agriculture
(USDA) personnel, the Committee was asked to identify key USDA
people that add value to the Committee meeting. Drs. Hill, Rippke and
Karli from USDA, Animal and Plant Health Inspection Service (APHIS),
Veterinary Services (VS), Center for Veterinary Biologics (CVB) were
identified as key participants and presenters for future meetings. There
were no resolutions to review and those present were encouraged to
Center for Veterinary Biologics – Program Activities and Initiatives
Dr. Richard Hill, Center for Veterinary Biologics, VS

Dr. Hill started his comments with recent progress at the 480 acre campus of the National Centers for Animal Health (NCAH), the new combined facility at Ames, Iowa. This is the single largest construction project in the history of the USDA. The APHIS/Agriculture Research Service (ARS) plan for upgrading and modernizing the Ames laboratory facilities brings three animal health institutes together in one site. They are CVB, National Animal Disease Center (NADC) and the National Veterinary Services Laboratory (NVSL). The $5.1 million, Laboratory/Administrative Phase I, was completed August 2004. Phase 2, containing Biosecurity level 3 (BSL-3) laboratories and administrative offices, at a cost of $279.5 million, is scheduled for completion in December 2008. The High Containment Large Animal Facility (HCLAF) was completed in February 2007 at a cost of $104.6 million. It contains 21 animal rooms in a BSL 3 Ag standard. This building made the national news as the building was constructed in a bubble. The Low Containment Animal Facility (LCLAF) construction is scheduled for completion in November 2008 at a cost of $257 million. Additional investments in laboratory equipment, equipment monitoring, roads, etc., are delayed due to money shortages. Essential equipment such as freezers are currently monitored by hand.

According to Dr. Hill the USDA continues to explore ways to meet the total budget. They reduced scope and costs of new construction and continue to use some existing buildings. Equipment and operational expenses are not in construction budget and paying for this in the 2009 budget appears to be a major challenge. Concern was expressed by Committee member Joe Huff that funds for the operational expenses of the new buildings will not be available in all future budgets.

Dr. Hill then discussed some of the current and emerging issues at USDA-APHIS-VS. Bluetongue preparedness was discussed. The gaps in existing plans were evaluated that includes research, surveillance, diagnostics, vaccination policy, collaborations, etc. Another issue, the future of the US Animal Health Laboratory Infrastructure was also examined and it was decided to have a National Forum in the future to address the issues. Effective October 1, 2008 there was a reorganization of APHIS-VS, CVB now reports directly to Dr. Jose Diez, Associate Deputy Administrator. The US is challenged by many emerging diseases. The scope includes such animals as reptiles and many new diagnostic tools. The USDA needs to modify their approaches to combating some diseases. Brucellosis was given as an example where a new regional approach for eradication can replace the old national approach due to persistence in the Western Region around Yellowstone National Park.

Specific CVB issues include budget limitations, extraneous agent developments, Pharmacovigilance set back, E. coli, Strain O157 coalition, and electronic Freedom of Information (FOIA), swine influenza project and cancellation of the 2009 CVB Public Meeting. Budget
REPORT OF THE COMMITTEE

shortages continue to cause serious personnel shortages. The CVB staff shows roughly 30 percent vacancies. There are five staff reviewer shortages out of a total of 17. The number of new licensed products has decreased from 76 in 2006, to 63 in 2007 and 59 in the fiscal year 2008. Inspections of firms is now well above the old yearly rate. Some equipment and operational activities are not in the budget. Reagent availability will probably be severely affected. There is likely a re-design of CVB to meet the mission critical programs. User fees charged to vaccine manufactures are a real and imminent option to supply needed funds. Both the Association of Veterinary Biologics Companies (AVBC) and Animal Health Institute (AHI) declined invitations to help set up proposed fee schedules. Extraneous Agent testing will continue to grow in importance as new technologies and research identify contaminants in master seeds and cell lines used in vaccine manufacture. The example of the Retrovirus, Strain RD 114 extraneous viral element in feline cell lines was discussed. Pharmacoviglance activities were not funded by Congress and will be dropped. Dr. Rippke expressed concern about the possible negative ramifications on exported products by some foreign countries and by concerns from the American Veterinary Medical Association (AVMA). CVB has participated in an E. Coli, Strain O157 coalition with various other organizations. The purpose is to apply reasonable efficacy expectations and testing methods for licensing these new food safety related products. New Freedom of Information Act (FOIA) implementations are still on the near horizon. CVB has a template and an example for review available upon request that show the use of efficacy data in the FOIA disseminations. Swine and equine influenza isolate collections are part of a collaboration with the Centers for Disease Control and Prevention (CDC) to monitor genomic changes and to improve vaccines. Recent canine influenza challenge observations did not impress CVB and therefore no licenses were approved to date. They will continue to review license applications for canine Influenza. The new U.S. Animal Health Report is available at www.aphis.usda.gov/publications. Lastly, but unfortunately, the CVB Public Meeting scheduled for 2009 has been postponed to March 29, 2010.
National Animal Disease Center (NADC) News and Research Update from the Virus and Prion Diseases of Livestock Research Unit
Dr. Marcus Kehrli, Research Leader, Virus and Prion Diseases of Livestock Research Unit, National Animal Disease Center (NADC), ARS-USDA

NADC is one of three centers in the National Centers for Animal Health. As part of the USDA-ARS, NADC is a national resource where roughly half of the ARS animal health research program is conducted. NADC staff conduct cutting-edge research with a goal to provide solutions to control the most economically important infectious diseases of livestock. Successful completion of our mission enables the livestock industry to provide a safe, healthy, economical and stable food supply to our Nation and the World. Research programs in ARS are Congressionally-mandated, mission oriented and are directed through the ARS Office of National Programs. Individual research projects undergo a rigorous external scientific review process once every five years through the Office of Scientific Quality Review. The research programs and objectives are selected on the basis of multiple external and internal stakeholder inputs regarding the needs of the Nation’s economically critical livestock health issues. This list of stakeholders includes numerous veterinary and producer groups, and several other Federal agencies (e.g., Food Safety Inspection Service, APHIS, Environmental Protection Agency, Food and Drug Administration). The projected base funding for Fiscal Year 2009 at NADC is $28 million with extramural funding in excess of $2.2 million. The extramural funding is at an all-time high and has become critical to our successful operation in the current budget environment. The NADC is made up of five research management units and an essential operational support staff that maintains business operations for a research facility that conducts
animal and laboratory research in a range of biocontainment level facilities (BSL1-3 labs and BL1-BL3Ag animal facilities). The research program consists of 18 separate research projects directly supported by 43 PhD-level scientists that currently includes only twelve DVM, PhD scientists. A highly skilled and trained technical and animal care support staff ensures research is conducted to the highest possible standards for animal care and biocontainment necessary for ensuring experimental integrity.

In the Virus and Prion Diseases of Livestock Research Unit we focus on the major viral disease pathogens affecting US swine and cattle. Six scientists on the Swine Viral Disease Pathogenesis and Immunology Project are conducting research to identify mechanisms of swine viral pathogenesis that may ultimately lead to the development of improve vaccination strategies to enhance or provide broad cross-protection for circulating subtypes of swine viral pathogens. Viruses we currently are researching include porcine reproductive and respiratory syndrome virus (PRRSV), swine influenza virus (SIV) and porcine circovirus type 2 (PCV2). Research includes a combination of molecular biology, immunology and disease pathogenesis studies in pigs to enable development of vaccines with improved efficacy. Using molecular genetic methods we are dissecting the genetic basis for viral virulence in the pathogens as well as the host response to infection. This two-fold attack will enable us to better understand the host-pathogen interaction of these challenging viral diseases so as to reveal the most effective way to intervene with these important swine pathogens.

Currently, only two scientists are focusing on countermeasures to control and support eradication of bovine viral diarrhea virus (BVDV). This virus is one of the most economically important viral diseases in cattle throughout the world. Despite its name and association with a diarrheal disease, BVDV is the most frequently isolated virus in pneumatic lungs from cattle reported with bovine respiratory disease; in 21 percent of these cases BVDV was isolated. Our research is focusing on the unique capability of this pestivirus to create a persistent infection in the fetus of pregnant cattle and deer. When these persistently infected calves or fawns are born, they typically appear healthy but will shed large amounts of virus and thus represent significant disease risks to healthy cattle they contact. Effective control of BVDV in wild deer will become paramount to the success of our nation’s efforts to better control BVDV in cattle. More basic research will be needed to understand the pathogenesis of fetal infections, how to diagnose an infected fetus in a pregnant animal and finally how to effectively protect the fetus from infection.

Another research project focuses on the transmission, differentiation and pathobiology of transmissible spongiform encephalopathies (TSEs). Four scientists are leading research assessing the cross-species transmissibility of TSEs in livestock and wildlife. Data from a completed
series of interspecies TSE transmission studies to cattle reveal it is possible to differentiate Bovine Spongiform Encephalopathy (BSE) in cattle from cattle with experimentally-transmitted scrapie, chronic wasting disease (CWD) or transmissible mink encephalopathy (TME) inoculated intracranially into the brain of cattle. These studies indicate a species barrier will prevent transmission of scrapie or CWD to cattle. We also discovered a novel prion allele in the 2006 BSE case that is a germline mutation and may represent a genetic form of BSE; research efforts are underway to verify this as a genetic cause of BSE. Research is planned to investigate the pathogenesis of atypical BSE. Preliminary findings of research methods for ante mortem diagnosis of BSE based on retinal accumulation of PrP$^{\text{Sc}}$ indicate the possibility of diagnosing BSE in preclinical stages of disease.

Finally, we recently published research on a potentially automated method to detect central nervous system (CNS) tissue contamination on meat and carcasses. Future efforts will also focus on development methods to inactivate infectious prions in agricultural settings.

Importation and Movement of Genetically Engineered Animals

Dr. Donna Malloy, Biotechnology Regulatory Services (BRS), APHIS USDA-APHIS published a request on September 19, 2008 for information on genetically engineered (GE) animals. This is part of the process of gathering information about ongoing and future research on GE animals to ensure that these do not pose risks to livestock health. Planning ahead will allow the regulatory agencies to keep pace with the industry and anticipated future needs. APHIS was part of the Coordinated Framework (CF) together with the Food and Drug Administration (FDA) and Environmental Protection Agency (EPA) in 1986 that initially provided some regulations of GE as part of the biotechnology area. APHIS currently uses the Animal Protection Act for regulating importation and movement but new and specific regulations are needed. To date the USDA has received over 500 comments and the FDA has received approximately 35. The FDA will be the lead agency in regulating the GE animals. At this time none have been approved by the FDA for commercial use. Dr. Malloy stressed it was the product and not the process that was to be regulated by this effort.

Committee Business:

The Committee entertained a resolution request from member Joe Huff for USDA to provide more funding for the operation of new facilities at NCAH in Ames, Iowa. There was inadequate funding in the 2009 budget. The committee is concerned that program such as licensing new products, vaccine product releases, monitoring and surveillance of emerging diseases, and other regulatory initiatives will be negatively impacted if funds are shifted to pay for vastly increased utilities and
maintenance of the new facilities. The motion was seconded by Dr. William Fales and passed unanimously. The Resolution was forwarded to the Committee on Nominations and Resolutions.

Dr. Jim Evermann discussed the need to safeguard current microbiological collections. With funding decreases affecting locations throughout the US that currently store these vital collections for research, archival and historical purposes, we need to assure future maintenance and availability of these valuable assets. These collections would be of value for studies such as: the changing epidemiologic pathogenesis patterns of microbes, their evolutionary/phylogenetic profiles; their antimicrobial resistance patterns; their value for diagnostic reagents; their potential for vaccine production; challenge models, etc. A proposal is anticipated during the next meeting to address this issue. It is the intension that this Committee and others will jointly support a resolution on maintenance and availability issue. The Committee was very receptive and will probably support this issue next year.
REPORT OF THE COMMITTEE ON
BLUETONGUE AND RELATED ORBIVIRUSES

Chair: James E. Pearson, Ames, IA
Vice-Chair: William C. Wilson, Laramie, WY

T. Lynwood Barber, CO; Shane A. Brookshire, GA; Charles E. Brown, IL, WI; Joseph L. Corn, GA; Edward J. Dubovi, NY; James F. Evermann, WA; Robert W. Fulton, OK; Robert F. Gerlach, AK; Chester A. Gipson, MD; William L. Hartmann, MN; Larry L. Hawkins, MO; Chris S. Hayhow, KS; Robert B. Hillman, NY; Thomas J. Holt, FL; Oscar Kennedy, VA; Francine Lord, CAN; N James MacLachlan, CA; Daniel G. Mead, GA; James O. Mecham, WY; Bennie I. Osburn, CA; Eileen N. Ostlund, IA; Laurie S. Prasnicki, WI; Shawn P. Schafer, ND; Charly Seale, TX; David E. Stallknecht, GA; Susan W. Tellez, TX; George O. Winegar, MI.

The Committee on Bluetongue and Related Orbiviruses met at the Sheraton Greensboro Hotel, Greensboro, North Carolina on October 25, 2008 at 1:00 p.m. There were 16 members and 34 guests in attendance. James E. Pearson, Chair, and William C. Wilson, Vice Chair, conducted the meeting.

Dr. Christian Griot, Institute of Virology and Immunoprophylaxis (IVI), National Reference Laboratory for Exotic Diseases, Switzerland, presented Bluetongue in Europe: The Swiss Perspective. This paper is included in its entirety at the end of this report.

Summary of USDA sponsored symposium on Bluetongue Virus type 8
Eileen Ostlund, United Stated Department of Agriculture (USDA) Animal Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL)

USDA-APHIS-VS held a symposium on bluetongue virus 8 (BTV-8) on July 10, 2008, Denver, Colorado. Featuring presentations by international experts, the meeting was attended by State animal health officials; academic researchers; animal industry representatives; USDA, Agricultural Research Service (ARS) scientists; and VS personnel. The symposium provided an overview of the virus and its effect on animal agriculture, discussed Europe’s experience with the virus, reviewed the latest research, and explored possible disease management and trade implications for North America. Participants contributed observations on gaps in research, diagnostics, surveillance, and vaccines. Symposium attendees also discussed potential ways to prevent and mitigate the entry and spread of BTV-8 in the United States. Finally, the need for collaboration with international counterparts, State and Federal governments, and industry was emphasized.
A summary of the symposium findings has been posted on the APHIS website. www.aphis.usda.gov/vs/ceah/ncahs/nsu/outlook/issue19_sep08.

**Update on Diagnostic Observations for Bluetongue, and Epizootic Hemorrhagic Disease in the United States**

Eileen Ostlund, NVSL-VS-APHIS-USDA

Bluetongue virus (BTV) and epizootic hemorrhagic disease virus (EHDV) isolations/polymerase chain reaction (PCR) positives are as follows for Calendar Year 2007:

Bluetongue virus or ribonucleic acid (RNA) was detected in 51 samples submitted during calendar year 2007. The positive bluetongue virus isolation and PCR test results from submissions to the NVSL in 2007 are listed below in Table 1:

**Table 1.** BT virus isolation (VI) / PCR positives, Calendar year 2007

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>3</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>FL</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>BTV-24</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Autolyzed</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>IA</td>
<td>10</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>MO</td>
<td>5</td>
<td>Cattle</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>MO</td>
<td>2</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>MT</td>
<td>3</td>
<td>Deer</td>
<td>Pos</td>
<td>BTV-17</td>
</tr>
<tr>
<td>MT</td>
<td>3</td>
<td>Antelope</td>
<td>Pos</td>
<td>BTV-17</td>
</tr>
<tr>
<td>MT</td>
<td>4</td>
<td>Sheep</td>
<td>Pos</td>
<td>BTV-17</td>
</tr>
<tr>
<td>MT</td>
<td>2</td>
<td>Sheep</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>NM</td>
<td>1</td>
<td>Cattle</td>
<td>Not done</td>
<td>BTV-11</td>
</tr>
<tr>
<td>SC</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Antelope</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>UNK</td>
<td>11</td>
<td>Cattle hemoglobin</td>
<td>Pos</td>
<td>Neg</td>
</tr>
</tbody>
</table>

During calendar year 2007, 62 samples tested positive for EHDV by virus isolation and/or PCR. The positive EHDV isolation and PCR test results from submissions to the NVSL in 2007 are listed in Table 2.
Table 2. EHDV isolation (VI)/ PCR positives, Calendar year 2007

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>FL</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>Neg EHD; BTV-24</td>
</tr>
<tr>
<td>IN</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>IN</td>
<td>1</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>IA</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>KY</td>
<td>4</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>KY</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>KY</td>
<td>1</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>MO</td>
<td>1</td>
<td>Deer isolate</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>NJ</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>NY</td>
<td>5</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>NY</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>NY</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Autolyzed</td>
</tr>
<tr>
<td>OH</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>OH</td>
<td>2</td>
<td>Cattle</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>OH</td>
<td>5</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>PA</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>PA</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>PA</td>
<td>4</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>SD</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>SD</td>
<td>2</td>
<td>Deer</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td>TN</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>TN</td>
<td>2</td>
<td>Elk</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>TN</td>
<td>1</td>
<td>Cattle</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>EHDV-1</td>
</tr>
<tr>
<td>WV</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>WV</td>
<td>1</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>WI</td>
<td>4</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>UNK</td>
<td>2</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>UNK</td>
<td>1</td>
<td>Deer isolate</td>
<td>Pos</td>
<td>Neg</td>
</tr>
</tbody>
</table>

Calendar year 2008 (January 1– October 21)
Bluetongue virus or viral RNA has been detected by PCR from 10 specimens submitted thus far in 2008 are listed in Table 3.
REPORT OF THE COMMITTEE

Table 3. BT virus isolation (VI)/PCR positives, Jan. 1 - Oct. 21, 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 Southeastern Cooperative Wildlife Disease Study)</td>
<td>Pos</td>
<td>BTV-3</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Sheep</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Deer isolate (year unknown)</td>
<td>Pos</td>
<td>BTV-17</td>
</tr>
<tr>
<td>UNK</td>
<td>6</td>
<td>Cattle hemoglobin</td>
<td>Pos</td>
<td>Neg</td>
</tr>
<tr>
<td>UNK</td>
<td>1</td>
<td>Cattle BSA</td>
<td>Pos</td>
<td>Neg</td>
</tr>
</tbody>
</table>

As of October 21, 2008, EHDV has been detected in nine samples submitted to NVSL. The positive EHDV isolation and PCR test results are listed in Table 4.

Table 4. EHDV isolation (VI)/PCR positives, Jan. 1 – Oct. 21, 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>1</td>
<td>Deer isolate (year unknown)</td>
<td>Not done</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>IN</td>
<td>1</td>
<td>Deer isolate</td>
<td>Not done</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>MT</td>
<td>1</td>
<td>Antelope (liver)</td>
<td>Pos</td>
<td>No Test / Toxic</td>
</tr>
<tr>
<td>SD</td>
<td>4</td>
<td>Deer</td>
<td>Pos</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Deer</td>
<td>Pos</td>
<td>Pending</td>
</tr>
<tr>
<td>TX</td>
<td>1</td>
<td>Deer</td>
<td>Not done</td>
<td>EHDV-2</td>
</tr>
</tbody>
</table>

2008 Bluetongue serology proficiency test

Fifty-six laboratories participated in the 2008 BT proficiency test. The panel consisted of 20 serum samples. The passing score was one or zero samples missed. Four laboratories failed the 2008 bluetongue proficiency panel on the first attempt. All 4 laboratories passed the retest. As of October 2008, there are 56 laboratories approved to conduct official export BT serology tests.

Bluetongue and Hemorrhagic Disease Surveillance, Update

David E. Stallknecht and Andrew Allison, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

An update on hemorrhagic disease (HD) in wild ungulates in the U.S. was presented. Last year (2007), there were numerous reports of HD and an unprecedented number of virus isolations (n=283) were made. Serotypes isolated during 2007 included EHDV-1, EHDV-2, EHDV-6, BTV-10, BTV-11, and BTV-17. Based on reports of disease that were
received from state fish and wildlife agencies during the winter and spring of 2008, there were two major outbreaks; EHDV-2 in white-tailed deer in the Eastern United States and BTV-17 in deer and pronghorn in the Western United States. The EHDV-2 outbreak probably represented the most extensive orbivirus outbreak in U.S. history and it affected deer in some areas where HD does not historically occur.

To date in 2008, SCWDS has isolated EHDV-1 (Texas), EHDV-2 (Texas, Indiana), EHDV-6 (Texas, Kansas) and BTV-3 (Arkansas). The BTV-3 isolate was confirmed by NVSL. This is the third consecutive year where EHDV-6 was isolated and the second report of BTV-3; the first isolation of BTV-3 from white-tailed deer in the U.S. came from a wild deer in Mississippi during 2006. Sequence analyses of the 2006-2008 EHDV-6 isolates suggest that this virus may be derived from an EHDV-6/EHDV-2 reassortment. The origin of this virus and BTV-3 are currently unknown but their repeated isolation suggests that they are now established in the US.

**Bluetongue in Europe and Its Risk on Animal Movement – The European Food Safety Agency’s Scientific Opinion**

M. D. Salman, Colorado State University and scientific panel member of European Food Safety Authority (EFSA) – Animal Health and Animal Welfare

The European Food Safety Authority (EFSA) involvement in producing a scientific opinion on blue tongue in Europe and its vaccines and control strategies among the European community was presented. The EFSA was legally established by a European Parliament and Council Regulation in 2002. EFSA, as independent agency for the European community, is solely engagement in scientific opinion by conducting risk assessment on various topics related to food security and food safety including animal health issues.

EFSA has contributed in producing scientific opinion on bluetongue current episodes through published reports that can be found via the following websites: www.efsa.europa.eu/efsaa/efsaa_locale-1178620753812_1178620770577.htm and www.efsa.europa.eu/efsaa/efsaa_locale-178620753812_117862077078.htm. There is also a scientific publication through a special issue in August 2008 of Preventive Veterinary Medicine (Elesevier publication) dedicated to this work.

The presentation included the main scientific conclusion items from these reports which are:

- *Culicoides* constitute a numerous and widespread group and act as important vectors of many pathogens including BTV
- knowledge of the life cycle of most species of *Culicoides* in Northern Europe remains incomplete
- European countries show that there is now almost continuous
emergence of fresh adult midges through the winter at the northern latitudes affected by BTV

- multiple blood feeding events by *Culicoides* are crucial to the initiation and subsequent spread of BTV
- *Culicoides* are able to travel much longer distances (>100 km) and so may be able to introduce pathogens like BTV into regions remote from the source
- infection rate in vectors is generally low with the potential of transmission from a viraemic host to the vector is much less in magnitude than from the vectors to animals
- the level of protection provided by insecticide treatment is not determined but it is unlikely to eliminate the risk of BTV transmission
- all BTV inactivated vaccines, when administered in two separate doses, are able to fully protect animals for a long period. However, a single dose of BTV-4 inactivated vaccine only partially reduced viremia in cattle when challenged 7 months later
- numerous Modified Live Virus (MLV) vaccines have been used under a wide range of conditions in the field
- all were found to induce viremia allowing for the potential infection, and possible subsequent transmission, of MLV strains of BTV by insects
- in general, the use of vaccines which prevent viremia after challenge is recommended
- the use of MLVs can be considered only after a comprehensive risk/benefit analysis has been made
- the vaccines are also suitable tools to facilitate the safety of movements of animals in infected areas when several factors are taken into consideration
- the circulation of BTV in wild ruminants can compromise a vaccination campaign and for this reason it is essential to establish what their precise role might be in the epidemiology of the disease.

Gaps in scientific knowledge and scientific advice on bluetongue have been identified and were also presented. EFSA contributed this month to a revision and update of previous opinions on vectors, viremia and over-wintering mechanisms. The conclusion from this scientific opinion was presented as following:

- no sufficient field data are available for assessing the probability of *Culicoides* presence with animals and their environment during transportation
- the risk assessment model suggested that increase of treatment efficacy may lead to a reduction of the risk
- the effect of treatment of the vehicles and animals with insecticides or repellent was difficult to assess due to lack of
sufficient data and involvement of several inter-related and poorly understood factors such as temperatures, midge density and prevalence of infectious vectors.


There are some specific features in Europe that should be taken into account: the European Union (EU) single market, the high volume of international intra-community trade on live ruminants, sheep and cattle are breed together in many countries, there is an important dairy sheep and goat industry and chiefly the fact that the EU has fully harmonized rules on animal health (Brussels).

EU rules are the result of the managers’ response to an evolving situation:

As a response to the 1999-2000 incursions, basic legislation (Council Directive 2000/75/EC) was adopted and contains general control measures, movement restrictions, provisions after suspicion, confirmation, for demarcation of protection and surveillance zones and also general provisions for vaccination.

As a response to 2006-2007 epidemic and the available scientific advice there was a major change (Regulation 1266/2007) that is based on experience gained and scientific advice and lays down more sustainable, proportionate and science-based measures that are more into line with international standards and reduces obstacles to trade while maintaining guarantees. It also presents a new approach to vaccination.

However, once there was scientific evidence of the relative high frequency of trans-placental transmission of serotype, it was necessary to review rules for the movements of pregnant animals from a restricted zone. In summary the cows must be vaccinated or naturally immunized before insemination/mating.

Again, once experience demonstrated that proper protection against attack by vectors were not easily achievable, rules for animal movements were reviewed allowing in general the movement of vaccinated or naturally immunised animals.

Finally, the objective of the future EU policy on BT is to control BT by containing disease spread and protecting susceptible animals in order to limit economic losses caused by the disease, not precluding a hypothetical eventual disease eradication. The strategy should be reviewed in 2010, when it will be clearer whether eradication in the EU is an achievable objective or not.

The measures will be based on three pillars: surveillance, movement restrictions and vaccination.
Impact of Bluetongue on Exports
Ellen Buck, National Center for Import-Export (NCIE), VS-APHIS-USDA
The following is the USDA-APHIS-VS-NCIE role in trade:
- import regulations prevent introduction of foreign diseases
- export activities meet requirements of receiving countries
- export activities facilitate trade

Bluetongue Virus - Trade Implications include:
- no requirements for imported cattle
- export testing requirements vary by country
- requirements are on APHIS website - iRegs
- some countries have semen export testing requirements

The following are the five top countries for bovine exports and the number of exports for fiscal year 2007:
- Canada: 17,220
- Saudi Arabia: 8,520
- Mexico: 4,566
- Morocco: 1,105
- Honduras: 255

Bovine semen and embryo exports:
- 2005: 11,782,537
- 2006: 11,186,017
- 2007: 12,693,767

FY 2005-2007 bluetongue testing requirements for export:
- typically antibody test, e.g. ELISA
- does not differentiate from active infection
- US would prefer elimination of BTV testing requirements
- PCR, virus isolation tests preferred over antibody tests

The following have no bluetongue export test requirements:
- Canada
- Mexico
- Saudi Arabia
- Honduras

The bluetongue import requirements varies from very strict to none.

Culicoides Surveys in the Southeast
Joseph L. Corn, 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 USDA-APHIS-VS. Surveys are ongoing in Florida, Georgia, Alabama, Mississippi, Louisiana, and Arkansas. The survey sites in southeastern Arkansas and northern Mississippi include two sites where bluetongue virus (BTV-3) positive deer were found. The sites in Florida include one site where sheep have died over a several years period due to bluetongue. Contents of light traps are counted and sorted for Culicoides.
sp., and then processed and identified at SCWDS. During January – October, 2008, traps were set for 1,141 trap nights at 69 premises in 52 counties throughout the Southeastern United States. A total of 376,504 have been counted from traps set out during 2008; 7,980 of these were *Culicoides* sp. During this time period, 564 *Culicoides* specimens were processed and 494 have been identified. These specimens included representatives of 22 species: *Culicoides insignis*, *C. furens*, *C. bickleyi*, *C. torreyae*, *C. barbosai*, *C. stellifer*, *C. haematopotus*, *C. edeni*, *C. baueri*, *C. niger*, *C. hinmani*, *C. knowltoni*, *C. crepuscularis*, *C. sonorensis*, *C. debilipalpis*, *C. paraensis*, *C. beckae*, *C. mulrennani*, *C. arboricola*, *C. floridensis*, *C. venustus*, and *C. guttipennis*. Additional field collections and identification of *Culicoides* sp. collected during 2008 are underway and this survey will continue in 2009.

**Bluetongue Virus Vaccines – The Good, the Bad and the Ugly**

N. James MacLachlan, School of Veterinary Medicine, University of California-Davis

Bluetongue vaccines were first developed in California shortly after isolation of the virus in the early 1950’s. Initial vaccines were propagated in embryonated chicken eggs, according to procedure pioneered in South Africa. These vaccines were teratogenic and caused unacceptable fetal mortality, thus they were quickly replaced by cell culture adopted live attenuated vaccines. Live attenuated vaccines to BTV serotypes 10, 11 and 17 are available in California, but only to serotype 10 elsewhere in the US. There is no vaccine for serotype 13.

There are inherent potential problems associated with the use of live attenuated vaccines, including, transmission by vector insects, reassortment of genes with field strains of BTV, and reversion to virulence. Inactivated vaccines exclusively have been used to control BTV serotype 8 infection in Europe, but inactivated BTV vaccines are not commercially available in the US. New generation vaccines have been developed, including virus-like particles composed of baculoviurs expressed BTV proteins and canarypox and other pox virus recombinants. A recombinant canarypox virus co-expressing the VP2 and VP5 genes of BTV serotype 17 induces sterilizing immunity in sheep. Effective and affordable vaccines will be absolutely needed for the future control of BT outbreaks in the US.

**New Strategies for Preventing Bluetongue in Sheep**

W.K. Reeves, Arthropod-Borne Animal Diseases Research Laboratory (ABADRL), Agricultural Research Service (ARS), USDA

Bluetongue disease is a sporadic and unpredictable disease in the northern Rocky Mountains. Epizootics can be separated by decades of little to no disease activity. Woolgrowers need access to control technologies that can be used after an outbreak is detected. We tested six formulations of midge repellent pesticides against *Culicoides*
sonorensis, the primary vector of bluetongue in the western US. Synthetic pyrethroids with PBO (a synergist) applied with both ear tags and a low-volume spray were effective in repelling biting midges for up to 5 weeks. These pesticides are low cost and can be applied during an outbreak and might protect sheep during the autumn until freezing weather sets in and kills the biting midges.

Investigation of an Outbreak of Bluetongue Serotype 17 in Sheep in Wyoming
M.M. Miller*, ABADRL, ARS-USDA

A report was provided on investigation of an outbreak of bluetongue virus serotype 17 in sheep from the Big Horn Basin of Wyoming. A new BTV intrusion into a naïve population and elevation might be the primary barrier to vector movement. The infection rate closely reflected the reported morbidity. Disease varied between locations suggesting that ranch level vector control strategies might be effective in minimizing infections. The investigation indicated that sheep naturally infected are not a long-term source of infectious virus.

Update on bluetongue antigen detection in Culicoides cells
James Mecham, ABADRL-ARS-USDA

An update was provided to the Committee on research at ABADRL to develop improved techniques for detecting bluetongue virus (BTV) in insect cells. He reported on the development of both an endpoint titration and an agarose overlay assay using In situ immune infrared fluorescent staining techniques to directly detect and titrate BTV in Culicoides cell culture. The sensitivity of these assays for detection and titration of virus in Culicoides cells was comparable or superior to that obtained by standard techniques in vertebrate cell culture. These assays will have application for both virus isolation and research using the insect cells lines.

Improved RNA extraction increases sensitivity of the bluetongue and epizootic hemorrhagic virus multiplex real-time RT-PCR
William Wilson, ABADRL-ARS-USDA

An update on improved protocols for the Multiplex real-time RT-PCR for detection of all serotypes of BTV and EHDV was provided. The assay can distinguish between BTV and EHDV RNA.

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

The ABADRL is located in Laramie Wyoming. Currently
the ABADRL staff of 30 consists of microbiologists, virologists, entomologists, and veterinarians, as well as staff who support the laboratories, administration and facilities. The Research Leader position became vacant in August of 2007 and remains so today with three ABADRL research scientists rotating as Acting Research Leaders every two months. The ABADRL’s Biosecurity Level 3 Agriculture (BSL-3Ag) Large Animal Isolation Building (LAIB) was closed after September 11, 2001 due to insufficient security. In 2003, after security upgrades were in place, the LAIB was inspected and it was determined that it did not meet current requirements for a BSL-3Ag level biocontainment laboratory. In January of 2006, after costly retrofit attempts, the LAIB was officially downgraded to BSL-2 based on its degraded physical structure. The ABADRL’s BSL-3Ag laboratory for small animal/laboratory/insect work (the Round Building; RB) was closed in January of 2002 due to catastrophic system failures after several days of extreme cold temperatures. In 2004, 75 percent of the RB was re-opened as a BSL-2 laboratory-only space. During 2004-2005, attempts were made to return the remaining 25 percent of the building to BSL-3 laboratory space. However, at the end of 2007, a degraded, inadequate roofing support system was identified putting in question the ability of the roof to support the existing air handling equipment, as well as the anticipated winter snow load. At this point, efforts to return the space to BSL-3 were abandoned. Currently the facilities have been renovated and approved by APHIS for BSL-2 laboratory, small animal, insect, and large animal work. To accomplish their BSL-3 research mission, the ABADRL is contracting work out, establishing more collaborations with scientists who have access to BSL-3 facilities, and spending a significant amount of time and budget resources traveling to collaborator locations to conduct research. Collaborator locations include Fort Collins, Colorado; Fort Detrick, Maryland; Winnipeg Canada; and South Africa.

The ABADRL has three five-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 eradicate Rift Valley fever virus (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. 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 vesicular stomatitis virus (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.
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, which includes research on important vector insect species of mosquitoes, midges, and sand flies and important arboviruses such as BTV, RVFV, and epizootic hemorrhagic disease virus (EHDV). Research objectives in this plan are 1.) to determine the importance of North American biting insects as vectors of endemic and exotic pathogens; 2.) to determine the biological factors that influence the risk of pathogen transmission by vector species; and 3.) to develop strategies for protecting livestock and humans from biting insects.

The President’s FY2009 budget recommendations included a 7.5 percent cut for ARS, $84 million below 2008 funding, affecting 8 percent of the ARS workforce. This accounts for 108 employees in the North Plains Area alone. The funding cut would result in significant reductions and re-allocations across ARS and the closure of 11 ARS locations around the country including ABADRL in Laramie, Wyoming. The recommendation is to relocate ABADRL from Laramie, Wyoming to Ames, Iowa. ABADRL research programs would be consolidated with the National Animal Disease Center for program efficiency and use of the new state-of-the-art facility. The current facilities at Laramie can not support high containment research and funds are not available to replace the current facility. The response of the US Senate to these recommendations was a request for more information. Exact language from the Senate was as follows: “Before deciding whether it is appropriate to relocate the laboratory, the Committee requests ARS to provide a report describing the current status of the laboratory’s facilities and research. Additionally, the Committee requests ARS to provide an assessment of no fewer than two locations that could serve as the new location of ABADRL. When selecting the locations to assess, ARS should consider the facilities, capacity, expertise, and synergies relevant to fulfilling and expediting the ABADRL mission that are offered by each potential location. Remarkable fiscal issues should also be noted.”

The study is being conducted by ARS headquarter National Program, Biosafety, and Engineering Staff as well as our Assistant North Plains Area Director. The study is starting November 1, 2008, following their visit to Laramie to evaluate current capacity. Sites in the report will include: Ames, Iowa; Manhattan, Kansas; Moscow, Idaho; Pullman, Washington; and Fort Collins, Colorado. The report will be submitted to the Senate by March of 2009 for consideration. In spite of the uncertain future for ABADRL, the laboratory currently has the highest level of funding in its history, thanks to additional funding sources such as the Department of Homeland Security. 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
BLUETONGUE AND RELATED ORBIVIRUSES

needs of our stakeholders.

Committee Business

The meeting was called to order at 5:35 p.m. by Dr. Pearson. There was one Resolution: Surveillance for bluetongue and epizootic hemorrhagic disease in the United States and Caribbean Region” submitted. There were proposals to broaden its scope but the Committee decided to leave it as submitted. The resolution was approved.

Dr. Pearson stated that he had been Chair of the Committee for 5 years, which the maximum allowed by the United States Animal Health Association, and called for nominations of a new Chair. Dr. William Wilson was nominated. There were no other nominations and the Committee voted unanimously to recommend Dr. Wilson for Chair; Dr. Wilson will appoint a Co-Chairman before the 2009 meeting.

Dr. Pearson thanked members of the Committee and guests for their excellent support in making this a very productive Committee.
Since 2006, Bluetongue disease (BT) caused by Bluetongue virus (BTV) serotype 8 was rapidly spreading across Europe and finally reached Switzerland in October 2007. The route of introduction into Europe remains at this time still unclear. As early as 2003, a BT surveillance program, due to the outbreaks of BT in Southern Europe, and a disease awareness campaign were initiated in Switzerland. The first case in Switzerland was recognized by the farmer and the state veterinarian, and samples were submitted to the IVI. BTV-8 virus was detected in numerous animals and a single animal was euthanized due to the severe clinical symptoms (Hofmann et al, 2008). In 2008, numerous BT-8 cases were found in Europe as well as in Switzerland. As of October 2008, BTV-6, a serotype new to Europe has also been detected in the Netherlands. In June 2008, a mandatory mass vaccination was initiated in Switzerland in which all susceptible livestock (cattle, goats, and sheep) needed to be vaccinated. Several field trials were preformed in Switzerland in order to have an estimate on the efficacy and potency as well as on possible vaccine side effects. Estimated livestock vaccination coverage of 80 percent was foreseen. Several European Union member states initiated vaccine campaigns either on a compulsory or voluntary basis.

It is known that clinical disease of BT in sheep may differ depending on breed, age and immunity of infected sheep and may also vary between serotype and strain of BTV. Since there were no data available on the susceptibility of Swiss sheep breeds for BTV-8, experimental infection of the 4 most common Swiss sheep breeds and the highly susceptible Poll Dorset sheep with the current BTV-8 was performed. Clinical signs were assessed regarding severity, localization, progression and time point of their appearance. The results clearly show that the Swiss sheep breeds investigated were susceptible to BTV-8 infection (Worwa et al, 2008). They developed moderate, BT-characteristic symptoms, which were similar to those observed in Poll Dorset sheep. Regardless of breed, the majority of infected animals showed fever, swelling of the head as well as erosions of the mouth and subcutaneous hemorrhages. In addition, these in vivo experiments gave samples for further test validation as well as excellent documentation material for students, private and government veterinarians.

In 2007, on the occasion of the mandatory testing of an export
BLUETONGUE AND RELATED ORBIVIRUSES

shipment of goats from Switzerland a novel BTV, named (according to the location of its first detection) Toggenburg Orbivirus (TOV) was detected by using real-time reverse transcription–PCR. Laboratory analysis and dendrogram construction showed that TOV is closely related to BTV, although some genome segments were distinct from the 24 known BTV serotypes. Because the gene encoding outer capsid protein 2 (VP2), which determines the serotype of BTV, is placed within the BTV serogroup in the dendrogram, we proposed that TOV represents a so far unknown 25th serotype of BTV (Hofmann et al, 2008).

In 2009, Switzerland will continue the active (e.g. sentinel herds, vector trapping) and passive surveillance program which is in concordance with the European Union legislation. It will include a mandatory vaccination program of livestock commencing February 2009. However it is currently unclear, if on a long term BT can be eradicated by these measures.

References:


REPORT OF THE COMMITTEE ON BRUCELLOSIS

Chair: Glenn E. Plumb, Yellowstone Park, WY
Vice Chair: Claude E. Barton, Nashville, TN

John B. Adams, VA; J Lee Alley, AL; Dan J. Anderson, TX; Neil J. Anderson, MT; Bill Barton, ID; Carter Black, GA; Richard E. Breitmeyer, CA; Becky L. Brewer-Walker, OK; Max E. Coats, Jr., TX; Thomas F. Conner, OH; Walter E. Cook, WY; Ed Corrigan, WI; Donald S. Davis, TX; Mark L. Drew, ID; Anita J. Edmondson, CA; Robert G. Ehlenfeldt, WI; Philip H. Elzer, LA; Steven R. England, NM; Donald E. Evans, KS; Dave E. Fly, NM; James M. Foppoli, HI; Tony G. Frazier, AL; Bob Frost, CA; Frank D. Galely, WY; Tam Garland, DC; Robert F. Gerlach, AK; Arnold A. Gertonson, CO; Michael J. Gilsdorf, MD; L. Wayne Godwin, FL; William L. Hartmann, MN; Greg N. Hawkins, TX; Steven G. Hennager, IA; Bob R. Hillman, TX; E. Ray Hinshaw, AZ; Sam D. Holland, SD; Majon Huff, CO; Dennis A. Hughes, NE; David L. Hunter, MT; Jon G. Johnson, TX; Susan J. Keller, ND; Terry L. Klick, OH; Terry J. Kreeger, WY; Maxwell A. Lea, Jr., LA; Jim R. Logan, WY; Laurent O’Gene Lollis, FL; Phillip M. Mamer, ID; Bret D. Marsh, IN; Barbara M. Martin, IA; Chuck E. Massengill, MO; Andrea Mikolon, CA; Henry I. Moreau, LA; Elizabeth J. Parker, DC; Janet B. Payeour, IA; Valerie E. Ragan, MD; Thomas J. Roffe, MT; Shawn P. Schafer, ND; David D. Schmitt, IA; Marilyn M. Simunich, ID; Robert C. Stout, KY; Paul L. Sundberg, IA; George A. Teagarden, KS; Kenneth J. Throlson, ND; Rick L. Wallen, WY; James A. Watson, MS; Gary M. Weber, MD; Diana L. Whipple, IA; P. J. White, WY; Margaret A. Wild, CO; Richard D. Willer, HI; Larry L. Williams, NE; Taylor H. Woods, MO; Martin A. Zaluski, MT; Glen L. Zebarth, MN.

The Committee met on October 27, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 1:00 to 6:15 p.m. There were 48 members and 59 guests present. Thirty-two of the guests requested to become members of the Committee. The meeting was chaired by Dr. Glenn Plumb, National Park Service. There were ten scientific presentations and reports. Two resolutions were presented to the Committee for consideration. Dr. Claude Barton, gave a brief review of the 2007 Annual Meeting reported on six resolutions from that meeting. The response from United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to all was positive.

The Committee received report from the Scientific Advisory Subcommittee on Brucellosis from Dr. Philip Elzer, Chair. The report was accepted and is included in this Committee Report.

The Committee received a report from the Feral Swine Subcommittee on Brucellosis and Psuedorabies chaired Dr. Carter Black. The report was
accepted and is included in this Committee Report.

Dr. Marty Zaluski, Montana, provided a report on the Subcommittee on Brucellosis in the Greater Yellowstone Area. The report was accepted and is included in this Committee Report.

Dr. Brian McCluskey, VS-APHIS-USDA, presented a time-specific paper titled National Brucellosis Elimination Zone Proposal. The paper is included in these proceedings following the Committee Report.

Drs. Debbi Donch and Arnold Gertonson, VS-APHIS-USDA, presented the Status Report – Fiscal Year 2008, Cooperative State-Federal Brucellosis Eradication Program. The full text of this presentation is included at the end of this report.

Dr. Alfredo Gutierrez, Mexico presented a report entitled Status of the Campaign against Brucellosis in Mexico. The full text of this report is included at the end of the Committee Report.
REPORT OF THE COMMITTEE
REPORT OF THE SCIENTIFIC ADVISORY
SUBCOMMITTEE ON BRUCELLOSIS

Philip Elzer, Chair

Subcommittee Chair Phillip Elzer, Louisiana Annual State University (LSU), convened the Subcommittee at 1:00 p.m., October 25, 2008 during the 112th Meeting of the United States Animal Health Association (USAHA). Subcommittee members are Don Davis, Phillip Elzer, Don Evans, Barb Martin, Steve Olsen, Jack Rhyan, and Gerhardt Schurig. There was one scientific issues referred to the Subcommittee during the year. Members present were Davis, Elzer, Rhyan and Olsen. There were 24 visitors also in attendance.

John Korslund, Veterinary Services (VS), gave a presentation entitled Proposed Standardized Serology Protocol for Swine Brucellosis Surveillance and Case Diagnosis. The main discussion points were the testing of serum and tissues for *Brucella suis* in the context of a swine brucellosis surveillance plan. There were numerous questions regarding serology and which test should be used for surveillance knowing the limitations of reagents, standardized tests and testing, validation of tests and test accuracy. The Committee will help facilitate data mining to see if fluorescent polarization assay (FPA) has been tested on a panel of swine samples. It was also suggested that Dr. Klaus Neilson, one of the developers of the FPA, be contacted for some data and new enzyme linked immuno sorbent assay (ELISA) technologies be explored.

John Treanor, Yellowstone National Park, gave a presentation entitled Effectiveness of RB51 Vaccination for Yellowstone Bison. The main discussion points offered responses to six focal questions, recognizing that sufficient data is generally lacking to make specific recommendations.

1. What level of vaccine efficacy can be expected in Yellowstone bison compared to experimental studies? It was discussed that the protective effects of a vaccine under field conditions may be influenced by a number of factors including, but not limited to, nutrition, environmental stress, percentage of the population vaccinated, and co-infection with other pathogenic agents. It was discussed that if all parameters are the same, protection under field conditions is most likely to be similar to protection under experimental conditions. However, it was also discussed that efficacy under field conditions may be greater as all animals are not exposed with an infectious dosage at the most susceptible time. At the present time, experimental data for hand vaccination of bison with RB51 suggests a 50-60 percent reduction in abortions, 45-55 percent reduction in infection of uterine or mammary tissues, and a 10-15 percent reduction in infection when
animals are necropsied at parturition in a standard mid-gestational challenge model. Committee members are reluctant to specifically predict field efficacy of current vaccines due to the multiple factors that may influence protection as mentioned above, and suggest that scientific studies be initiated if specific measurements of protection are needed.

2. Can similar vaccine efficacy be expected from remote delivery compared to syringe delivery? In general, Committee members discussed the fact that currently available data suggests that remote delivery induces protection that is less than hand vaccination. The scientific basis for this reduction has not been specifically identified but multiple factors were discussed that may be influencing the current observations. For reasons similar to those discussed above for vaccine efficacy, the Committee cannot place a specific numeric value on the reduction.

3. Is it safe to vaccinate pregnant bison prior to mid-gestation? Although scientific data is limited, the committee felt that when compared to the risk associated with the possibility of infection and abortion caused by field strains of *Brucella abortus*, risks associated with administration of vaccines strains to Yellowstone bison are not significant. The Committee discussed the fact that abortions have been documented in bison with RB51 and Strain 19. It was discussed that unknown factors may influence the incidence of abortions by brucellosis vaccine strains. Two Committee members discussed studies in which they were unable to induce abortions in pregnant bison with RB51 in safety studies involving single or multiple dosages. The Committee is currently unable to provide specific numeric estimates for abortions in pregnant bison induced by brucellosis vaccines.

4. What is the best time of year to maximize vaccine efficacy? The Committee discussed that, with the exception for the influence of nutritional or environmental stress, it was anticipated that responses to calfhood vaccination would be similar. It was also discussed that pregnant bison may be less responsive to vaccination particularly around the peripartuient period. The Committee recommends that vaccination of bison be timed to provide a minimum of 12-14 weeks prior to anticipated dates of exposure to virulent field strains of *Brucella abortus*.

5. How frequently should bison be vaccinated? The Committee discussed that due to the time for *Brucella* vaccines to be cleared from bison, it was unlikely that frequent vaccination would be beneficial. The Committee discussed that annual vaccination of all female bison would most likely be most beneficial for maintenance of maximal protection.

6. Can bison be vaccinated too much? The Committee discussed that scientific data on multiple vaccination of bison is very limited.
REPORT OF THE COMMITTEE

Excluding the possibility of syndromes associated with hyper-immunization, it was assumed that multiple vaccinations would be safe in bison. However, as discussed above, the Committee questioned how beneficial administration of multiple vaccinations would be.

The Subcommittee received one charge from the Chair of Committee on Brucellosis through USDA-APHIS-VS to evaluate the use of *Brucella abortus* Strain RB51 in domestic bison between the age of 1 and 18 months. If the committee recommends the use of this vaccine in this age of animal, the Center for Veterinary Biologics (CVB) will evaluate the recommendation. The Committee agreed to wait for some data being generated by VS and Agriculture Research Service (ARS) prior to making a final recommendation in the next few months. It is important that this future recommendation is regarding safety and serology only, and not about efficacy in bison vaccinated at 12 to 18 months of age with RB51.

The Subcommittee also discussed and supported a Resolution developed by the Subcommittee on Brucellosis in the GYA, regarding *Brucella abortus* select agent status.
BRUCELLOSIS

REPORT OF THE FERAL SWINE SUBCOMMITTEE ON
BRUCELLOSIS AND PSUEDORABIES (PRV)

Carter Black, Chair

The Subcommittee met on Monday, October 26, 2008. At least 28 persons were in attendance, including 11 members of the Subcommittee. Reports were provided on a number of disease issues of interest. A summary of the reports is included below.

Dr. Joseph L. Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), 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 United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) 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. Currently 33 states are reporting feral swine populations but sightings in additional states are under review. The NFSMS is accessed via the internet at http://www.feralswinemap.org/.

Dr. John Korslund provided an update on USDA-APHIS-VS Swine Health Program activities as related to feral swine prepared by Dr. Troy Bigelow. Two cooperative agreement initiative funded by VS programs were reviewed, the feral swine PRV phylotyping work completed by Dr. Hahn, and the feral swine mapping work by SCWDS, both reported on at the Committee meeting. Transitional herd infections were reported for FY2008 (herds indemnified with USDA funds): PRV positive transitional herds Arkansas (1), Texas (2), Michigan (4), Florida (1) and this herd was dually infected with swine brucellosis (SB); SB positive transitional herds indemnified Arkansas(1), Hawaii (1), South Carolina (1), Florida (1) and this herd was dually infected with PRV. PRV and SB risk-based regulations to prevent spread of disease are being developed. A regulatory workplan has been approved by APHIS-VS. Dr. Bigelow will
Mr. Seth Swafford, USDA-APHIS-Wildlife Services gave an update on the USDA-APHIS-Wildlife Services Comprehensive Feral Swine Disease Surveillance Program. Feral swine continue to pose a significant disease risk to the commercial swine industry and the nation’s disease status. Wildlife Services (WS) has recently become more involved in conducting a comprehensive surveillance and monitoring project to document diseases that are important to the commercial swine industry and public health. Through a partnership with Veterinary Services (VS), Classical Swine Fever (CSF) Surveillance Risk Factors 2006 was drafted to identify high risk states. WS partnered with VS to also draft CEAH’s Pathway Assessment of Foot-and-Mouth Disease (FMD) Risk to the US 2001 #405. A review of the current CSF surveillance activities and upcoming FMD surveillance in feral swine was provided and will be based on the risk assessments. WS currently samples 2300 feral swine for CSF early detection and plans to sample 4000 feral swine for FMD surveillance. Under the current sampling efforts, there have been no positive CSF detections in feral swine in the US.

Two endemic diseases of feral swine are also of interest and importance in the US. WS is currently working in 30 states to provide baseline data to policy and decision-makers by sampling and testing over 2500 feral swine for swine brucellosis (SB) and pseudorabies (PRV). SB and PRV testing is being conducted to monitor the bacteria and virus, respectively, to prepare for epidemics, and to support regulation. Monitoring efforts for these pathogens have yielded detections at greater than 30 percent.

Recently, WS was approached by VS, industry representatives, and USDA Agricultural Research Service (ARS) to investigate trichinellosis and toxoplasmosis in feral swine. By accessing its national archive, WS will begin providing feral swine serum samples to ARS for testing. Many local efforts are also underway to investigate porcine circovirus, porcine reproductive and respiratory syndrome, E. coli, among other pathogens and diseases in feral swine. By collecting and testing over 2300 feral swine annually for foreign animal diseases and endemic diseases, WS has implemented a comprehensive feral swine disease surveillance and monitoring project.
update on regulations in Texas. In Texas, more than two million feral swine populate nearly every one of the state's 254 counties. These animals pose a significant threat to domestic swine and to cattle. On the other hand, hog hunting is a popular and profitable sport in the state. The problem, protecting livestock health, while encouraging trapping and hunting, to keep the population numbers from exploding. Feral swine testing in Texas from August 2003 through May 2007 indicated that 20 percent of the animals were infected with pseudorabies and about 10 percent had swine brucellosis. From January 2003 through June 2008, 26 of 41 domestic swine herds infected with swine brucellosis had either definite or possible contact with feral swine. Furthermore, since January 2006, 27 cattle in 20 herds in Texas have tested positive for swine brucellosis. Prior to 2008, the Texas Animal Health Commission (TAHC) had feral swine regulations, but no authority over the animals. The 80th Texas Legislature, in 2007, gave the TAHC authority to make regulations for these animals for disease control purposes only. This includes regulations for specifications for holding facilities and hunting preserves, sale and exhibition restrictions and requirements for movements. The law gave the TAHC the teeth it needed to handle noncompliance with regulations. After months of work by an industry-led committee, including representatives from the Texas Parks and Wildlife Department, hunters, processors and ranch owners, TAHC commissioners adopted new regulations, effective October 1, 2008. In a nutshell, the regulations allow for the trapping of feral swine, but only boars and barrows may be moved to TAHC-authorized hunting preserves. To help control the population, feral sows are destined only for slaughter. Record-keeping and identification requirements are mandated, and failure to comply with the regulations is a Class C misdemeanor, punishable by a $500 fine. Repeat offenses are a Class B misdemeanor, which can include jail time.

Dr. Edwin Hahn, University of Illinois, reported on progress in a cooperative agreement with USDA-APHIS-VS, Markers for Pseudorabies in Feral Swine. He reported that the transitional herd outbreak in Michigan in 2008 was typed as a virus most closely related to virus from feral swine in the Southeastern states. In contrast, the outbreak in Florida resembled virus of domestic pig origin, similar to the last outbreak in Indiana in 1999. In a study of multiple samples from an Oklahoma herd, extreme variation was seen with many genotypes present in the 20 samples sequenced. This is consistent with a situation where feral pigs from several different sources were mixed for later distribution. Some pigs harbored more than one strain of virus, suggesting dual infection and the possibility of recombination. Although different genotypes were found, no differences in viral pathogenesis for sites of oral infection were found that related to the genetic differences observed. Dr. Hahn is in the process of transferring his technology to National Veterinary Services Laboratory (NVSL) so the genotyping can be continued.
Dr. John Korslund, VS-APHIS-USDA provided an update on PRV and swine brucellosis surveillance plans. The revised PRV Surveillance Plan has been approved by VS for implementation. The plan reduces but targets sampling toward high-risk animals to save costs while improving effectiveness. The 3 objectives of the plan include rapidly detect PRV in commercial herds demonstrate freedom from PRV in U.S. commercial herds, and monitor the risk of introduction of PRV into U.S. commercial swine. Current sampling requirements for 5 percent annual sampling of cull breeding animals will be dropped. New surveillance streams for rapid detection include investigation/diagnosis of suspicious PRV cases, antigen testing of sick pig tissues submitted to diagnostic laboratories, serological testing of swine cases submitted to diagnostic laboratories, serological testing of herds classified as high-risk and voluntary reporting of herds with exposure to feral swine. The two streams utilized for documenting freedom from PRV infection are testing of cull sows identified by official swine program identification methods and market swine slaughtered at selected federally inspected slaughter establishments via premises identification. Activities for monitoring potential sources of infection include monitor and document the feral swine reservoir, routine summary of number and distribution of swine hunting preserves and monitoring and documentation of international PRV status. The plan will be implemented over the next 3-4 years as components come on line to make parts of the plan feasible. Critical points in implementation include all laboratory work proposed to be transferred to the National Animal Health Laboratory Network (NAHLN) system, sample numbers for proving freedom of infection drop precipitously from 790,000 to 6,000 samples, Animal Health Surveillance and Monitoring System (AHSM) database development critical for measuring performance metrics, targeted sow surveillance will require National Animal Identification System (NAIS) premises ear tags for targeting and automation, premises identification (ID) of market swine lots to ID commercial production grower-finisher segment to allow targeted sampling, feral swine sero-surveillance in targeted populations collected by WS and continuation of classical swine fever (CSF) partnership. Current PRV and swine brucellosis program standards (Uniform Methods and Rules (UMR) must be changed as sampling activities are lowered and targeted or no one will meet 5 percent threshold.

Swine brucellosis surveillance planning is being modeled after the PRV plan, with some differences related especially to assay issues. The basic streams are similar, although sample numbers may be altered based on sensitivity and specificity of assays used. In summary both programs rely on targeted surveillance to allow much lower testing levels while providing enhanced effectiveness. Premises ID is necessary to assign risk and target surveillance based on feral and backyard herd proximities, Data collection and management is critical for effective targeted surveillance, and targeted samples align well within PRV, SB, CSF, and foot and mouth disease (FMD) surveillance objectives, yielding potential program
BRUCELLOSIS

efficiencies through comprehensive planning.

A recommendation was approved and forwarded to the Committee on Transmissible Diseases of Swine. The Subcommittee recognizes a need for a comprehensive review of the PRV Program funding. Concerns that operating under the continuing resolutions have locked the budget at the 2006 level and the program is unable to conduct proper disease surveillance. It is recommended that USDA, state and industry stakeholders conduct a comprehensive review of the PRV program funding.
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON BRUCELLOSIS IN THE GREATER YELLOWSTONE AREA

Martin Zaluski, Chair

The Subcommittee met on Saturday, October 25, 2008. Subcommittee members are Martin Zaluski, Michael Gilsdorf, PJ White, John Belfrage, Sam Holland (not present), Terry Kreeger, Jim Logan, Chuck Massengill, and Bill Barton. There were 24 visitors also in attendance. The purpose of the Subcommittee is to provide support and recommendations to the Committee on for disease transmission risk management and the eventual elimination of the disease in the Greater Yellowstone Area (GYA). 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 Brucella abortus in the United States. The Subcommittee 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.

Dr. Bill Barton, Idaho State Veterinarian, Dr. Jim Logan, Wyoming Assistant State Veterinarian, and Dr. Neil Anderson, Montana Fish, Wildlife and Parks Service, each presented on brucellosis in the GYA. The Subcommittee discussed common threads of what has changed in the GYA states where there is an increased number of documented or suspected wild elk to livestock transmission. Common threads of change that were discussed by all three GYA states of Wyoming, Montana, Idaho include human population increase and demographics; a number of rural communities have increased in size and changed in preference of seeing elk, elk distribution in some areas of the GYA states has altered wintering behavior in location and duration. Elk brucellosis prevalence; overall, the brucellosis prevalence in wild elk has increased in the GYA, and that while wolves have an impact on elk distribution and risk, the impact of wolves is unknown.

Dr. Jack Rhyan, VS-APHIS, presented on immunocontraception technology as a potential method of reducing/eliminating brucellosis in bison in the GYA and recommends that this technology holds some promise and the Subcommittee felt that it should be explored further.

Rick Wallen, Yellowstone National Park, provided an update on the Yellowstone bison population.

Dr. PJ White, Yellowstone National Park provided a presentation on a brucellosis risk assessment project currently ongoing as a cooperative effort between the National Park Service, UC Davis, and USDA/APHIS.
This project will utilize geographic information system (GIS), information on elk movement, and other factors to answer basic questions on brucellosis transmission in the northern GYA, and identify mitigation activities.

Dr. Brian McCluskey, Western Region Director, Veterinary Services, VS-APHIS-USDA, provided a presentation on a National Brucellosis Elimination Zone Proposal.

The Subcommittee developed two resolutions 1) recommending a review of select agent status for Brucella abortus and 2) updating the Code of Federal Regulations (CFR) and Uniform Methods and Rules (UMR) for brucellosis to address the risk of transmission from wildlife in the GYA with draft language provided below (note for each section, only the sentence that includes proposed changes are shown below).

**Code of Federal Regulations, Title 9 Part 78. 78.1**

**Definitions. Class Free State or area.** *(page 266)* A State or area which meets standards for classification as a Class Free State or area, except for cattle and domestic bison within an APHIS approved wildlife risk management zone (WRMZ), and is certified as such on initial classification or on reclassification by the State animal health official, the Veterinarian in Charge, and the Administrator. Any reclassification will be made in accordance with §78.40 of this part. **Except in an APHIS approved WRMZ,** all cattle herds in the State or area in which brucellosis has been known to exist must be released from any State or Federal brucellosis quarantine prior to classification.

**CFR Title 9, Part 78.1. Official Adult Vaccinate** *(page 269).* (a) Female cattle or female bison older than the specified ages defined for official calfhood vaccinate and vaccinated by an APHIS representative, State representative, or accredited veterinarian with an reduced-dose approved brucella vaccine, diluted so as to contain at least 300 million and not more than 1 billion live cells per 2 mL dose of Brucella abortus Strain 19 vaccine or at the dosage indicated on the label instructions for other approved Brucella vaccines, as part of a whole herd vaccination plan authorized jointly by the State animal health official and the Veterinarian in Charge; and (b)(1) Permanently identified by a “V” hot brand high on the hip near the tailhead at least 5 by 5 centimeters (2 by 2 inches) in size, or by an official AV (adult vaccination) tattoo in the right ear preceded by the quarter of the year and followed by the last digit of the year; and (2) Identified with an official eartag or individual animal registered breed association registration brand or individual animal registered breed association tattoo.
(Page 279). Test-Eligible Cattle and Domestic Bison. (e) Cattle and domestic bison which are being moved from within a WRMZ to be used for breeding purposes and are 12 months of age or older

Uniform Methods and Rules (2003)

Class Free State or Area (page 14). Included among the requirements for Class Free status are that the cattle and/or domestic bison herds in the State or area within the State, except for cattle and domestic bison within an APHIS approved wildlife risk management zone (WRMZ), must have remained free from infections with field strains of *Brucella abortus* for at least 12 months. Except in an APHIS approved WRMZ, all cattle and/or domestic bison herds in which field-strain *Brucella abortus* was known to exist must be legally released from quarantine before the area or State can be certified.

Approved Wildlife Risk Management Zone (WRMZ). Any State or area that contains, or is adjacent to, an area where *Brucella abortus*-affected or exposed wildlife animal species resides may maintain a Wildlife Risk Management Zone (WRMZ). The border of the WRMZ shall be determined by an APHIS risk assessment in conjunction with the State Veterinarian, the State Wildlife Manager, and the Area Veterinarian in Charge. For Class Free States that maintain a WRMZ, there will be provisions for maintaining Class Free status, if multiple *Brucella abortus* affected cattle and/or domestic bison herds are detected in the WRMZ within a 12 month period. These provisions include the following: The State Animal Health Authority must sign a memorandum of Understanding with APHIS that defines the coordinated management activities that the State will provide in and around the WRMZ. Within the WRMZ, enhanced brucellosis surveillance procedures must be in place and all Federal and State brucellosis eradication regulations must be followed, and there must be livestock movement controls at the border of the WRMZ. All sexually-intact cattle and domestic bison over 12 months of age within the WRMZ will be individually identified with a permanent official identification device before they leave the WRMZ. All imported-sexually intact cattle or domestic bison must also have a permanent official identification device prior to importation. Any official identification device used must be entered into a USDA-approved process-verified data management system. All herds within the zone must be subjected to an annual individual herd risk assessment and a herd test at least once every three years with the frequency depending on the risk as determined by the herd risk assessment. Cattle or domestic bison being moved out of the WRMZ must comply with the following: Non sexually intact cattle or domestic bison (steers and spayed heifers) can move out of the WRMZ without restrictions.
AND all sexually-intact cattle or domestic bison 12 months of age or older being moved out of the WRMZ must be: Negative on an official brucellosis test within 30 days prior to movement unless tested between Aug 1 and Nov 1, then 60 days prior to movement, OR Branded with a hot iron brand “F” on the left hip and move for feeding purposes only, OR Transported directly to an USDA approved slaughter facility in a sealed vehicle.

<table>
<thead>
<tr>
<th>For Feeding Purposes</th>
<th>To Breeding herd</th>
<th>Directly to slaughter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spayed / castrated</td>
<td>No restrictions</td>
<td>N/A</td>
</tr>
<tr>
<td>Sexually Intact</td>
<td>“F” brand or tested within 30 days prior to movement, or if tested between Aug 1 and Nov 1, 60 days prior to movement</td>
<td>For animals 12 mo of age or older, tested within 30 days prior to movement, or if tested between Aug 1 and Nov 1, 60 days prior to movement</td>
</tr>
</tbody>
</table>

All female sexually-intact cattle and domestic bison calves born in or imported into the WRMZ must be officially calfhood vaccinated. Female adult sexually intact cattle may be required to be adult vaccinated with an approved Brucella vaccine as determined by the brucellosis DBE in the State and with concurrence of the APHIS regional brucellosis DBE, the Area Veterinarian in Charge and the State Veterinarian. If brucellosis affected cattle and/or domestic bison herds (herds known to be affected) are found within the WRMZ, the herds must follow all the requirements listed within the most recent brucellosis UM&R and CFR requirements for movement controls and quarantine release. If any cattle and/or domestic bison herd is found affected with *Brucella abortus* within the WRMZ, it will not affect the States Class Free status if the most probable source of the disease is from wildlife and the State implements an approved Brucellosis Management Plan (BMP) within 60 days which defines the brucellosis control and eradication procedures that must be followed at the interface of the wildlife and domestic cattle and domestic bison. These BMP’s must be approved by APHIS and the State Animal Health official. The BMP, as well as the criteria for establishing/maintaining the border of the WRMZ, must be reviewed annually and re-approved by a Brucellosis Management Committee (BMC) appointed by the Deputy Administrator. The BMC will consist of the state animal health...
official, or his/her designee, of any 2 adjacent States not having a WRMZ, the Regional Brucellosis Epidemiologist for APHIS, VS, and a cattle industry representative of any 2 adjacent states not having a WRMZ as recommended by that state’s animal health official, a cattle producer, and the state veterinarian from the state with the MOU. If Brucella abortus infection is found outside the zone in one or more herds during a 12 month period and the epidemiological investigation indicates the source of the infection is from within the WRMZ, as a result of cattle or domestic bison being moved out of the zone or contact with infected wildlife, the State will lose its brucellosis free status and must follow the existing requirements to regain Class Free status. States that have Brucella abortus infected or exposed wild elk or bison shall have existing laws and procedures authorizing responsible State wildlife agencies to manage/mitigate brucellosis risks presented by infected or exposed wild elk or bison to prevent brucellosis transmission to livestock. These agencies shall continue to engage in cooperative, integrated management of migratory ungulates across administrative jurisdictional boundaries in the Greater Yellowstone Area. States shall strive to reduce risk presented by infected or exposed wild elk or bison.

Feedlot—cattle and/or domestic bison (page 17). The feedlot will not be considered a herd if it is a State approved terminal feedlot.

State Approved Terminal Feedlot (new proposed definition). Any feedlot designated as an approved terminal feedlot by the State Animal Health Authority. All animals entering the feedlot must comply with the required movement tests of the brucellosis UM&R and CFR and must be identified with an approved official identification device that allows for tracing of each animal back to its herd of origin. All animals moved out of the feedlot must go directly to slaughter or to another State approved terminal feedlot and must be identified with an approved official identification device.

Official vaccinate (adult) (page 21). A bovine or bison female that as part of a herd that was approved for whole-herd vaccination, was inoculated subcutaneously with an approved Brucella vaccine at an age older than that permitted for calfhood vaccination. At vaccination, the animal must have been properly identified as an adult vaccinate with a Brucella vaccination tattoo and official identification device and must have been reported on the appropriate form to the State or Federal animal health agency in that State.

Testing Requirements. A. Cattle. Official vaccinate (adult) (Page 21). The animal must have been tested negative within 10 days before vaccination, except for animals vaccinated within a WRMZ.
Quarantined pasture (page 23). Quarantined pastures can be approved within a WRMZ. Animals leaving a quarantine pasture located within a WRMZ must comply with the movement and testing controls established for movement within or from the WRMZ.

Chapter 1. Part II. 2. Procedures for Vaccination. C. Identifying Vaccinates (page 34). 2. Official adult vaccinate. To be an official adult vaccinate, the vaccinated animal must be a. Part of a herd approved for whole-herd vaccination at the time of vaccination, and b. Female cattle and/or bison vaccinated at an older age than the maximum age approved for calfhood vaccination, and c. Tested negative within 10 days before vaccination, and d. Vaccinated subcutaneously with an approved 2-mL dose of Brucella abortus Strain 19 vaccine containing between 300 million and 1 billion live organisms. (The optimum dose is 500 million live organisms.) If the animal was vaccinated before August 15, 1983, the vaccine must have contained between 300 million and 3 billion live organisms, or e. Vaccinated subcutaneously with an approved 2-mL dose of Brucella abortus Strain RB51 vaccine containing at least 1 billion live organisms, and f. Vaccinated by a State or Federal animal health representative or by an accredited veterinarian as instructed by the State animal health official and the APHIS AVIC, and g. Identified as an official adult vaccinate as described in Section C, and h. Reported on the appropriate forms as an adult vaccinate to the State or Federal animal health agency for that State.

Chapter 2. Part II. Class Free Status. 1. Size of Area (page 85). A State may also request a WRMZ if they have a known focus of Brucella abortus infection in wildlife within the State boundaries.

UM&R. Chapter 2. Part II. Class A Status. 1. Size of Area. A State may also request a WRMZ if they have a known focus of Brucella abortus infection in wildlife within the State boundaries.

Chapter 2. Part II. Class Free Status. 3. Standards To Attain and Maintain Class Free Status (UM&R page 88). B. Herd Infection Rate. 1. States, except within a WRMZ, must remain free of brucellosis resulting from infections with field strains of Brucella abortus for 12 months or longer.

Chapter 2. Bovine Brucellosis. Part II. Class Free Status. 4. Movement of Cattle and Domestic Bison on Change of Ownership Within and From Class Free States or Areas for Certain Purposes. B. For Feeding. 1. Movements to quarantined feedlots or quarantined pastures (Page 94). Quarantine feedlots may also be approved within
a WRMZ as needed for the movement of cattle and domestic bison from anywhere within the zone to the quarantine feedlot.

UM&R. Chapter 2. Part II. Class A Status. B. Herd Infection Rate (UM&R page 98). *Brucella abortus* affected cattle and domestic bison herds within the State's WRMZ will also be included in the State accumulated 12-month herd infection rate.
As the cooperative State-Federal brucellosis eradication program nears its goal of eliminating *Brucella abortus* from U.S. livestock herds, the persistence of brucellosis in bison and elk in the Greater Yellowstone Area (GYA) remains problematic because of continued exposure to livestock. Although all 50 States achieved Class Free status early in 2008 for the first time in the brucellosis eradication program’s 74-year history, this milestone was tempered by the discovery of newly affected herds near the GYA. In the past few years, brucellosis has been intermittently detected in domestic livestock in Idaho, Montana, and Wyoming, the States surrounding the GYA, where wild bison and elk populations are known reservoirs of infection. Numerous organizations, agencies, committees, and individuals have worked toward the ultimate goal of eliminating brucellosis from domestic livestock and wildlife in this area. The Greater Yellowstone Interagency Brucellosis Committee (GYIBC) has coordinated Federal and State brucellosis research and management activities in the GYA since the mid-1990s. Despite these and other efforts to solve the brucellosis problem, several recent brucellosis cases have been detected among livestock herds in the GYA, with epidemiological and genetic evidence indicating infected elk as the source. These outbreaks have resulted in the reclassification of the affected States, impacted the livestock industry, and increased scrutiny of wildlife management policies. The likelihood of further spread of brucellosis to livestock in the GYA presents a significant challenge to livestock owners and regulators, as well as land and wildlife managers within the region. To assist the three States in the GYA, the Animal and Plant Health Inspection Service’s (APHIS) Veterinary Services (VS) branch is proposing to create a designated National Brucellosis Elimination Zone (NBEZ). The establishment of this zone would facilitate the elimination of brucellosis from livestock and provide clear, consistent control and surveillance guidance to livestock producers in the NBEZ, while simultaneously allowing the balance of the United States to be considered free of bovine brucellosis.

In this proposal, VS intends to introduce how regionalization concepts would be applied to the GYA, justify application of these concepts, demonstrate how this plan would be accomplished, and stimulate critical feedback from partners and stakeholders. Further efforts are required to ensure successful implementation of any plan, including a risk assessment to determine the zone boundaries and appropriate surveillance and mitigation strategies; specific implementation strategies; and a communication plan to maintain the valuable dialogue between partners, stakeholders, and the public. Implementation of the NBEZ requires a concurrent planning effort with the many wildlife agencies and entities in
the GYA. Consideration of the GYA as an entire ecosystem should drive this planning process with development of potential strategies to eliminate brucellosis from bison and elk in the GYA.

**Justification and Support.**

The World Organization for Animal Health (OIE) adopted the concept of regionalization to define distinct subpopulations (herds) for disease control and international trade purposes. These concepts will be applied to the NBEZ to improve upon ongoing disease control efforts. According to the OIE, a zone or region is a clearly defined part of a country containing an animal subpopulation with distinct health status, with respect to a specific disease, for which required surveillance, control, and biosecurity measures have been applied for international trade purposes. Historically, US disease eradication programs such as tuberculosis, pseudorabies, and brucellosis have relied on a regionalized approach on a State-by-State basis. This method has been effective for disease control because eradication program standards allow States to enforce interstate movement and testing requirements. Although regionalization at the State level has been effective, it can be costly for States when only a few livestock herds in a small geographic area are identified as affected. For brucellosis, when an affected livestock herd is identified anywhere in a State, the entire State is downgraded to the next lower level of classification in accordance with title 9, Code of Federal Regulations (9 CFR), section 78.40. When a State is downgraded, all producers in that State must meet the additional testing and mitigation requirements. The downgrade results in a costly situation for producers as well as State and Federal governments. To minimize the impact to a whole State during an outbreak situation, 9 CFR 78.40 and the Brucellosis Eradication Uniform Methods and Rules (UM&R), October 2003, allow States to designate a two-area classification, called split-State status, in which one area has a separate brucellosis classification from the rest of the State. One benefit of split-State status is that areas considered free of brucellosis may ship livestock interstate and internationally with minimal restrictions. However, the application process for split-State status can take over a year to complete. States are responsible for the majority of the workload and are required to have the legal and financial resources necessary to implement the zone. In addition, split-State status currently requires a regulatory change each time; therefore, increasing or decreasing the size of the zone as risks change can be difficult and burdensome for the State.

As an alternative to split-State status, APHIS-VS is proposing to define a high-risk zone for livestock, the NBEZ, to reduce the impact of brucellosis in the affected GYA States. This proposal would offer several advantages. Similar to split-State status, creation of the NBEZ would allow the remainder of the State to maintain its brucellosis free status. However, the NBEZ would allow flexibility in modifying the boundaries of the zone as the risks associated with *B. abortus* change. In contrast, split-
BRUCELLOSIS

State status would require a new application to redefine the classification areas, delaying the designation. Management of the NBEZ would be a collaborative State-Federal effort, reducing the burden on each individual State and creating a more effective way to work toward brucellosis elimination in these livestock populations. The key to the plan’s success is participation from all three impacted States. The efforts of the States and other organizations with a vested interest in the status of brucellosis in the domestic livestock and wildlife of the GYA will be integrated during the development of the NBEZ. This zone would encompass an area around the GYA where potential exposure to *B. abortus* could occur. The official NBEZ boundaries will be established based on a risk assessment that considers current brucellosis surveillance and control practices in both livestock and wildlife in the GYA, the risk factors associated with transmission of brucellosis, and other ecological factors. Successfully eliminating brucellosis will require enhanced surveillance and mitigations to ensure early detection of affected herds and to prevent spread of *B. abortus* outside of the NBEZ. Implementation of this concept would allow the remainder of each State outside the NBEZ to maintain Class Free status regardless of detection of disease in livestock within the NBEZ. For the rest of the United States, creating a zone around the GYA for brucellosis management in livestock would ensure that international trade of US cattle continues uninterrupted in compliance with OIE standards.

**Proposed Action Plan.**

Risk Assessment. As one of the first steps to establish the NBEZ, APHIS-VS will conduct a risk assessment to ensure the evaluation of all factors that may increase the risk of *B. abortus* transmission to livestock within and outside the NBEZ. Using the OIE concept of regionalization, the assessment will utilize current knowledge of brucellosis epidemiology and ecology in the GYA to establish the boundaries. Simultaneously, a herd-risk scoring tool will be developed to allow for the tiering of risk among herds within the NBEZ.

Identification of the NBEZ. To create the NBEZ, an area where herds are at greater risk of *B. abortus* exposure than surrounding populations will be identified. Epidemiological, ecological, and geographic factors will be used to define a zone with distinct and identifiable boundaries that contain a majority of the potential risk factors for *B. abortus* exposure. Procedures to establish the NBEZ will include identification and assessment of all pathways of potential spread of *B. abortus*. This task will incorporate current scientific knowledge of the ecology, epidemiology, and disease dynamics of *B. abortus* in domestic livestock and free-ranging bison and elk. Information from investigations of brucellosis outbreaks in livestock, as well as surveillance in domestic livestock and wild populations of bison and elk, will also help identify potential risk pathways. To define the NBEZ boundaries, this information will be combined with data describing the distribution and ecology of bison and elk populations in the GYA, including
migratory behavior and routes, overwintering areas, calving areas, and use of areas occupied by livestock. In addition, data on management of wild bison and elk such as feed ground use and location and hazing of bison will be considered. This information will be used to determine areas of greatest likelihood for contact between livestock and free-ranging bison and elk, and potential livestock exposure to *B. abortus*. Disease risk is not static and can change significantly over time as production practices change, exposure mitigations are implemented, and disease management of free-ranging bison and elk populations improves. Because the system is dynamic, the NBEZ boundaries may be redefined as new data become available. This will continually ensure that the risk of exposure is adequately contained while the impact to livestock in the adjacent free zone is reduced, and surveillance and mitigation requirements are not unnecessarily imposed on herds no longer considered at significant risk.

Risk-based approach to herd management within the NBEZ. States and other entities and organizations have developed multiple herd-level risk classification tools, such as herd plans and risk factor scoring. However, these tools and their implementation vary by State. APHIS-VS and States will develop a herd classification system that integrates existing tools with the goal of standardizing efforts in all three States. A risk scoring system will be used to assess herd risk based on producer-identified risks (e.g., elk presence on property), management practices, and biosecurity. Risk levels may be further defined based on other factors, such as proximity to elk feeding grounds, elk and bison population levels, and seroprevalence rates of *B. abortus*. The risk tool will provide a standardized method for producers and animal health officials to define a herd’s risk of acquiring brucellosis, identify needed mitigation to reduce risk, conduct surveillance to assure early detection, and allow movement with confidence of a herd’s freedom from brucellosis. Livestock producers may have the opportunity to improve their herds’ risk score by adopting mitigation strategies associated with the identified risk factors. Producers within the NBEZ will use their herd risk scores to choose which herds they add to or allow to mingle with their herds, under guidelines similar to existing herd certification programs. However, a herd’s risk status will be raised if producers add from or mix with herds of a higher risk status.

**Mitigations**

Surveillance. Surveillance procedures for brucellosis currently depend on the State’s class status. Generally, when a State’s classification is lowered, surveillance is increased, which raises costs to the producer and the State. By developing a tiered surveillance scheme that addresses surveillance outside and within the NBEZ, States will be able to utilize their resources more for brucellosis detection and elimination by focusing efforts on their portions of the NBEZ. Although this plan focuses on addressing domestic livestock, it is important to note that effective wildlife surveillance and control implemented concurrently within the NBEZ will provide higher
confidence of disease detection in livestock.

Surveillance outside the NBEZ. Depending on the findings of the risk assessment, surveillance in areas of Idaho, Montana, and Wyoming outside the NBEZ may need enhancement to ensure rapid detection of disease due to intrastate movement of animals from inside the NBEZ. Meeting these requirements will allow Idaho, Montana, and Wyoming to maintain Class Free status outside the NBEZ. States outside the GYA will continue surveillance under the established national protocols for maintaining Class Free status per the Brucellosis Eradication UM&R. In those areas, surveillance streams used to evaluate brucellosis status will continue to include bovine brucellosis slaughter surveillance, milk surveillance using the brucellosis ring test in dairy herds, first-point testing (market surveillance), and abortion screening. Livestock moved from within the NBEZ to slaughter or feedlots outside of the NBEZ or outside Idaho, Montana, and Wyoming may need to be specifically targeted for surveillance testing, preferably using electronic animal movement information and mandatory identification.

Surveillance in the NBEZ: Within the defined NBEZ, brucellosis surveillance will be increased to ensure rapid detection of affected herds and prevent movement of *B. abortus* out of the zone. An appropriate level of surveillance will be recommended for all herds located inside the NBEZ. The risk scoring system described above will be utilized to establish herd-specific surveillance protocols. Testing requirements for the lower-risk herds will be set to equal the minimum level for the NBEZ. Higher-risk herds will be subject to greater surveillance requirements. Herd-level surveillance will include movement testing, investigations of abortion events, and serologic testing of herds. Again, the amount and frequency of herd testing required will depend on the herd-risk status.

Additional mitigations. In order to prevent the spread of brucellosis within and outside of the NBEZ, several mitigation practices may be adopted. Electronic movement certificates and animal identification should be used for animals leaving the NBEZ to ensure compliance with appropriate testing requirements. This will also ensure that effective trace investigations associated with affected livestock can be performed. Additional mitigations, such as vaccination and restricting movement of livestock only to slaughter, may also be applied.

**Implementation**

Regulatory changes. Official establishment of the NBEZ will require regulatory changes at the Federal level. The necessary rulemaking to establish the zone according to internationally accepted guidelines will require many months to complete. The rule, however, will allow for more flexibility in modifying the zone boundaries as conditions change. Prior to publishing the official rule that will develop the zone, APHIS-VS intends to work in close partnership with the GYA States to establish the zone boundaries and concomitant standardized surveillance activities,
mitigations, and movement controls. Rapid implementation of consistent, focused disease elimination and control strategies in the zone is in the best interest of Federal and State animal health officials and producers. Initial implementation of many of these strategies does not require regulation but only the cooperative efforts of State, Federal, and producer entities. Regulatory changes at the State level will also be required, with particular attention needed on requirements for movement of livestock outside of the zone. APHIS will begin work immediately to establish zone boundaries following stakeholder and partner acceptance of the NBEZ concept.

Oversight and monitoring. State animal health officials and producer groups have worked extensively to create herd risk assessment tools, herd plans, surveillance techniques, and suggested regulatory changes. APHIS-VS will work closely with these groups to assist with standardizing these tools, leveraging them for appropriate application across the entire NBEZ. A toolbox of surveillance approaches, disease mitigation strategies, risk assessment approaches, and herd plans will be developed and made available to all partners and stakeholders. State and Federal animal health officials will share the use of these tools. For example, the location of a Federal or State veterinary medical officer will determine who will conduct a herd risk assessment and develop a herd plan. Oversight and monitoring of herd plans will be the State animal health official’s responsibility, as it is currently. This approach will continue the long-standing cooperative effort between State and Federal officials in the brucellosis program.

Mitigation implementation and enforcement. Implementing appropriate levels of surveillance within the zone will be critical to demonstrate mitigation and movement control effectiveness. As with any surveillance effort, the collection, validation, and reporting of accurate surveillance data facilitates the demonstration of effectiveness and allows for rapid response to detections of disease. Existing data collection and management systems, including the Mobile Information Management System (MIMS) brucellosis application, the Animal Health Surveillance and Monitoring System (AHSM), and components of the National Animal Identification System (NAIS), will be used to enhance surveillance capabilities in the NBEZ. Individual State and Federal animal health officials will be responsible for meeting the established surveillance standards, including reporting deadlines and criteria within their States. Livestock movement controls will be implemented to assure the States that the risk of disease spread outside the zone is minimal. As mentioned previously, individual State authorities will be responsible for enforcing movement controls, such as ensuring that only low-risk cattle are moving, without brucellosis testing, outside the zone or that high-risk cattle are moving only to slaughter or feeding operations where the risk of spread is controllable. A key component to effective movement control will be the zone-wide implementation of premises and animal identification. This will be combined with other efforts such as check stations, permitting, electronic
movement certificates, market surveillance, slaughter surveillance, and frequent record review to provide necessary confidence in the risk mitigations employed. APHIS-VS, primarily at the VS Area Office level, will work closely with State animal health officials to continuously monitor movement information and provide rapid service to producers needing to transport livestock outside the NBEZ.

Wildlife. The NBEZ concept presented here is only part of a successful approach to brucellosis elimination in the GYA. Implementation of the NBEZ requires a concurrent planning effort with the many wildlife agencies and entities in the GYA. Consideration of the GYA as an entire ecosystem should drive this planning process with development of potential strategies to eliminate brucellosis from bison and elk in the GYA. Numerous points exist for integration of these efforts. The Interagency Bison Management Plan has outlined strategies requiring concerted efforts for adequate spatial-temporal separation of bison and livestock. A coordinated approach to surveillance in both domestic livestock and wildlife (e.g., serologic testing and observation of abortions or orchitis) is also critical to ensuring control and elimination of brucellosis in the GYA. APHIS-VS is eager to partner with wildlife agencies and entities in the wildlife brucellosis planning effort.

Resources
An accurate estimate of the resources needed to establish and then maintain the NBEZ will not be possible until boundaries are determined, surveillance levels established, and mitigation strategies developed. Additional financial resources in the GYA States will be necessary. These funds will support additional field and technical personnel, vehicles, laboratory activities, travel, supplies, administrative and analytical support, producer incentives, and vaccination, among other needs. APHIS-VS is currently developing an updated national brucellosis surveillance plan. The plan will incorporate strategies that include, but are not limited to, laboratory consolidation, standardizing test protocols, redirecting surveillance funds, and communication to stakeholders regarding potential changes to current brucellosis surveillance components. APHIS-VS intends to redirect resources gained from the restructured national surveillance system to the NBEZ, the area of highest brucellosis risk. In fiscal year 2008, APHIS-VS allocated approximately $2.5 million to brucellosis work in the GYA States. These funds were used for cooperative agreements with the GYA States and universities, and for APHIS-VS personnel and activities in VS Area and Regional Offices. Total contributions from States and producers are unknown but substantial. APHIS-VS, States, and producers will continue to jointly provide the financial and personnel resources needed to create and maintain the zone.

Conclusion
Elimination of *B. abortus* from the United States is nearly complete,
with only a nidus remaining in wildlife reservoirs in the GYA. This problem has affected the brucellosis status of the States surrounding the GYA, adding costs and burdens to all producers. Designation of the NBEZ would allow the remainder of the United States, including the areas outside the NBEZ in Idaho, Montana, and Wyoming, to maintain Class Free status even if an affected herd is found in the zone, thus minimizing trade and movement restrictions. In addition, creating the NBEZ would allow greater flexibility than Split-state status in redefining zone boundaries as the natural history of brucellosis evolves in the GYA. A cooperative State-Federal effort to establish the NBEZ and efficiently utilize resources in affected States would allow the United States to eliminate brucellosis in both livestock and wildlife. To succeed, this effort will require the continued partnership of APHIS-VS with States, agencies, and industry, as well integrated planning and implementation efforts with wildlife agencies and interest groups.
For the first time in the 74-year history of the Brucellosis program, all 50 States, Puerto Rico, and the US Virgin Islands were simultaneously designated brucellosis Class Free for a brief period of time in fiscal year (FY) 2008. This accomplishment was made possible thanks to the diligent and cooperative efforts of Federal, State, and industry partners. This milestone occurred when Texas was declared brucellosis free on February 1, 2008. However, in May 2008, the State of Montana disclosed a second brucellosis affected cattle herd within a twenty-four month period of time, resulting in reclassification to brucellosis Class A State status on September 3, 2008.

Brucellosis program eradication efforts have been successful in eliminating the disease from our national cattle herds. Depicted below is the most recent ten-year history of the numbers of brucellosis-affected cattle herds disclosed and their location by State status. The number of brucellosis affected cattle herds ranges from a high of twenty-seven in 1999 to a low of one in 2007. Continuing surveillance activities after achieving Class Free State status is essential, as evidenced by the disclosure of brucellosis-affected herds in Class Free States in recent years.
10-year History of Numbers of Brucellosis Affected Cattle Herds in Class A and Class Free States

- □ # of Brucellosis affected herds in Class A States
- □ # of Class A States with Brucellosis affected herds
- □ # of Brucellosis affected herds in Class Free States
- □ # of Class Free States with Brucellosis affected herds


Values: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30
BRUCELLOSIS

Chart on previous page by John D. Thompson, VPA, USDA-APHIS-VS-RHP

Brucellosis affected herds disclosed in FY 2008

In January 2008, an epidemiologic investigation involving a research herd at Louisiana State University (LSU) was completed. The index herd was determined to have been exposed to a research strain of *Brucella*. The single infected animal, which was test negative on prior annual herd certification testing, was removed. The rest of the herd tested negative, remains under quarantine, and is under an intensive herd plan that includes a comprehensive testing regimen and strict movement controls for the next 2 years. All adjacent herds, source herds, and contact herds were identified and tested; no additional brucellosis affected herds were disclosed.

On June 9, 2008, APHIS confirmed *Brucella abortus* in a cow originating from a cattle herd in the Paradise Valley area of Montana. This herd was tested as part of Montana’s efforts to test and develop brucellosis risk mitigation herd plans for herds near the Greater Yellowstone Area. The brucellosis affected herd was depopulated with indemnity and a thorough epidemiologic investigation conducted. No additional brucellosis affected cattle herds have been disclosed to date. Infected free-ranging elk are thought to be the most likely source of infection. A year earlier, in May 2007, a single brucellosis affected was also disclosed in Montana. With the finding of two brucellosis affected herds within twenty-four months, Montana no longer met the conditions for Class Free status and was subsequently reclassified to Class A State status via the publication of an interim rule on September 2, 2008. The reclassification requires the testing of certain classes of cattle for brucellosis prior to interstate movement. Until this time, Montana had been classified brucellosis Class Free status since June 3, 1985. The loss of Montana’s status demonstrates the importance of remaining vigilant. The presence of brucellosis in wildlife populations, such as the free-ranging bison and elk in Yellowstone National Park and Grand Teton National Park, remains a challenge, threatening the brucellosis status of surrounding States.

On June 30, 2008, APHIS confirmed *B. abortus* in two cows originating from a cattle herd in Sublette County, Wyoming. These animals were tested as part of Wyoming’s first-point testing at livestock auction markets. Testing of the herd of origin revealed additional reactor classified animals on each of three successive herd tests. The brucellosis affected herd was subsequently depopulated with indemnity and a thorough epidemiologic investigation conducted. No additional brucellosis affected cattle herds have been disclosed. Infected free-ranging elk are thought to be the most likely source of infection. Brucellosis regulations provide for a State to maintain Class Free status provided the single affected herd is depopulated and a thorough epidemiological investigation is completed (including all associated herd tests) within 60 days, and no additional
affected herds are disclosed. If another affected herd is found within 24 months, Wyoming would be subject to reclassification to Class A status. In February 2004, Wyoming lost its Class Free status in this manner after the disclosure of four brucellosis affected herds. Wyoming was successful in regaining Class Free State status in September 2006.

**Brucellosis Surveillance Planning**

An evaluation of the current brucellosis surveillance program identified redundancies in surveillance activities. Working to eliminate these redundancies and provide effective and efficient surveillance, a Brucellosis Surveillance Planning Workgroup developed a proposed plan that consists of reducing slaughter surveillance, eliminating brucellosis milk surveillance testing, eliminating Federal funding for first-point testing in States where it is not required, and standardizing slaughter surveillance testing using the rapid automated presumptive test and the fluorescence polarization assay for initial slaughter surveillance sample screening.

To further the development of a National Brucellosis Surveillance Plan, the NSU is developing options for a national surveillance system that is, in part, based on criteria such as the length of time a State has been considered free of brucellosis as well as the movement of high risk cattle. Brucellosis surveillance planning will include consideration of specific needs associated with development of a National Brucellosis Elimination Zone plan for the Greater Yellowstone Area (GYA). Brucellosis-infected wildlife, primarily elk, in the GYA have been implicated in the transmission of brucellosis to cattle herds in the GYA in the past 4 years.

**Brucellosis Laboratory Consolidation**

APHIS' National Surveillance Unit (NSU) is working with the Brucellosis Laboratory Consolidation and Testing Standardization (BLCTS) Working Group to assess laboratory capabilities for bovine brucellosis slaughter surveillance sample testing. The assessment will evaluate economies of size in the laboratories and the potential for consolidating brucellosis slaughter surveillance testing. The objectives of the brucellosis laboratory consolidation plan are to increase cost efficiency of slaughter surveillance testing, increase effectiveness by standardizing slaughter surveillance testing, and maintain testing accuracy and timely reporting of results. This assessment will ensure that APHIS creates an efficient and effective brucellosis slaughter surveillance system. This is both an economic issue and an issue of integrity for the US brucellosis surveillance program as recognized in national and international trade.

**Brucellosis/NAIS Integration Feasibility Project**

The Brucellosis/NAIS Integration Feasibility Project was initiated in January 2008. The project is to develop, test and support a scalable solution for brucellosis electronic field data collection, using NAIS standards, to enhance national animal disease traceability and surveillance.
BRUCELLOSIS

and brucellosis program management. The system design provides data capture events and reports as defined by the program. In addition, the project design would collect data that would be used for traceability reporting and cost/benefit analysis of the brucellosis Mobile Information Management (MIM) application.

The use of radio frequency identification (RFID) devices facilitates MIM use in the field. However, RFID ear tags are not necessary to use the MIM application. Data can be manually entered. Initially all identification, breed, age, sex, vaccination status data is collected upon the initial use of the MIM application during a brucellosis event. During subsequent events, collection (either manually or electronically) and recording of the individual animal data is achieved upon entry of an official identification device in the MIM application. The brucellosis MIM application has been used in Montana and Wyoming and well accepted by State and Federal animal health regulatory field personnel and livestock producers.

The brucellosis MIM application is similar in design and function to the tuberculosis MIM application, thus facilitating usage of the data collection devices, transmission of data, and development of program reports. This similarity also reduces the amount of training and time to become proficient in the use, by field personnel, of both applications.

Brucellosis – Greater Yellowstone Area (See Time Specific Paper by Mcluskey included in the Committee Report)

Brucellosis Program Surveillance Activities

[The following surveillance statistics for the cattle brucellosis eradication program is based on data available as of October 15, 2008. Normal data reporting time allowances for states to gather and submit monthly data preclude ascertainment of all data for FY 2008.]

Fiscal Year (FY) 2008 began with 49 States and three Territories classified at Brucellosis Class Free state status and one state, the State of Texas, classified at Brucellosis Class A State status. FY 2008 ended with 49 States and three Territories classified at Brucellosis Class Free State status and one state, the State of Montana, classified at Brucellosis Class A State status. After successfully completing all program regulatory requirements, the State of Texas officially attained Class Free State status on February 1, 2008. The State of Montana was officially reclassified to Class A State status on September 3, 2008 pursuant to the finding of a second brucellosis-affected herd within twenty-four months.

Cattle herd inventories in the US at the end of FY 2008 were distributed as follows: 1.26 percent of all cattle herds were located in the single Brucellosis Class A state; 23.57 percent of all cattle herds were located in states classified as Brucellosis Class Free for five years or less; 25.59 percent of all cattle herds were located in states classified as Brucellosis Class Free status for six to ten years; 18.87 percent of all cattle herds were located in states classified as Brucellosis Class Free status for eleven to fifteen years; 8.29 percent of all cattle herds were located
REPORT OF THE COMMITTEE

in states classified as Brucellosis Class Free status for sixteen to twenty years; and 22.42 percent of all cattle herds were located in states classified as Brucellosis Class Free status for more than twenty years.

The FY 2008 national herd prevalence rate for bovine brucellosis was 0.0003 percent. Three brucellosis affected cattle herds were disclosed in FY 2008. Affected herds were identified via annual herd certification testing, herd testing as part of surveillance and high-risk herd management, and first-point testing at a livestock market. Per recommendations outlined in the Brucellosis Emergency Action Plan (BEAP), the two brucellosis affected herds located in the high-risk area of the Greater Yellowstone Area were depopulated with indemnity. The third herd, a research herd, is under quarantine and is subject to a comprehensive herd plan including quarterly herd testing.

Maintaining Brucellosis state status focuses on continual surveillance activities. Two primary surveillance activities are conducted for bovine brucellosis, Market Cattle Identification (MCI) testing and Brucellosis Milk Surveillance Testing (BMST). During FY 2008, approximately 7.349 million head of cattle were tested under the MCI surveillance program. Per the Brucellosis program standards, blood samples are collected from a minimum of 95 percent of all test-eligible slaughter cattle as part of the MCI surveillance activities. Preliminary tallies indicate blood samples were collected from approximately 94.3 percent of all test-eligible slaughter cattle in FY 2008. First-point testing at livestock markets is required in Brucellosis Class A states. Several Brucellosis Class Free states continue to conduct first-point testing at markets to facilitate interstate movement of cattle and enhance surveillance activities. Brucellosis program standards provide for a minimum of 90 percent successful traceback of all MCI reactor cattle and a minimum of a 95 percent successful case closure rate. In FY 2008, approximately 97.24 percent of all MCI reactors were successfully traced, all leading to successful case closures.

Approximately 69,100 additional head of cattle were tested on farms or ranches during FY 2008, bringing the total cattle tested for brucellosis in FY 2008 to approximately 7.978 million head. BMST surveillance is conducted in all commercial dairies – a minimum of two times per year in Class Free states and a minimum of four times per year in Class A States. Suspicious BMSTs are followed up with an epidemiologic investigation. Dairy herd inventory data reported on state’s annual reports totaled approximately 61,250 dairy operations in the U.S in FY 2008. Approximately 138,000 BMSTs were conducted in FY 2008; approximately 110 BMSTs yielded suspicious results after repeat screening (repetitive BRT and/or HIRT). All suspicious BMSTs in FY 2008 were confirmed negative by subsequent epidemiologic investigations and additional herd testing. There were approximately 3.799 million calves vaccinated for brucellosis in FY 2008. The national calfhood vaccination policy recommends proper calfhood vaccination in high risk herds and areas
and whole herd adult vaccination when appropriate in high risk herds and areas. Elimination of mandatory vaccination in all states is also recommended.

The reclassification of Montana to Class A State status in FY 2008 demonstrates the importance of remaining vigilant. The presence of brucellosis in free-ranging bison and elk in the GYA threatens the brucellosis status of the surrounding States and the health of their livestock herds. As a result, final eradication of brucellosis from the United States continues to be a challenge.

![Brucellosis Eradication Program](image-url)
REPORT OF THE COMMITTEE

Distribution of U.S. Cattle Herds by Brucellosis State Status
2007 NASS data

National Prevalence Rate: Brucellosis Affected Cattle Herds

United States Department of Agriculture
Animal and Plant Health Inspection Service
The current regulations that support the campaign of eradication against brucellosis in Mexico is the Federal Law of Animal Health. – Published on July 25th 2007. The Official Norm “NOM-041-ZOO-1995”, “National Campaign against Animals Brucellosis” is being updated by a Technical Subcommittee with 70 percent modification advancing.

Historic Budget
The brucellosis eradication campaign budget from 2000 to 2008 is of 616.2 million Mexican pesos, and in 2008 it was 89.3 million Mexican pesos.
Incidence of Human Brucellosis in Mexico

The decline in incidence of human *Brucella* is derivative of animal disease eradication efforts.

*update September/30Th/ 2008 . Week 41. EPIDEMIOLOGY GENERAL DIRECTION/PUBLIC HEALTH MINISTERY

**Strategic Planning for the National Campaign for Brucellosis Eradication**

A Strategic Plan for the campaign of eradication of brucellosis was completed at Tequiquiapan, Queretaro on September 30, 2008. Highlights of the Strategic Plan are:

- Brucellosis eradication program will adopt the focus of the zoosanitary condition and infrastructure of the tuberculosis (TB) Campaign, including: Identification of zoosanitary coincidence areas between the two eradication programs; Perform the brucellosis diagnosis at A zones; Increase the current infrastructure with other zones and animal species; Training system for brucellosis specialist personnel; To take advantage of the current TB slaughter surveillance program; and incentives for Origin Certification of herds.

- Increasing vaccination with a highly promoted incentive promotion, including: Vaccine standardization; Quality production and distribution controls; Vaccine management training of veterinarians and distributors about transport, storage, uses and application techniques.

- A mobilization control system, including: Training for movement documentation centers and checkpoint personnel; Checkpoints performing as Zoosanitary Service Centers; Cancellation of the
BRUCELLOSIS

Zoosanitary Movement Certificate when a shipment arrives to the destination with a notification system to the origin; All ruminant movement must be with negative brucellosis test.

Communication and training programs, including: distribution of educational materials to advertise the campaign image; replicable training for epidemiology of brucellosis for all States; national program for education of general population about brucellosis eradication campaign; education of consumers about the importance to buy products free of brucellosis; periodic meetings and training forums for cattlemen and veterinarians about the control and eradication of brucellosis.

International Recognition

The state of Sonora has intensified efforts to fulfill SUDA regulations for Class A Status, including: Surveillance traces reaching 95 percent of slaughter of animals older than 2 years; Monitoring the brucellosis milk surveillance testing (BMST) in stables: 4 rounds per year (at least); Herd blood test in stables, those who fail to meet the 4 rounds or as a positive brucellosis ring test; Reaching 95 percent of success in tracing animals reactors monitoring in traces and tests on animals in buffer zones; Strict control for livestock introduction into Sonora; Quarantines released by depopulation or negative tests in a period of not less than 1 year; Proficiency tests panels to evaluate the performance of diagnostic laboratories including validation of the technical and personnel (proficiency testing) by SAGARPA’s Official Central Laboratory; Recognition of veterinarian specifically trained in epidemiology of brucellosis with the faculties to classify herds and animals infected on the basis of information composed of each case.
The Committee met on October 26, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 12:30 to 4:30 p.m. There were 31 members and 28 guests present.

Dr. Shana Gillette, Colorado State University, presented a time-specific paper, Risk Model Design for Decision-Making in Chronic Wasting Disease (CWD). The paper in its entirety is included at the end of this report.

Update on Animal Care (AC), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA) was presented by Dr. Robert Gibbens. He reviewed the Animal Welfare Act (AWA) inspection process and reported that there are now approximately 9800 total licensed facilities with 2667 exhibitors. Total inspections of
16,000 were conducted last year. They have 100 inspectors, including three taxonomy specialists (elephant, large felid, non-human primate). There are a number of proposed rules including those affecting marine mammals, standards for regulations of birds not bred for research, veterinary medical records for licensed facilities, minimum age for transport of species other than dogs and cats, and requirements for development of contingency plans for disasters/emergency for licensed facilities. USDA-APHIS-AC now has the authority to deny applications and terminate licenses for facilities that are considered unfit under the AWA. USDA-APHIS is establishing a Center for Animal Welfare in Kansas City. Other issues that continue to be addressed are elephant and large cats. A new information system is being implemented that will allow better tracking of information. The website for further information on AC activities is www.aphis.usda.gov/animal_welfare/index.shtml.

Update: Rectal Biopsy Test for Chronic Wasting Disease (CWD) in Elk was presented by Dr. Kurt VerCauteren, National Wildlife Research Center (NWRC), USDA-APHIS, Wildlife Services (WS).

CWD belongs to the group of diseases known as transmissible spongiform encephalopathies (TSEs) for which prions are the causative agent. Preclinical diagnostic tests for TSEs have been described for deer using tissues of palatine tonsil and for sheep using tissues of palatine tonsil, third eyelid, and rectal mucosa. We have been evaluating the utility of rectal mucosa biopsy as an antemortem test for CWD in Rocky Mountain elk (Cervus elaphus), a species for which there has been no practical live-animal diagnostic test. An accurate diagnostic test to identify infected elk during early preclinical stages of the disease would be useful to the private elk industry and could be used in test and cull management of wild populations. After experimentation, we have determined where and how to take biopsies to maximize the number of lymphoid follicles collected. We have detected PrP\textsuperscript{CWD} in rectal mucosa of elk that have been clinical and non-clinical. The biopsy technique is easy, performed quickly, and can be performed multiple times over the life of an individual. It may be suitable for diagnostic testing as part of an integrated management strategy in privately-owned and free-ranging elk. In this presentation Dr. VerCauteren provides an update on the latest advances on work toward validation.

Could Crows Play a Role in Spreading CWD was presented by Dr. Kurt VerCauteren, NWRC, WS-APHIS- USDA.

From the first observations (40 years ago) of CWD in mule deer (Odocoileus hemionus) and Rocky Mountain elk (Cervus elaphus nelsoni) in Northern Colorado, the disease has been identified in an increasing geographic area. Mechanisms for the spread of CWD are incompletely understood. Birds have been identified as potential vectors for a number of diseases, where infected material is ingested and the disease agent is later shed in new areas after flying substantial distances. We hypothesized that avian scavengers have the potential to disseminate
prions associated with transmissible spongiform encephalopathies (TSEs), like CWD, by a similar process. As prions are resistant to destruction, it is reasonable that infectious material could pass through the digestive tract of scavenging birds. Our objective was to determine if TSE-positive brain material from mice (i.e., mouse-adapted scrapie) could pass through the digestive tract of American crows (Corvus brachyrhynchos) and still be infectious to mice. Our experimental design included treatment groups of mice inoculated intraperitoneally with: 1) normal mouse brain, 2) infected mouse brain, 3) gamma-irradiated feces from crows gavaged with normal mouse brain, and 4) gamma-irradiated feces from crows gavaged with infected mouse brain. Our preliminary results indicate feces from each of 20 crows gavaged with infected mouse brain were infectious for mice (proportion of crows=1.00, 95% CI: 0.83-1.00) and average longevity for mice was 213 days (95% CI: 210-216). Longevity of mice inoculated with infected mouse brain was slightly less (198 days, 95% CI: 188-207). Most mice inoculated with normal brain, or feces from crows gavaged with normal brain, were still alive 1 year post inoculation with no evident clinical signs of TSE disease in any control mice. Our results demonstrate that a common, migratory North American scavenger, the American crow, can pass infective prions in feces and, therefore, could play a role in the spatial dissemination of prion disease.

Use of Infrared Thermography to Detect Signs of Foot-and-Mouth Disease in Wild and Domestic Ungulates was presented by Dr. Mike Dunbar, NWRC, WS-APHIS-USDA.

Infrared thermography (IRT) measures heat emitted from a surface, displays that information as a pictorial representation, and is capable of being a remote, non-invasive technology that provides information on the health of an animal. We are evaluating, the use of IRT to detect a variety of animal diseases, including high path avian influenza in chickens, classical swine fever in swine, and foot-and-mouth disease in a variety of domestic and wild animal species of North America. Foot-and-mouth disease (FMD) caused by FMD virus (FMDV) is a severe highly communicable viral disease of cloven-hoofed animals including both domestic and wild ruminates. Early detection of the disease may reduce economic loss and loss of susceptible wildlife. We evaluated the use of IRT to detect possible heat changes associated with FMDV infection in experimentally infected mule deer (Odocoileus hemionus). Infection occurred through either inoculation with FMDV (intraepithelial tongue inoculation with 10,000 bovine tongue infective doses of 01 Manisa FMDV) or exposure to inoculated animals. Early vesicular lesions were observed within 24 hours post-inoculation and 48-96 hours post-exposure on the mouth and/or feet. From internal temperature sensors in exposed animals, temperature elevated significantly from the pre-infection temperature (P ≤ 0.002) starting approximately one day before any lesions were observed. Differences in eye thermal temperatures and body temperatures of well
focused images were found not to be significantly different. Therefore, eye thermal images could be used as an index to body temperature. For feet thermal images of exposed animals, the mean of the daily maximum (MMAX) foot temperature rose significantly (P= 0.017) from two days before (27.3°C ±1.9°C SE) to two days after (33.0°C ±2.0°C SE) first foot lesion occurrence. We also evaluated the use of IRT in experimentally infected pronghorn antelope (*Antilocapra americana*) and found similar results. Furthermore, we evaluated IRT in naturally infected domestic cattle in an FMD outbreak in Israel. There, we found it had applicability in a field situation. These experiments and observations indicate that IRT may be a rapid, remote, and noninvasive method to screen for suspect animals to further test for FMDV infection during an FMD outbreak. It may also be possible to detect thermo graphic evidence of infection associated with FMDV before clinical signs are observed, thus reducing transmission of the disease.

Serodiagnosis of Tuberculosis (TB) by Innovative DPP® Assay Format was presented by Dr. Konstantin Lyashchenko, Chembio Diagnostics, Inc.

The current testing methodologies for animal TB, such as the intradermal tuberculin test, are inadequate for most non-domestic species. To improve control programs, new diagnostic tools that would be simple, rapid, accurate, inexpensive, and host species-independent are needed. We developed a rapid serological assay, Elephant TB STAT-PAK, using lateral-flow technology to detect specific antibody in elephants and other captive wildlife. This test was approved by the Center for Veterinary Biologics (CVB) in August 2007. In addition, a novel point-of-care immunoassay format called Dual Path Platform (DPP) was recently designed and patented by Chembio. This innovative technology offers several advantages over the conventional lateral-flow assays. Pilot studies on several species of domestic livestock and zoo animals demonstrated superior diagnostic performance of DPP assay prototype and suggested its potential for rapid and accurate serological detection of TB in multiple hosts.

Brucellosis in Central Asia: Challenges and Opportunities was presented by Dr. Glenn Plumb, Yellowstone Center for Resources. Dr. Plumb provided an overview of a brucellosis meeting held in Russia in June 2008. Over 80 scientists attended to discuss the issues of Brucellosis in Central Asia. In Russia, the human cases of brucellosis are 0.4/100,000 with 75 percent occurring in farm workers. The disease has largely been eradicated through the use of vaccination with Rev1, strain 19, strain 82, and strain 75/79 as well as removal/replacement of infected animals. Unfortunately, the human and livestock case rate in other areas of Central Asia is significantly higher. For instance, in Tajikistan, in children under the age of 14 years, the case rate is 12,000/100,000. Over 70 percent of villages have brucellosis in their livestock. Brucellosis...
REPORT OF THE COMMITTEE

is widespread in both humans and livestock in other countries of Central Asia as well due to the international movement of livestock and the gap in human and animal health services.

Committee Business:

- No additional reports, business, or resolutions were brought to the Committee.
Chronic Wasting Disease (CWD) is a transmissible spongiform encephalopathy (TSE) of deer and elk similar to Bovine Spongiform Encephalopathy (BSE) in cattle, scrapie in sheep, and the variant Creutzfeldt-Jakob (vCJD) disease in humans. Introduction and detection of CWD in captive cervid (deer and elk) herds may lead to trade restrictions and/or depopulation of all the animals on the property.

With funding from the United States Department of Agriculture (USDA) Risk Management Agency, a risk management tool was developed to assist farmers in establishing a CWD risk profile of their farm. The risk management tool was designed to enhance cervid farmers’ understanding of the risks and to assist them in determining strategies for CWD risk management and mitigation.

Typically, risk models are used for decision-making among animal health professionals. Therefore, models often do not address how producers may want to use the model as a decision aid. In this presentation, we explore how producer goals for decision aids may necessitate changes in a typical risk model design. Our convenience sample of 20 represented a wide range of cervid farmers in terms of risk orientation, locus of control (LOC), size of farm, cervid species, and cervid products.

Cervid farmers have already taken many steps to reduce their CWD risk in their buying and monitoring practices. They are now interested in knowing more about the latest research in CWD risk and how they can identify strengths and weaknesses in their management practices.

Preferences for model improvements do not appear to be connected with one type of risk orientation, whether it is perception of CWD risk or LOC. However, it is possible that LOC may be tied to certain subjects of interest. For example, someone with a high-chance LOC may be more interested in how CWD is monitored in the wild since they may believe that CWD introduction will most likely occur from the wild population.

Using Rowan’s (2000) five barriers to effective risk communication as a framework, we describe how these barriers can be addressed through changes in model design. For example, an understanding of producer goals and concerns can earn trust, clarity and transparency can increase awareness, a simple and memorable presentation of information can increase understanding, highlighting areas of consensus may decrease discomfort over uncertainty, and providing motivation may overcome inertia regarding changes in management practices.
The Committee met on October 7, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 7:00 to 10:15 p.m. There were 22 members and 5 guests present. Co-Chairs Frost and Osburn briefly reviewed the Committee’s accomplishments over the last few years which has evolved as a working committee that has produced resolutions promoting veterinary medical workforce and animal health laboratory needs.

Invited speaker Dr. H. Scott Hurd, Deputy Under Secretary of the Office of Food Safety, United States Department of Agriculture (USDA) was unable to attend due to family illness. Dr. Hurd who manages all meat and poultry inspection in United States, with over 10,000 employees, is responsible for insuring the protection of public health and food safety through policies and programs aimed to ensure that the nation’s supply of meat, poultry and processed egg products are safe and wholesome. Dr. Hurd’s presentation was to address the critical needs of the nation’s specialized food system veterinarians and illustrate opportunities for graduating veterinarians in food safety and public health careers. Dr. Hurd’s comments intended for presentation to the Committee are included at the end of this Report.

Mr. Brian Smith, Association of American Veterinary Medical Colleges, reviewed 2008 veterinary workforce and related issues. The report in its entirety is at the end of this report.
Dr. Neville Clark, The Center for Foreign Animal and Zoonotic Disease Defense’s (FAZD Center) reviewed the FAZD Center Top Products and need for renewed funding. Dr. Clark’s report in its entirety is at the end of this report.

A brief discussion on the status and number of bio-medical research laboratories in the Hearing Report of the House Committee on Energy and Commerce, Subcommittee on Oversight and Investigations was held and a review paper in its entirety is included at the end of this report.

Dr. Paul Kitching, Animal Health Centre, British Columbia, Canada gave a report on the status and accomplishments of the North American Animal Health Laboratory Network (NAHLN). The integration of animal production systems across North America requires that the diagnostic laboratories supporting the movement of live animals between the United States, Mexico and Canada develop harmonized testing procedures, thereby avoiding border delays or other disputes which can result from discrepant test results. The initiative to harmonize the protocols used by testing laboratories involved in certifying exports and national surveillance programs has been supported by the three governments and encouraged by USAHA. Currently the focus has been on harmonizing tests for vesicular diseases, avian influenza and tuberculosis, with workshops being held in the participating national laboratories and the sharing of proficiency panels. Additional tests will be included in the future, reliant on 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.

Dr. Larry Clark, Director, Wildlife Services, National Wildlife Research Center (NWSC), reviewed the planning progress of the Centers’ Biosafety Level-3 (BL-3) Agriculture Wildlife Disease Research Laboratory. An action item was presented as a reaffirmation of previous resolutions passed in 2006 and 2007 in support of the NWSC Laboratory initiative.

Dr. Clark Tibbetts, Executive Vice-President, TessArae, LLC, presented a new microbial diagnostics paradigm. The platform is based upon highly multiplexed detection and identification of viruses and bacteria by direct and simultaneous sequencing of multiple pathogen genes. The methodology is capable of detection and differentiation of previously known and unknown emergent strains or deliberately altered variants of targeted pathogens. Dr. Tibbetts urged professionals and agencies to seek resources to support validation of emerging applications of multiplexed gene sequencing-based diagnostics.

A brief discussion reviewing senior scientist veterinary pay adjustments scale Title 42 resulted in an action item.
Dr. William Wilson, et.al., Arthropod-Borne Animal Disease Research Laboratory (ABADRL), United States Department of Agriculture (USDA), Agriculture Research Service (ARS), presented a review of a white paper on Readiness and Capacity of the United States for the Instruction of an Exotic Arthropod-Borne Viruses. The paper in its entirety is included at the end of this report.

The following ten Resolutions were passed unanimously and forwarded to the Committee on Nominations and Resolutions:

- Support for High-Containment Biosafety Laboratories
- Veterinary Medicine Loan Repayment Program (PL 108-161)
- Increasing the Veterinary Workforce by Expanding Veterinary Medical School Capacity
- Support for Section 1433 Formula Funds for Animal Health and Research
- Support for Food Animal Residue Avoidance Databank (FARAD)
- Support for Regional Centers of Excellence in Food Systems Veterinary Medicine
- Increased Funding for Expanded Research for the Department of Homeland Security National Center for Foreign Animal and Zoonotic Disease Defense (FAZD) Center
- Funding for Wildlife Services, National Wildlife Research Center’s New Biosafety Level-3 Agriculture (BSL-3 AG) Wildlife Disease Research Laboratory
- Veterinary Diagnostic Laboratory Readiness for Arthropod-Borne Diseases
- Review of Compensation for Research and Diagnostic Veterinarians
Thank you for the opportunity to address your Committee.

As the nation’s largest employer of veterinarians, the work this Committee does in veterinary workforce development is important to the Food Safety and Inspection Service (FSIS), and so I am especially pleased to share these thoughts with you.

I would like to focus on the food system veterinarians of the 21st century: why we need them, the skills they need, and opportunities in FSIS for this “food system veterinarian” of the future.

As you know, veterinarians have long played a role in protecting public health. The first meat inspection act of 1890 in this country, enacted to reduce the risk of trichinosis from affecting United States (US) pork exports, required veterinary inspection of live animals for export and inspection of cured meat for both export and interstate commerce.

Sixteen years later, the Meat Inspection Act of 1906, a watershed event in the history of food safety and public health in the U.S., started a system of continuous veterinary inspection in slaughterhouses. Today, there is still a need for veterinarians in the food system. As we move forward, we’re looking for veterinarians who specialize in the food system.

FSIS does more than inspect meat. Modern animal processing systems require millions of dollars in investments; the modern veterinarian must understand how to work in these complex systems.

As FSIS moves to an advanced food safety, risk-based inspection system, we have found ourselves with a critical shortage of some of the skills we need most. We need veterinarians who have skills in areas such as epidemiology, data analysis, Hazard Analysis and Critical Control Points (HACCP) and modern microbiology.

Further, as we continue to expand the role of veterinarians in the food system, my colleagues at FSIS also emphasize other less technical areas that the veterinarian of the future needs.

First, we need them to have a public health mindset or frame of reference. At FSIS, our bottom line is protecting public health. The food system veterinarian uses their knowledge and expertise toward this important goal.

They must be able to work effectively in teams. We need people who are skilled in supervising, motivating, and leading teams—such as a group of in-plant inspectors. Project management skills are also important skills for food safety specialists. As I will address, our
veterinarians will be involved in a wide range of activities that require this skill.

These veterinarians also need certain soft skills, including interpersonal skills to assist their teams and plant management in finding optimal solutions to complex problems. Obviously, communication skills are also vital.

So far I have focused on what skills the food system veterinarian of the future needs. But veterinarians, by training, already bring a broad range of knowledge and skills to the food safety table and have several critical skills in ensuring the safety of foods of animal origin. What we have to do is take these skills and apply them in the context of a high speed, modern slaughter system.

Going forward, we need to train and equip veterinarians to specialize in food safety, understand and embrace the complexity of the modern food system, and make public health their priority.

The FSIS veterinarian of the future is no longer just a technical concentration. We are transitioning our veterinarians into public health professionals who oversee the effectiveness of farm-to-table food safety systems. At FSIS, we call this food system veterinarian of the future the public health veterinarian (PHV).

Our veterinarians' roles have been expanded to include public health assurance responsibilities such as verifying HACCP system and intervention processes when conducting food safety assessments, identifying and evaluating conditions affecting the growth of microorganisms, analyzing data to determine indicators of pathogen reduction before and after control points, participating in recalls of adulterated product, directing ante-mortem and post-mortem inspection and overseeing humane handling and slaughter.

They are engaged in opportunities in the field, in international public health assessment and policy, or in scientific public health and policy. They undertake activities that are outside of the box of how we think about the typical, ‘hard hat’ slaughter veterinarian, but there are critical ways veterinarians are involved in ensuring public health through food safety.

I am always excited about the opportunity to get the word out about the opportunities that FSIS has for veterinarians. I mentioned earlier that we are the largest employer of veterinarians in the country, so you can see that we have worked hard to attract some of the brightest minds in the veterinary field to food safety.

Some of the things we do to get and keep great veterinarians in the door are offer recruitment bonuses, Student Loan Repayment, and continuing education, as well as establish partnerships with institutions and organizations, such as the Public Health Service Commissioned Corps and the University of California, Davis, where Committee Co-Chair, Bob Frost, and I had the chance to meet.
The ‘food system veterinarian of the 21st century’ I have been talking about has already shown up to work at FSIS, and we are still looking and actively recruiting for more.

Thanks to the work of veterinarians in public service, today far fewer people are getting sick from food they eat than was they were more than a century ago when veterinarians first began inspecting meat and poultry for human food.

We believe that PHVs will continue to play a key role in the food system. There is still a correlation between good animal health and good public health. The food system veterinarian of the 21st century understands this correlation and embraces the complexity of the modern food system.

Thank you again for the opportunity to address your Committee. I hope that my perspective on the role veterinarians can play in the 21st century food system helps inform the discussion as you develop recommendations on veterinary workforce development.
Increasing the Veterinary Workforce

Brian Smith
Association of American Veterinary Medical Colleges

The United States Animal Health Association (USAHA) has historically passed resolutions supporting the concept of increasing capacity in veterinary schools by adopting a resolution in support of the Veterinary Public Health Workforce Expansion Act (HR1232, S. 746 in 110th Congress). That bill did not pass but was considered in the House of Representatives. A hearing was held in the House Energy and Commerce Subcommittee on Health in January 2008.

In 2007 and 2008, two new programs were signed into law to address the lack of capacity within veterinary schools, the School of Veterinary Medicine Competitive Grant Program (authorized in the Department of Health and Human Services) and the Agricultural Biosecurity Grant Program (authorized in the Department of Agriculture). While these two new programs were inspired by past efforts to pass workforce expansion bills for academic veterinary medicine, they lack authorization language providing for more comprehensive construction in lieu of minor renovations and improvements. It has not been determined how effective these new grants will be at alleviating the shortage of veterinarians in the workforce and the lack of capacity at veterinary school.

Veterinary Medicine Loan Repayment

The Veterinary Medicine Loan Repayment Program (VMLRP) was created 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 United States Department of Agriculture (USDA). The Secretary of Agriculture can determine veterinary shortage areas in rural practice, urban practice, federal 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 of 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.

NVMSA was enacted in December 2003 and has received modest appropriations beginning with the 2006 fiscal year. Until recently the regulations governing the VMLRP remained unwritten by USDA rendering the program non-functional. Language in the 2008 Farm Bill helped to expedite that process and USDA now reports it is on schedule to have the program running by March 2009. Congress also held a hearing in early 2008 to determine why VMLRP has been delayed for
years. In the past, the Bush Administration has not included funding for NVMSA in the President's budget.

1433 Formula Funds
Section 1433 Formula Funds (Public Law 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 are important funds for most of 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 research which will not support research on agricultural animals, nor on food safety at the farm level. These 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.

Historically, the President’s budget has not requested any money for Section 1433 Formula Funds but Congress has provided an average of about $4.3 million annually. There are indications that Congress may choose to cease funding the program if enough stakeholder support for the program is not conveyed to Congressional Appropriators.

Centers of Excellence
Part of the 2008 Farm Bill included the establishment of new regional centers of excellence in food systems veterinary medicine. A regional center of excellence shall be composed of one or more colleges and universities (including land-grant institutions, schools of forestry, schools of veterinary medicine, or Land-Grant Institutions) to focus on species specific diseases.

The criteria for consideration to be a regional center of excellence shall include efforts to ensure coordination and cost-effectiveness, leverage available resources, implement teaching initiatives, increase the economic returns to rural communities, and improve teaching capacity and infrastructure at colleges and universities.

USDA has not reported how they intend to implement this new program, either as a new stand-alone grant or part of the larger reorganization of USDA's extramural research programs.

Food Animal Residue Avoidance Databank (FARAD)
FARAD, in existence since 1982, develops and maintains a unique food safety databank that provides veterinarians, livestock producers, and state and federal regulatory and extension specialists’ information on avoiding both animal drug residue and environmental contaminates
REPORT OF THE COMMITTEE

in meat, milk and eggs. FARAD’s databank provides information regarding the time-course of drug and chemical depletion in the 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 finally, FARAD trains veterinary students and veterinary medical residents in the principles of residue avoidance.

The loss of an earmark for funding of FARAD in 2007 clearly demonstrates the dilemma that has existed throughout FARAD’s existence. FARAD shut down all public access on September 30th 2008, and with remaining funds, will maintain the existing databank for an additional month. Without permanent multi-year funding ($2.5 million/yr for 3-5 years), FARAD will discontinue all activities by the start of 2009.

Hearing Report

Report on House of Representatives Committee on Energy and Commerce
Subcommittee on Oversight and Investigations
Chair: Bart Stupak (D-MI)

On May 22, 2008, the Subcommittee held the second hearing on the status and number of bio-medical research laboratories in the U.S. This hearing was entitled Germs, Viruses, and Secrets: Government Plans to Move Exotic Disease Research to the United States. The main topic of discussion was H.R. 1717 which would authorize the building of the Department of Homeland Security (DHS) National Bio and Agro Defense Facility (NBAF) which will be a Biosafety Level 4 (BSL-4) laboratory and would assume the research previously conducted at the Plum Island Animal Disease Center (PIADC) in addition to new zoonotic disease research. The bill would allow movement of NBAF to the mainland marking the first time in U.S. history that foot-and-mouth (FMD) research could be conducted there. Finalist sites for NBAF are Flora, Mississippi; Athens, Georgia; Manhattan, Kansas; Butner, North Carolina; San Antonio, Texas and a possibility exists that the facility could be rebuilt on Plum Island.

The hearing devoted much time to examining the potential threat to the U.S. livestock industry and national economy if foot-and-mouth disease (FMD) should escape a laboratory and be introduced into the surrounding environment. The Subcommittee reviewed the FMD
outbreak in the United Kingdom in 2001 and the leak of FMD virus from the Pirbright laboratory in August 2007. They also recounted the 1978 accidental release of FMD from the PIADC. Virus did not escape the island and the World Organization for Animal Health (OIE) was persuaded not to issue an embargo of American meat products. A summary report from that incident cited the water barrier surrounding PIADC as being instrumental in containing the potential spread of FMD. Testimony also noted that Germany and Denmark both conduct FMD research on small islands, and that Canada conducts limited research with FMD at their national laboratory in Winnipeg which has had no virus escapes.

The Subcommittee also had concerns about the cost of NBAF and the future expenses of demolition, decontamination and environmental cleanup of PIADC if that site is abandoned.

The Government Accountability Office (GAO) issued an interim report at the hearing and GAO representatives testified that DHS had not performed the necessary steps to determine whether FMD research can be safely performed on the mainland. GAO claimed that DHS neither conducted nor commissioned any study to determine whether FMD work can be done safely on the US mainland, relying instead on a United States Department of Agriculture (USDA) study that simply addressed whether it was technically feasible to do so and disregarding the potential for human error. They also felt the DHS study was inaccurate in comparing other countries’ FMD work experience with that of the United States. (Report # GAO-08-821T; summary and full text available from: http://www.gao.gov/products/GAO-08-821T).

DHS testified that while human error could never be fully avoided, the redundancies built into NBAF’s design and use of the latest biosecurity and containment systems would effectively minimize any risks. Individual risk assessments are being conducted at each of the finalist sites to study the impact of a hypothetical FMD release and public comment will be received on those findings.

A panel of representatives from various livestock industries testified, describing the catastrophic effects that an FMD outbreak would have on the industry and the overall US economy. They all felt that oversight for animal disease research should fall solely with USDA and that more study was necessary before a laboratory is located on the mainland. Concern was voiced for the ability of the US government to assure consistent and adequate funding for NBAF, regardless of the location of the facility.

H.R. 1717 has not advanced past initial introduction (March 7, 2007), but the final version of the 2008 Farm Bill does contain a provision that would allow for FMD research to move to “…any facility that is a successor to the Plum Island Animal Disease Center and charged with researching high-consequence biological threats involving zoonotic and foreign animal diseases…” (HR 6124 EH; Title VII, Sec. 7524).
The Subcommittee has archived a copy of the webcast of the hearing along with witness list/prepared testimony: http://energycommerce.house.gov/cmteMtgs/110-oi-hrg.052208.plumisland.shmtl.

**Government Accountability Office (GAO) Report**

On October 16, 2008, the GAO released a report entitled “Biosafety Laboratories: Perimeter Security Assessment of the Nation’s Five BSL-4 Laboratories”. This report covered the current Centers for Disease Control and Prevention (CDC) laboratories, part of the United States Department of Health and Human Services, but would also apply to any BSL-4 laboratories planned by the United States Department of Agriculture. BSL-4 laboratories handle pathogens for which no cure or treatment exists. At present, CDC regulations do not mandate that specific perimeter security controls be present at all BSL-4 laboratories. The report found that current laboratory site security varies widely among the current five functioning laboratories. Only one laboratory had all recommended 15 security controls in place. Immediate action is needed to implement specific perimeter controls for all BSL-4 laboratories to act as a deterrent and to reduce the likelihood of unauthorized intrusion. The CDC should work with USDA to coordinate perimeter security requirements. Full text of GAO-08-1092 is available from: http://www.gao.gov/new.items/d081092.pdf.
1. Commercialization of Vaccine for Rift Valley Fever (MP-12): A major pharmaceutical company has approached the University of Texas Medical Branch (UTMB), a partner in the FAZD Center, to support the development of a commercial vaccine for Rift Valley fever using the MP-12 antigen which is also being considered for development of a human vaccine. The FAZD Center has supported the development of an animal vaccine at UTMB for three years. This is a major step towards successful technology transfer for a product that can either become part of the national veterinary stockpile or be commercialized for international use. If the decision to proceed is taken, the initial development cycle would require about one year.

2. Model of Interstate Movement of Livestock: Most epidemiologic models assume disease is spread by direct or indirect contact at local levels and they do not take into account the long distance movement of animals across the country that occurs in commerce. The Department of Homeland Security (DHS) has provided special funding to the National Center for Food Protection and Defense (NCFPD) and the FAZD Center to acquire the data and to build a national transportation model that will be input to multiple epidemiologic modeling efforts. The initial effort will focus on beef, dairy, and swine, but the centers are planning follow up efforts for other commodities. This will provide for the first time a quantitative estimate of what is probably one of the most important factors in the spread of foreign animal or zoonotic disease through the interstate movement of large numbers of animals over long distances.

3. System to Alert Non-Commercial Livestock Owners of Disease Outbreaks: The County Animal Security and Health Network (CASHN) is designed to improve communication between the county agent and the backyard owner through a common element, the local feed store. A pilot program in six states found that a message of a disease outbreak can flow from the state veterinarian to the feed retailer in little more than 48 hours. The CASHN system could potentially take the message to an average of 795 non-commercial owners within a week of receipt, the pilot shows. Rapid dissemination is designed to improve response to a potentially catastrophic outbreak, 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

DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

Top Products from the National Center for Foreign Animal and Zoonotic Disease Defense

Neville P. Clarke
National Center for Foreign Animal and Zoonotic Disease Defense
destruction of more than 3.5 million birds and the suspension of exports to 34 nations from California, Nevada and Arizona.

4. Agreement to Enhance Data Collection on Incidences of Rift Valley Fever: A project between the FAZD Center and the Kenyan Ministry of Public Health will provide high resolution disease incidence data for the first time to improve modeling and vaccine trial development for Rift Valley fever. This project aligns directly to the DHS Chem/Bio Division’s agrodefense portfolio.

5. Assessment of Impact of Foot-and-Mouth Disease (FMD) Outbreak in Feedlots: The impact of outbreaks of FMD into randomly selected feedlots has been assessed in a nine county area of the High Plains of Texas that contains a high concentration of large Concentrated Animal Feeding Operations (CAFO). The FAZD Center’s economic researchers are evaluating the economic impacts of the various mitigation strategies that were simulated. Early detection is a very important facet in limiting the spread of FMD after introduction and the epidemiologic and economic impact. Vaccination as a means of containing the disease was effective only in selected scenarios. The early availability of vaccine was important in its efficacy.

6. Risk communications training on FAZD issues: The FAZD Center sponsored a two-day train-the-trainer workshop focused on how to handle risk communications during an outbreak of an animal disease that threatens the public health or the economy. Twenty-eight communicators participated in the workshop, representing Texas A and M University, Texas Tech University, Ohio State University, Iowa State University, Purdue University, Kansas State University, the University of Arizona and the University of Georgia. The program is designed to give communicators the tools and training they need to provide instruction to communicators in their regions.

7. Recognition and Internships for FAZD Center scholars: Across the FAZD Center, approximately 100 students and post doctoral fellows are involved in research, education, and outreach activities. Many of them have earned honors, recognition and internships. Among them are:

- Noried M. DeJesus-Velazquez, a FAZD Center student participating in the 2007 DHS Minority Serving Institutions Summer Research Team Program, was chosen to make a presentation to the Department of Homeland Security (DHS), Science and Technology Directorate Under Secretary Jay M. Cohen. She also received honors for a poster presentation at the 2007 Annual Biomedical Research Conference for Minority Students.
DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT

- Texas A and M University graduate student Vinayak Brahmakshatriya won first place in the student poster contest held during the first DHS University Network Summit on Research and Education. He was among seven FAZD Center students who presented posters.
- Six graduate students completed fellowships with high level agencies and laboratories within the homeland security sector. Amy Pohl interned at U.S. Northern Command (NORTHCOM) in Colorado Springs to study education and research topics. Lindsay Holmstrom interned with Lawrence Livermore National Laboratory in California. Jennie Finks worked with USDA, Animal and Plant Health Inspection Service in Mexico and Central America. Melinda Hergert designed a public health program on rabies while working in South Africa. Amy Delgado worked with the Department of Environment, Food and Rural Affairs (DEFRA) in the United Kingdom. Heather Engleking interned with USDA, Food Safety and Inspection Service and Agricultural Research Service.

8. Genetic Marker Vaccines for Selected Zoonotic Diseases: There is a critical need for improved vaccines for zoonotic diseases of economic and public health applications, such as Rift Valley fever (RVF) and avian influenza (AI). In addition to safety, efficacy, and the ability to manufacture sufficient quantities of vaccine, FAZD Center investigators are using modern recombinant technologies to incorporate genetic markers into RVF and AI vaccines to make it possible to distinguish vaccinated livestock from infected livestock. In an outbreak, this property will prevent unnecessary slaughter of animals, and which causes further damage to the economy through trade restrictions while creating challenges to the capacity for carcass disposal.

9. Rapid Detection Tests: After an outbreak of foot-and-mouth disease (FMD) has been confirmed, the emergency response program to eradicate the disease involves sometimes massive culling of infected or exposed herds. The FAZD Center is developing rapid, accurate, inexpensive field tests that will distinguish between infected and uninfected animals at chute site within minutes. This will eliminate unnecessary loss of uninfected animals, saving hundreds of thousands of animals in large outbreaks. Prototypes are awaiting an opportunity for testing at Plum Island Animal Disease Center in 2008.

10. Anti-Viral Protection Against FMD: Standard vaccines for FMD require up to 10 days before becoming effective, creating an immunity gap during which livestock remain vulnerable to one of the most contagious of viral diseases. A new antiviral from the FAZD Center
promotes “natural killer cells” that attack the FMD virus, providing protection within three days. Research in this area contributes to vaccine development at Plum Island Animal Disease Center (PIADC).

11. Avian Flu Training for Early Responders: In the event of an outbreak of highly pathogenic avian influenza H5N1, a lack of training among early responders will lead to delayed detection and ineffective reactions. The FAZD Center’s Avian Influenza School trains the trainers and provides training modules for use by extension agents, veterinarians, researchers and farmers – for prevention, intervention and recovery from outbreaks. Sessions have been held in Texas, California and Minnesota, and in Africa, and are in demand in the developing world.

12. Risk Assessment Models for Rift Valley fever (RVF): RVF is a zoonotic disease that is recognized as a candidate for intentional or unintentional introduction into the US from the Horn of Africa, where an outbreak in animals and humans is underway. Using emerging FAZD Center models, estimates of the impact of introduction of RVF are being made for the biennial White House Biothreat Assessment. A workshop of subject matter experts met April 23-24, 2007, to develop critical estimates of responses to the disease in the US providing critical inputs to the application of the FAZD model for the threat assessment.

13. Integrated Platforms for Unknown or Attenuated Disease Agent Characterization: Pathogens encountered in the future may differ substantially and in unknown ways from those identified and characterized today, either by natural or intentional attenuation. To address this gap, the FAZD Center is developing with its partners a suite of universal, unbiased, and massively parallel micro- and nano-analytical devices that can collect, compare, and archive genetic biosignature information to effectively categorize and contribute to the development of strategies for outbreaks of unknown etiology. This suite of technologies includes the Integrated Biomarker Specific Biosignature (IBSB), Multiple Select Agent Specific (MSAS), and Universal Biosignature Detection Array (UBDA) platform technologies.

14. Integrated System to Support Threat Assessment: Strategic planning and emergency response interventions require a broad perspective to include economic, epidemiologic, and environmental consequences of options. The FAZD Center modeling approach is providing this linkage for planning, training, emergency response and recovery.
15. Pathomics Discovery Platform – Elucidating the Molecular Mechanisms of Infectious Disease Processes: The ability to examine the molecular intricacies of infectious agent-host processes is critical to the development of new protection, detection, and therapeutic strategies. The FAZD Center has worked with multiple partners including several national laboratories to develop a suite of molecular analytical tools that has provided valuable and often unanticipated insight into select agent disease pathways, and is now being employed for the study of other important agents including avian influenza.

16. Stakeholder Workshops on Mass Animal Mortality: If a pandemic or a catastrophe resulted in the death of US livestock in large numbers, current environmental policy and regulations would severely hamper carcass disposal. FAZD Center workshops in California and Texas brought together major stakeholders from the livestock industry: industry representatives, policymakers, scientists and regulators. They examined policy and suggested changes to improve response and recovery, and established working relationships.

17. Protection Against Highly Pathogenic Avian Influenza H5N1 Transmission in Live Bird Markets: Daily interaction between humans and birds in live markets in major US cites offer ample opportunity for transmission to humans and the possible mutation to human-to-human transmission. FAZD Center has studied these interactions and has defined the potential for transmission. Preventive measures have been approved and adopted.
REPORT OF THE COMMITTEE

Readiness and Capacity of the US for the Introduction of Exotic Arthropod-Borne Viruses

William C. Wilson*, Kristine E. Bennett, James O. Mecham, Myrna M. Miller, Will K. Reeves and Barbara S. Drolet
Arthropod-Borne Animal Diseases Research Laboratory
Agricultural Research Service

Arthropod-borne animal viruses (arboviruses) cause significant economic losses to the United States (U.S.) and world agriculture. This paper will discuss the current and potential impact of these viruses, as well as the readiness and capacity of US diagnostic laboratories and veterinary workforce to deal with these re-emerging insect transmitted viruses affecting livestock and wildlife. The U.S. veterinary community needs to be more prepared for both endemic and exotic viruses including: bluetongue virus (BTV), epizootic hemorrhagic disease virus (EHDV), African horse sickness virus (AHS), Akabane, vesicular stomatitis virus (VSV), West Nile virus (WNV), the equine encephalitis viruses and Rift Valley fever virus (RVFV). The current readiness for endemic arboviruses is fairly high, but we are extremely limited in our capacity to detect and respond to an introduction of exotic viruses, which reflects the difficulties in investigating these unique pathogens. An integrated approach is needed, involving multiple scientific disciplines such as veterinary medicine, virology, entomology, pathology, immunology, wildlife biology, and epidemiology. Although there are many institutions in the US with expertise in these disciplines, there are limited locations that have an integrated research team addressing veterinary arboviruses. In addition, there is limited workforce with veterinary arbovirus research experience and a lack of large animal high biocontainment facilities with the capabilities of performing insect-transmission studies.

Among these arboviruses are those that are transmitted by biting midges in the genus Culicoides, including BTV and EHDV and VSV. These viruses infect cattle, sheep, goats and/or wild ungulates causing sub-acute to lethal disease. BTV has the greatest economic impact to the US livestock industry (estimated at $120 million annually), with losses attributed to effects on animal health and productivity. Losses worldwide attributed to BTV have been estimated at $3 billion annually. Although there is a fairly good understanding of the epidemiology of domestic strains of BTV, there is little to no information on how competent the primary US vector, Culicoides sonorensis, or any other Culicoides species are for exotic BTV serotypes. Especially concerning is the economic and unique disease impact BTV-8 has had on Europe and the fact that there have been multiple isolations of exotic BTV serotypes in the US over the past 3 years. There is only one commercial vaccine
available nation-wide at that is specific to BTV type 10. There is limited to no cross protection between serotypes. The related orbivirus, EHDV, is of considerable interest to the captive cervid industry and the recent isolation of an exotic serotype (Type 6) has raised concerns in the livestock industry as well. EHDV-7 has been associated with clinical disease in Israeli cattle. A number of assays are available for diagnosis of U.S. endemic strains including: virus isolation, virus neutralization, competitive inhibition and antigen capture enzyme linked immunosorbent assays (ELISAs) and reverse transcriptase-polymerase chain reaction (RT-PCR) genome amplification for domestic BTV and EHDV. Additionally, real-time RT-PCR assays are available to detect exotic BTV and EHDV serotypes. A multiplex assay has also been developed to detect BTV and EHDV and distinguish between the two viruses in a single closed tube. Reagents for immunological-based detection and serotyping of exotic BTV and EHDV are limited to a few laboratories. There is no commercial EHDV vaccine available nation-wide. Culicoides-transmitted exotic arboviruses include African horse sickness (AHS) virus, which is lethal to horses, and Akabane which is teratogenic in cattle. There are tools available to diagnose AHS however; due to high biocontainment restrictions, performing these assays in the U.S. is limited to the USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Foreign Animal Diseases Laboratory (FADL) on Plum Island, New York. Currently, USDA-ARS does not have any internally funded research on AHS or Akabane.

Central and South America are enzootic for VSV which periodically invades the U.S., presumably on or in insect vectors, to cause epizootics in cattle and horses. Culicoides, black flies and sand flies transmit VSV. Insects are believed to play an essential role in transmission of the virus from natural reservoirs to domestic livestock. Once initial infection has occurred, direct contact transmission is believed to be the major route of transmission. The clinical severity of VSV and its similarity to foot-and-mouth clinical disease results in quarantines, sale barn closures, and restrictions on the movement of livestock and animal products. As with BTV there are a number of standard diagnostic tools available for detection of VSV including a recently developed real-time RT-PCR for detection and distinguishing VSV Indiana and VSV New Jersey.

Endemic/epidemic viruses, including Western, Eastern and Venezuelan Equine encephalitis viruses that also cause disease in birds, humans and horses. A majority of the current research on the equine encephalitis viruses (Alphaviruses) is conducted by laboratories whose primary interests are in human health using standard diagnostic tools where available. There is a commercial vaccine for Eastern equine encephalitis (EEE) and candidate vaccines for Venezuelan equine
encephalitis (VEE) and Western equine encephalitis (WEE).  

The introduction of WNV into the US in 1999 exemplifies how readily exotic arboviruses can establish themselves in new ecosystems and significantly impact an unprepared nation. It is well known now that WNV is a mosquito-transmitted pathogen of birds, humans and horses. Unfortunately, gaps in understanding other endemic mosquito-transmitted viruses, such as Saint Louis encephalitis virus, complicated early detection of the WNV introduction. WNV spread in birds and mosquitoes across the country resulting in highly publicized impact on the nation. The economic impact on North Dakota alone in 2002 was estimated at $1.9 million. Guidelines for detection of WNV came out fairly quickly and a number of improvements have been made. There are now at least three commercial WNV vaccines for horses. The rapid, uncontrolled spread of WNV and our inability to distinguish it from related endemic viruses, exemplifies our lack of readiness for introduction of exotic arboviral diseases.

Recent outbreaks of RVF have raised concerns of the potential impact of introduction of this virus into the US. The introduction of this arbovirus would have devastating effects on the US livestock industry. When these outbreaks occurred in Africa, no USDA staff was vaccinated, nor had any experience working with this virus. The USDA-ARS and USDA-APHIS are working together to address the lack of diagnostic reagents and validated test. Seven USDA staff members have been vaccinated with the very expensive investigational vaccine to work safely with this virus. The USDA-ARS has developed a new research program to address countermeasures for RVF. This work is hampered by the absence of high biocontainment research facilities certified to work with this virus. Research on large animals infected with RVFV currently is being conducted outside of the US.

The development of validated diagnostics and effective control strategies and the formulation of reasonable animal regulatory statutes to reduce the economic impact on US livestock require understanding the molecular biology, epidemiology and pathogenesis of these arboviruses. The following bullets are current needs in the US to address these issues:

Readiness/capacity:

- Training and awareness/education for all National Animal Health Laboratory Network (NAHLN) laboratories and veterinarians as to clinical presentations of various arthropod-borne diseases;
- Clear guidelines/requirements for reporting by livestock owners and veterinarians;
- Sensitive/specific diagnostic assays, multiplex assays, standardized serum (sample) panels and testing protocols for validation;
Information on susceptible vector and host species to exotic arthropod-borne pathogens;
Better Integrated Pest Management;
Better surveillance and modeling of both animals and insects;
Information on potential wildlife reservoirs for arthropod-borne pathogens;
Vaccine discovery, non-biased evaluation, and commercial development; and
High biological containment laboratories and large animal isolation facilities to evaluate new diagnostics and vaccines.

The economic impact resulting from a lack of readiness and capacity could further damage the current US economy. Although it is impossible to predict what will be the next arboviral introduction to the US, many of the scientific tools and infrastructure outlined here would be applicable to other pathogens not currently targeted.

References:
10 Lancellotti RS, Roehrig JT, Deubel V, et al.: 1999, Origin of the West Nile virus responsible for an outbreak of encephalitis in the


REPORT OF THE COMMITTEE ON ENVIRONMENT

Chair: Gavin Meerdink, Mahomet, IL
Vice Chair: Randall A. Lovell, Martinsburg, WV

Frank D. Galey, WY; L. Wayne Godwin, FL; John P. Honstead, CO; Laurent O’Gene Lollis, FL; Lee M. Myers, GA; Gary D. Osweiler, IA; Elizabeth J. Parker, DC; Jane F. Robens, MD; Larry J. Thompson, MO; Gary M. Weber, MD.

The Committee met on October 25, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 3:30 to 6:05 p.m. There were 2 members and 26 guests present. This was a joint meeting with the American Association of Veterinary Laboratory Diagnosticians (AAVLD) Veterinary Analytical Toxicology and Mycotoxins Committee.

Mycotoxin Update:
State mycotoxin updates showed isolated problems with aflatoxins, fumonisins, deoxynivalenol, ergot alkaloids, tremorogenic mycotoxins and zearalenone in different areas the past year. No large scale mycotoxin-related health problems were reported. In several states, the harvest of the 2008 corn and soybean crops has gone well due to dry conditions, but in some areas wet conditions have markedly delayed the harvest and may impact mycotoxin levels.

Planned Inter-Laboratory Projects:
Two inter-laboratory analytical toxicology proficiency projects were discussed. Dr. Jeffrey Hall plans on sending out swine serum to many AAVLD laboratories for analysis of elements in the next couple of months. Dr. Gene Niles, Centralia Animal Disease Laboratory, and/or Dr. Michelle Mostrom, North Dakota State University, will send cattle livers with elevated lead levels to Dr. Nick Schrier, University of Guelph. Dr. Schrier plans on freeze drying the livers and to send samples to many AAVLD laboratories for analysis of elements in the first half of 2009. The major objectives of these projects are to provide the AAVLD laboratories with certified serum and liver samples.

Dr. Christina Wilson, Purdue University, made a presentation entitled Suggested Guidelines for Analytical Method Validation. She discussed the International Commission on Harmonization (ICH) Q2B validation guidelines and summarized the efforts by the laboratory to validate a method on blood lead by graphite furnace atomic absorption spectroscopy (AAS). Christina specifically discussed linearity, precision and accuracy, instrument detection limit (lower and upper limits of quantitation), dilution integrity, specificity, carryover, system suitability, recovery, and matrix and solution freeze/thaw stability.
In 2007-2008, the United States Department of Agriculture (USDA), Food Safety Inspection Service (FSIS) collected fat samples at slaughter (n = ~500) from heifers, steers, barrows, gilts, broilers and turkey poults and USDA, Agriculture Research Service analyzed them for seven dioxin, 10 furan and three polychlorinated biphenyl congeners (dioxins). Whenever elevated dioxin levels were found (more than two standard deviations above the mean for the livestock class from the 2002-2003 USDA survey), the Food and Drug Administration (FDA) issued follow-up on-farm assignments. The FDA has collected and analyzed samples from two of these farms and in both cases high dioxin levels (>300 ppt toxicity equivalent [TEQ]) were found in wooden material (support post and a railroad tie) the animal had access to.
The Committee met on October 6, 2008 at the Sheraton Greensboro Hotel Greensboro, North Carolina, from 1:00 to 5:00 p.m. There were 13 members and 1 guest present. Chair Dan Lafontaine presided. After welcoming remarks, Dr. Lafontaine introduced this year’s main topic, The Crossroads of Animal Health, Food Safety and Antimicrobial Resistance; an Update on the National Antimicrobial Resistance Monitoring System (NARMS), 1996-2007. This topic consisted of a series of presentations by antimicrobial resistance experts from the Food and Drug Administration (FDA), the United States Department of Agriculture (USDA) and the Center for Disease Control and Prevention (CDC). At the conclusion of the main topic, Dr. J. Dennis McCurdy, Center for Veterinary Medicine (CVM), FDA presented comments on the Animal Feed Safety System. The Committee’s business meeting followed the scientific presentations.

FDA-CVM provided the following background information on National Antimicrobial Resistance Monitoring System (NARMS). In the United States, NARMS – Enteric Bacteria is a national public health monitoring system that tracks changes in the susceptibility of certain enteric bacteria
to antimicrobial agents of human and veterinary medical importance. The NARMS program was established in 1996 by FDA-CVM as part of its overall strategy to assess the impact of antimicrobial use in food animals on public health. NARMS is a collaborative program which brings together three federal agencies; FDA-CVM, CDC, and USDA-Agricultural Research Service (ARS).

Antimicrobial resistance is a serious problem that threatens both human and animal health. In human medicine, antimicrobials are most often used to treat infectious diseases, whereas in food animals, antimicrobials are used for the prevention, control, and treatment of infectious diseases, as well as for enhancing growth and improving feed efficiency. An undesired consequence of antimicrobial use in any environment is the potential development of antimicrobial-resistant bacteria. In food animals, these bacteria can contaminate meats as well as dairy products, eggs, and indirectly produce. These resistant bacteria, and in particular resistant zoonotic pathogens, may be transferred to humans through the consumption, handling, or improper cooking of contaminated foods and may cause serious infections.

As part of the overall CVM strategy to assess relationships between antimicrobial use in agriculture and subsequent human health consequences, the NARMS program was developed in 1996 to monitor changes in susceptibility of select bacteria to antimicrobial agents of human and veterinary importance. In addition to collaboration among the three aforementioned US federal agencies, NARMS also collaborates with antimicrobial resistance monitoring systems in other countries, including Canada, Denmark, France, the Netherlands, Norway, Sweden and Mexico so that information can be shared on the global dissemination of antimicrobial resistant foodborne pathogens.

The NARMS program monitors antimicrobial susceptibility/resistance in two categories of enteric bacteria recovered from food animals, humans, and retail meats. These categories are zoonotic bacterial pathogens (Salmonella and Campylobacter) and commensal bacteria (E. coli and Enterococcus). All three NARMS components (animal, human and retail meats) also characterize Salmonella and Campylobacter through use of Pulse-Field Gel Electrophoresis (PFGE) in an effort to determine genetic-relatedness between isolates. Epidemiological and microbiological research studies are conducted within each agency or between agencies on isolates of special interest such as those of a particular serotype or expressing a particular resistance pattern. As a public health monitoring system, the primary goals of NARMS are to:

- provide descriptive data on the extent and temporal trends of antimicrobial susceptibility/resistance in zoonotic foodborne bacterial pathogens and select commensal organisms to veterinarians, physicians, public health authorities, and other stakeholders;
- provide a platform for successive epidemiology and research studies to better understand the emergence and transfer of antimicrobial resistance and the burden of illness
posed by these organisms, and assist in the development of science-based strategies to contain or mitigate resistance; and

- assist the FDA in making decisions related to the approval of safe and effective drugs for humans and animals, as well as to promote judicious use of antimicrobial drugs.

This session is intended to provide attendees an update on the human, animal, and retail meat components of the NARMS program. The objectives are to: 1) present the current status of the NARMS program; 2) describe the occurrence of antimicrobial drug susceptibility/resistance among select foodborne pathogens and commensal bacteria from the three NARMS components and; 3) provide updates on the epidemiological trends of these bacteria and associated antimicrobial drug susceptibility/resistance phenotypes from 1996 to 2007.

The topic was introduced by Dr. Beth Karp, Coordinator, NARMS, CVM-FDA. Her presentation was entitled, Program Overview of NARMS. NARMS is a national public health monitoring system that tracks changes in the susceptibility of certain enteric bacteria to antimicrobial agents of human and veterinary medical importance. There are four specific objectives of NARMS:

- monitor trends in antimicrobial resistance among foodborne bacteria from humans, retail meats, and animals.
- disseminate timely information on antimicrobial resistance to promote interventions that reduce resistance among foodborne bacteria.
- conduct research to better understand the emergence, persistence, and spread of antimicrobial resistance.
- assist FDA in making decisions related to the approval of safe and effective antimicrobial drugs for animals.

NARMS collects data in three different categories: human, retail meat and animals. CDC collects human data from 53 health departments nationwide which is input into the NARMS database. Retail meat data is collected by FDA-CVM through ten FoodNet sites plus the State of Pennsylvania. Animal data is collected by USDA-ARS in collaboration with USDA, Food Safety Inspection Service (FSIS). Several different microorganisms have been tested for antimicrobial resistance since 1996.

For the human component, CDC has tested:
- Non-Typhi Salmonella (1996) (Indicates year added)
- E. coli 0157:H7 (1996)
- Campylobacter (1997)
- Salmonella Typhi (1999)
- Shigella (1999)
- Enterococcus (2001)
- E. coli (2004)

In retail meats, the FDA has tested:
- Non-Typhi Salmonella (2002)
FOOD AND FEED SAFETY

- Campylobacter (2002)
- Enterococcus (2002)
- E. coli (2002)

In animals, USDA tests
- Non-Typhi Salmonella (1997)
- Campylobacter (1998)
- E. coli (2000)
- Enterococcus (2003)

Laboratory testing consists first of identification, including serotyping and speciation. Microorganisms are then tested for drug susceptibility using broth microdilution. Prior to entering data into PulseNet or VetNet, pulsed-field gel electrophoresis (PFGE) serotyping is performed. Annual reports of NARMS data are being produced for each NARMS component (human, animal and retail meat). Additionally, an Executive Report is periodically produced. The Executive Report summarized, in an integrated format, NARMS data from humans, animals and retail meats. The most recent Executive Report is available at www.fda.gov/cvm/nams_pg.html. Data are presented in multiple formats in the Executive Report. Some examples are Salmonella isolates tested, Salmonella serotypes, Campylobacter species in humans and chicken parts, antimicrobial resistance by serotype and antimicrobial class, and drug-resistant isolates by serotype. Ongoing NARMS research efforts are generally grouped into four categories:

1. methods development
   - standardized antimicrobial susceptibility testing (e.g., Campylobacter)
   - rapid isolate testing (e.g., PCR, microarrays, molecular serotyping)
   - multi-locus sequence typing (MLST) for Campylobacter

2. Pilot projects to examine emerging issues
   - methacillin-resistant Staphylococcus aureus (MRSA), C. difficile in retail meats
   - Salmonella, E. coli, and Enterococcus in feeds
   - Enterococcus strains in humans and retail meats in MD and MI
   - MLST for Enterococcus

3. Studies to understand the emergence and spread of resistance
   - linking NARMS susceptibility data with PFGE results
   - examining historical strains to document the emergence of resistance
   - sequencing 17 Salmonella genomes, including resistant strains, in partnership with J. Craig Venter Institute
   - plasmid-mediated virulence genes in Salmonella Kentucky
   - virulence factors in generic E. coli isolates
REPORT OF THE COMMITTEE

- development of resistance in treated animals

4. Epidemiological studies
- risk factors for acquiring resistant infections
- public health impact of resistance

NARMS supports and collaborates with several international activities such as PulseNet International, the World Health Organization Global Salmonella Surveillance Initiative and the Codex Task Force on Antimicrobial Resistance.

There was a recent FDA Science Board Subcommittee Review of NARMS. The FDA Science Board Advisory Committee established a subcommittee to evaluate the NARMS program. General comments of the subcommittee were as follows: 1.) NARMS has evolved into a mission-critical tool for FDA, 2.) outstanding progress has been achieved over last decade, 3.) it should be a high priority for future support and attention, 4.) visioning, strategic and business planning processes should be considered and adopted where appropriate, 5.) consider making the program more predictive, responsive and expansive. Additionally, the subcommittee provided constructive recommendations with regard to key elements and future directions of the NARMS program. These include:

- Sampling strategies
  - use national, random sampling when possible
  - when not feasible, further stratify data or use a more targeted sampling strategy
  - encourage monitoring of commensals from healthy humans

- Research studies
  - encouraged further development and expansion
  - emphasis on hypothesis-driven and collaborative research

- International activities
  - strongly endorsed continuation and expansion of international activities, including training

- Data harmonization and reporting
  - need for an integrated database and timely reporting

NARMS has begun implementing several of these recommendations and will continue to evolve into a more valuable tool for assessing susceptibility of enteric bacteria to antimicrobial agents.

Dr. Karp’s presentation was followed by Dr. Ezra Barzilay, CDC, who presented human NARMS surveillance data. Antimicrobial agents are commonly used in food animals and it is known that inappropriate use can lead to natural selection for bacterial resistance to antimicrobial agents. Additionally, food animals constitute an important reservoir of antimicrobial resistance. Resistant bacteria can be transmitted to humans through the food supply. This is most evident with pathogens, but also occurs with
commensal bacteria. In order to monitor this, in 1996 FDA’s Joint Advisory Committee recommended that a surveillance system be created to monitor development of antimicrobial resistance among foodborne bacteria, the NARMS. In 2003 strategic planning lead to the formation of an integrated surveillance system wherein CDC performs human surveillance, the FDA-CVM is responsible for retail meat surveillance and the USDA-ARS conducts animal surveillance.

NARMS monitors the susceptibility of antimicrobial agents among enteric bacteria from humans, foods, and animals by collecting surveillance information on the following areas: 1) core surveillance, 2) Retail Food Survey, 3) outbreak isolates and 4) commensal organisms. Core surveillance provides a centralized source of antimicrobial resistance data from major surveillance systems using uniform methods. The Retail Food Survey monitors trends and changes in the prevalence of antimicrobial resistance among enteric bacteria isolated from four retail food commodities; ground beef, ground turkey, pork chops and chicken breasts. Outbreak isolates characterize the antimicrobial resistance attributes of bacterial pathogens isolated from foodborne disease outbreaks. Lastly, commensal organism surveillance provides ongoing monitoring for antimicrobial resistance among Enterococci and E. coli, commensal bacteria traditionally thought to cause disease in hospital settings. By providing information for action, NARMS goal is to promote the prudent use of antibiotics in veterinary settings through solidifying partnerships with food-animal producers and disseminating antimicrobial usage guidelines in agricultural settings.

Human data collection for NARMS began in 1996, with fourteen states participating. New York was added in 1999. The program had expanded to 28 states by 2002 and to all 50 states the next year. Human clinical isolates are identified by the state health departments and then submitted to the NARMS laboratory for antimicrobial resistance testing. NARMS receives every 20th non Salmonella, Typhi Shigella, and E. coli O157. All Salmonella typhi, Salmonella paratyphi A and C, Listeria, and non-cholera Vibrio are submitted. A representative sample of Campylobacter from ten FoodNet sites is also submitted. NARMS objectives are: 1) to monitor trends and changes in the prevalence of antimicrobial resistant enteric bacteria; 2) to determine the burden of illness of antimicrobial resistant enteric bacteria; 3) to identify and develop new intervention and mitigation strategies to help stem the increase of bacterial antimicrobial resistant; and 4) through education efforts, to promote the prudent use of antibiotics in veterinary settings.

Since its inception, NARMS has had a significant public health impact. NARMS has been a key component in completing goals from the interagency task force on antimicrobial resistance and in accomplishing CDC’s mission of enhancing the surveillance and investigation of foodborne infections. Additionally, NARMS data provide information for tracking progress towards the Healthy People 2010 National Health
REPORT OF THE COMMITTEE

Objective for Resistant *Salmonella* and *Campylobacter*. Some of the key findings and conclusions from a ten-year retrospective view of human NARMS data include the following:

- resistance to clinically important antimicrobial agents in non *Salmonella typhi* has increased.
- resistance to nalidixic acid (quinolone) has increased, which correlates with decreased susceptibility to ciprofloxacin
- resistance to ceftiofur (3rd generation cephalosporin) has increased, which correlates with decreased susceptibility to ceftriaxone
- *Salmonella Enteritidis* is the most common serotype among nalidixic acid-resistant non *Salmonella typhi*
- MDR-AmpC, a multidrug resistance pattern that includes ceftiofur resistance, emerged in 1998 in *Salmonella Newport* and has been detected in 14 other non *Salmonella typhi* serotypes.
- *Salmonella Newport* is the most common serotype in non *Salmonella typhi* with MDR-AmpC
- The increase in ceftiofur resistance in non *Salmonella typhi* was mainly driven by the emergence of MDR-AmpC in *Salmonella Newport*
- ACSSuT in *Salmonella typhimurium* has declined, however, it has remained high at 19 percent in 2006.
- *Salmonella typhimurium* is the most common serotype in non-Typhi *Salmonella* with ACSSuT.
- ACSSuT has declined in non *Salmonella typhi*, similar to the trend observed in *Salmonella typhimurium*.
- Monitoring to detect emerging multidrug and clinically important resistance, including serotype-specific trends, is important to guide clinical care and public health interventions.

\(^1\) ACSSuT – resistance to at least ampicillin, chloramphenacol, streptomycin, a sulfonamide and tetracycline

At the conclusion of Dr. Barzilay’s presentation, comments regarding retail meat NARMS surveillance data were made by Ms. Linda English, CVM-FDA. Retail meats are monitored for antimicrobial resistant microorganisms for several reasons. The use of antimicrobial agents in food animals can result in the development of antimicrobial resistance in enteric bacteria. Meat and poultry offered for retail sale can become contaminated with enteric bacteria during slaughter. Retail meats are a direct route of exposure for consumers. Comparing enteric bacteria from retail meats to those from humans and animals permits an estimation of the contribution of enteric bacteria from meats to human illness. Additionally, NARMS retail meat data assist FDA-CVM in
making decisions on the safety and effectiveness of antimicrobial drugs and support the FDA's mission as a science-based regulatory agency. NARMS surveillance of retail meats began as a pilot study in 2001 by FDA-CVM in Iowa. In 2002 Public Health Laboratories in Connecticut, Georgia, Maryland, Minnesota, Oregon and Tennessee were added. California and New York began submitting data in 2003 while Colorado and New Mexico joined in 2004. In 2007 Maryland did not participate. To collect samples, every site visits five grocery stores per month. From each store, two packages (different brands) of chicken breasts (with bone/skin), pork chops, ground turkey and ground beef (80 percent lean) are purchased. Samples are refrigerated and cultured within 96 hours. Results are recorded on standardized specimen log sheets. All sites test for Salmonella and Campylobacter while Georgia, Oregon, Maryland and Tennessee test for E. coli and Enterococcus. Presumptive positives are forwarded to FDA-CVM for confirmation of identification, susceptibility testing, and further isolate characterization. Confirmatory testing is performed using one or more of several methods, including rapid biochemical-based methods, polymerase chain reaction (PCR) (Campylobacter), serotyping (all Salmonella) and other conventional methods (all species). Resistance to numerous antimicrobials is tested. Specific compounds tested is dependant on several factors such as organism isolated, analysis of previous years’ data, human and animal NARMS data, development of new compounds, and others. The antimicrobials tested change from year to year, depending on these factors.

A summary of the 2002-2007 NARMS retail meats indicates the following:

1. both E. coli and Enterococcus occurred in a high percentage of all retail meats
2. Salmonella was most often recovered from poultry and Campylobacter from chicken breasts but seldom from ground beef, ground turkey, and pork chops
3. Campylobacter jejuni was recovered two to three times more often than C. col.
4. resistance in Salmonella most often occurred to the older antimicrobials (tetracycline, streptomycin, ampicillin, and sulfasaxazole)
5. approximately 15 percent of all Campylobacter were resistant to flooroquinolin. Almost no C. jejuni, but approximately 10 percent of C. coli, were resistant to erythromycin, azithrhomycin, clindamycin, and telithromycin. Resistance to tetracycline occurred in 40-50 percent of all Campylobacter
6. with a few exceptions, all Campylobacter were susceptible to florfenicol and gentamycin
7. multiple drug resistance occurred in both Salmonella and Campylobacter
REPORT OF THE COMMITTEE

8. NARMS retail meat surveillance provides valuable data on antimicrobial resistance in foodborne zoonotic bacteria to veterinarians, physicians, and others interested in public health.

Dr. Heather Harbottle, CVM-FDA presented, Genetic Relatedness of *Salmonella* and *Campylobacter* Isolates from NARMS. As discussed by Ms. English, *Salmonella* and *Campylobacter* are two of the most common isolates recovered from NARMS retail meat samples. Consequently, FDA-CVM is expending considerable effort on developing better and faster methods for subtype characterization of these microorganisms. The goal of this subtyping effort is to enhance NARMS’ retail meat component ability to assess genetic relatedness of their isolates with those of NARMS animal and human isolates as well as other isolates in PulseNet. Subtyping is the process of analyzing multiple isolates within a given species to determine whether they represent single or multiple strains. A strain is defined as a single isolate or a group of isolates distinguishable from other isolates of the same genus and species with the use of phenotypic and/or genotypic characteristics.

Two phenotyping methods are serotyping and classifying by antimicrobial susceptibility. Serotyping is the primary typing method for *Salmonella* based on O and H antigens. There are over 2500 *Salmonella enterica* serotypes and CVM performs traditional serotyping on all retail *Salmonella* isolates received. About 37-45 different serotypes are encountered each year. Classifying by antimicrobial susceptibility involves developing phenotypic susceptibility profiles using a standard Clinical and Laboratory Standards Institute broth microdilution method. Antimicrobials tested include amoxicillin-clavulanic acid (AUG), ampicillin (AMP), cefoxitin (FOX), ceftiofur (TIO), ceftriaxone (AXO), chloramphenicol (CHL), gentamicin (GEN), kanamycin (KAN), streptomycin (STR), sulfisoxazole (FIS), tetracycline (TET), and trimethoprim-sulfamethoxazole (COT). Multiple drug resistance (MDR)-AMP is the designation used for a recognized multiple drug resistance in certain microorganisms that are resistant to AMP, AUG, FOX, TIO, CHL, STR, FIS, TET and decreased susceptibility to AXO (MIC ≥16 µg/ml). The genotyping methods used by CVM are molecular serotyping and PFGE. Molecular serotyping uses the Bioplex System which involves simultaneous multiplex analysis of up to 100 different biomolecules in a single well of a microplate in 30 minutes. Current studies involve validating molecular serotyping by traditional serotyping for all serotypes. PFGE continues to be the primary subtyping method. It is currently recognized as the gold standard for serotyping. Briefly, this process involves cutting bacterial deoxyribonucleic acid (DNA) with one or more enzymes resulting in fragments of DNA that can vary in size. This may reveal changes in the bacterial DNA, such as mutations, insertions and rearrangements. Cutting the bacterial enzyme with increasing numbers of enzymes increased the discriminatory power of PFGE, but absolute matches with other isolates is still not possible without
The CVM PFGE database contains PFGE fingerprints derived from cutting with two enzymes since 2002. Currently the database contains approximately 1757 Salmonella genotype fingerprints and 2334 Campylobacter fingerprints. CVM's NARMS data can be used to compare isolates in PulseNet. Several genotypically identical matches have been found. This analysis indicates that, as speed and efficiency of genotyping methods evolve, the potential exists to compare epidemiological data with matching genotypes to assess common sources for microorganisms involved in human illness.

Microarray is a rapid detection method being tested by CVM. Microarray can detect hundreds to thousands of genes simultaneously and is customizable for specific genes of interest. Currently it is detecting 272 resistance, virulence and pathogen ID genes. It is being evaluated for identifying of all classes of antimicrobial resistance genes as well as common virulence genes. It is improving the understanding of the origin of antimicrobial resistance in retail meat, animal and human origin samples. Additionally, it supports an FDA Critical Path Initiative, Interrogating the Genomic Diversity of Enteric Pathogens Using a Novel 85 Genome Salmonella enterica, Escherichia coli, Shigella and Vibrio cholera Multi-Species Microarray. This is an intra-agency collaboration between CVM and the Center for Food Safety and Applied Nutrition. The Critical Path Initiative is FDA's effort to stimulate and facilitate a national effort to modernize the scientific process which holds the potential to improve the tools FDA uses to evaluate the safety and efficacy of human and veterinary products as well as the safety and nutrition of food and food ingredients. Examples of prospective tools are new rapid tests for biological and chemical contamination of animal-derived foods; technologies for detecting and mitigating the microbial contamination of food; and analysis technologies for assessing the safety and nutritive value of foods and food ingredients. The ultimate goal of the initiative is to stimulate the development of products needed to address urgent public health needs.

Following Dr. Harbottle, animal NARMS surveillance data was reviewed by Dr. Jonathan Frye, ARS-USDA. NARMS is a collaboration with FDA-CVM, CDC, and USDA-ARS, USDA-FSIS and USDA-Animal and Plant Health Inspection Service (APHIS). USDA-ARS also has non-federal partners, including veterinary diagnostic laboratories. NARMS began in the US in 1996. It is funded through and interagency grant by the FDA. Unfortunately, funding has been level for the past three years, which, of course, equates to a decline in money each year as salaries and operating costs increase. NARMS tests isolates from on-farm and diagnostic sources when available and funding allows. However, routine testing of slaughter/processing isolates is the hallmark of the animal component of NARMS. It is a passive system, relying on the receipt of Salmonella isolates from FSIS. But, it remains the only comprehensive
REPORT OF THE COMMITTEE

snapshot of resistance in animal production in the US. All food animal species, all sizes of plants, and all geographic areas are represented in the slaughter isolates. ARS also tests for *E.coli, Campylobacter* and *Enterococcus*, as money permits. In the past ARS received diagnostic isolates from veterinary clinics. Currently, isolates originate only from non-diagnostic sources. These include some on-farm isolates from the NAHMS, via APHIS. Predominantly, however, isolates come from slaughter samples taken by FSIS. How is the data reported? Each arm of NARMS posts yearly annual reports on their respective websites. Additionally, an executive report which combines data from all three arms is posted on the FDA website and can be linked from the other websites. A future goal is to post individual reports in a timelier manner and to have the executive reports completed within nine months of data closeout.

A data review will first focus on the multi drug resistance issue. The percentage of pan-susceptible isolates has not changed dramatically over the years and remains at approximately 50 percent. MDR, with resistance to five or more antimicrobials, appeared to go up earlier in the decade, but has declined since 2003. The same is seen for resistance to ten or more antibiotics. However, when you look by animal source, a slightly different picture emerges. More cattle isolates are pan-susceptible than isolates from other animal sources. Cattle are followed by chickens, then swine and turkey. Even though overall numbers are lower, swine and turkey have gained in percent of pan-susceptible isolates. Resistance is not only associated with animal source but also by particular serotype. Some serotypes tend to be much more resistant to more antimicrobials than other serotypes. MDR, by percentage, for the ten cattle serotypes is newport, agona, typhimurium and typhimurium variant 5-. The percent of increased resistance to nalidixic acid and/or decreased susceptibility ciprofloxacin presents an interesting situation. Human data shows a slight increase since 2002. Conversely, a decrease among animal isolates has been observed.

There are four new tools being introduced to expand the capability of NARMS. First is VetNet. The primary objective of VetNet is to capture PFGE patterns of *Salmonella* and *Campylobacter* isolates submitted to NARMS. Generic *E. coli, Enterococcus* and other bacterial isolates will be added over time. Then VetNet and PulseNet PFGE patterns will be compared. This will enhance the ability to investigate animal illness outbreaks and assess the possibility of linkage with food borne illness outbreaks. There are known limitations of VetNet. It evaluates only one-enzyme cuts. There is no standardized agreement of what a match really means (or what criteria to use). Band differences can be attributed to some type of molecular change – the acquisition of a plasmid in fact changes the relatedness of isolates, particularly when comparing to those that do not carry a plasmid or the same plasmid. Additionally, prior to a final interpretation, other information, including but not limited to plasmid status, presence or absence of other genes and supporting
epidemiology, is required prior to determining the final level of relatedness. Another tool is an interactive database that is available on the NARMS website. There are a number of different types of graphs which allow the user to customize their searches based on the antimicrobial or organism of interest. ARS has also continued to develop techniques to improve salmonella serotyping. One of the oldest microbiological laboratory problems is serotyping. It is also slow, cumbersome, difficult and expensive. However, serotyping is absolutely necessary for characterizing *Salmonella*. So ARS has been developing a molecular technique for determining *Salmonella* serotypes. This is based on genes identified by comparative genomic hybridizations. Through collaboration, ARS developed a multiplex PCR to detect these genes. Recently ARS adapted this to a high-throughput technique called Salmonella Multiplex Assay for Rapid Typing (SMART). It uses a single tube, fifteen-product multiplex that labels each product during PCR. This is then separated and detected by capillary analysis on a sequencer with automated scoring and serotype determination. It was tested in 2007 on a blind sampling of over 800 clinical isolates from the Washington State Department of Health. It identified over 90 percent of isolates. The few that were ambiguous could be identified by PFGE. ARS is currently beta-testing this at several clinical laboratories in the US and Canada and a publication should be coming out very soon. Lastly, high density tests are being developed to identify the genetic elements responsible for the phenotypes seen in NARMS isolates. This primarily uses a DNA microarray that can detect virtually every known antimicrobial resistance gene. It was designed by searching the National Center for Biotechnology Information database for all genes annotated as antimicrobial resistant associated. These were downloaded into a local database which was used to synthesize probes to detect each gene. The probes were used to construct the array. Testing is complete and it works very well. ARS is currently using it to analyze the NARMS isolates to try and find the genes causing resistance and to determine their distribution and epidemiology.

The NARMS group’s formal presentations were concluded with Dr. Frye’s second presentation entitled, Extended-Spectrum β-lactam Resistance Among *Salmonella*. Human data in this presentation is courtesy of Jean Whichard at the CDC. β-lactams are divided into four general groups: the penicillins, the cephalosporins, the monolactams and carbapenems. They all possess the four member β-lactam ring and have various modifications to their R groups. These R-group modifications change the chemical properties of the β-lactams and affect solubility, stability, bioavailability and degradation by the host. Thus these changes in chemical properties result in the spectrum of clinical activity due to transport and access to their targets in the bacteria and resistance to β-lactamases produced by the bacteria. How do β-lactams work? The β-lactam is mistaken by the enzymes that build the cell wall for one of its components. When the enzymes try to catalyze the reaction, the
four member ring of the β-lactam is broken and bound irreversibly to the enzyme, inactivating it. Eventually the growing cells wall weakens causing the cell to lyse. β-lactamases work by cleaving the β-lactam ring, inactivating the antibiotic. To help combat this, sometimes β-lactams are mixed with β-lactamase inhibitors like clavulanic acid. An example is Augmentin which is ampicillin and clavulanic acid. These work by binding to and inhibiting the β-lactamases. This is kind of a molecular arms race with the bacteria.

NARMS has been testing susceptibility of Salmonella to the following β-lactams: cephalothin, ceftriaxone, ceftiofur, cefoxitin, ampicillin, and amoxicillin/clavulanic acid. In 2004 we decided to do a study on β-lactam resistance in Salmonella animal isolates. ARS reviewed the data and found that resistance to the various β-lactams was increasing over the past 5 years. An earlier study of NARMS animal isolates from 1997-1998 had identified the \( \text{bla}_{\text{CMY-2}} \) β-lactamase gene as responsible for resistance. A similar increase had been seen in human isolates of Salmonella. ARS decided to focus on ceftiofur resistance because of the importance of 3\(^{rd} \) generation cephalosporins in treatment of infections and its wide spread use in animals. In all animal groups from 1999 to 2003, 34,411 Salmonella were isolated and about 11 percent of those were resistant to ceftiofur. Cattle have the highest level of resistant isolates. The majority of the resistant cattle isolates were clinical samples from ill animals. Salmonella newport stood out as having the greatest ceftiofur resistance with over 77 percent of animal isolates resistant. Almost all of these were also isolated from cattle. The ARS NARMS group finally looked at the cause of ceftiofur resistance and found that by PCR assay of 125 representative isolates, over 80 percent had the \( \text{bla}_{\text{CMY-2}} \) gene detected. The group then took a closer look at some strains and found that the \( \text{bla}_{\text{CMY-2}} \) gene was located on a large, self-transmissible MDR plasmid. A summary of the data shows that ceftiofur resistance in animal isolates had increased over time during the study. Cattle were the dominant source of resistant isolates and were mostly from diagnostic samples. S. newport was the dominant ceftiofur resistant serotype. The resistance mechanism was the \( \text{bla}_{\text{CMY-2}} \) gene and was linked to the MDR-AMPC plasmid.

Because of the results of the previous study, the next study focused on resistance in cattle. ARS was especially concerned about the possibility of extended spectrum β-lactamases being present in animals. These markers had spread widely in human and animal isolates in other parts of the world and had begun to be found in humans in the U.S. To do this, ARS took a close look at all 3,984 cattle slaughter isolates from 2000-2004. These were all from healthy animals. They were first screened for resistance and selected any with reduced susceptibility to ceftriaxone for further analysis. These were then tested for extended-spectrum β-lactamase (ESBL) phenotype, PCR analysis for several β-lactamase genes, and PFGE analysis for genotyping. All 3,984 isolates collected were susceptible to 4\(^{th} \) generation cephalosporins. None of the
97 selected for further analysis had an ESBL phenotype which is defined by a greater than two-fold reduction in minimum inhibitory concentration (MIC) to ceftazidime when clavulanic acid is added to the assay. No ESBL genes were detected by PCR in the 97 isolates, and almost all isolates had the cmy-2 gene detected. All of the 97 isolates had the MDR-AMP phenotype with resistance to a variety of other antimicrobials. Most of the 97 isolates were *S. newport* or *S. agona* and these were clonal in nature, with the *Newport* being wide spread while the Agona were mostly from the northeastern region.

Animal data through 2007 shows that *Salmonella newport* has been declining both in number and MDR phenotype. While predominantly isolated from cattle, *S. newport* continues to be isolated from other sources. In 2007, cattle were followed closely by turkey. Another interesting observation is that the number of pan-susceptible isolates appears to be increasing. Of the 50 isolates in 2007, 52 percent were resistant to five or more antimicrobials but 48 percent were pan-susceptible whereas in 2006 only 19 percent were pan susceptible. The reasons for this shift are unknown, but have been observed among other serotypes over time. How does this compare to current human data? Human data shows that *S. newport* was going up in the percentage of total *Salmonella* since the beginning of the decade. However, if we look at the level of multi-drug resistance, among *S. newport*, we noted that it also went up in the beginning of the decade but then began declining, just as we saw in animal isolates. The multi-drug resistance in humans and in animals seems to be linked to the MDR-AMPC phenotype. Similar to our work in animal isolates, this has also been associated with large plasmids in the human isolates and a paper describing this has just been published by the CDC. To summarize, a large proportion of multi-drug resistance was due to *Salmonella newport*, but other serotypes were also involved. This was associated with cattle isolates, especially diagnostic isolates. Resistance was due to an MDR-AMPC plasmid, which is found not just in *S. newport*. The same was true for human isolates. Prevalence has been going down over time in both human and animal *S. newport* isolates. However, the MDR-AMPC plasmids have been found in other serotypes and may be spreading.

Ongoing and future planned studies are focused on the following areas:

- Continued surveillance for β-lactam resistance (esp. ESBLs) in animal isolates (dairy cattle next target). ARS will use many of the same techniques discussed above to continue this work.
- Sequencing and genomics of MDR-AMPC (and other) plasmids. To complete this work we have our antimicrobial resistance gene microarray to which probes for four of the major *Salmonella* MDR plasmids have been added.
- Identification of resistance genes in MDR isolates collected over the ten years of NARMS (*Salmonella* and *E.coli*). The
Following Dr. Frye's remarks, Dr. Lafontaine introduced Dr. J. Dennis McCurdy, CVM-FDA, who provided an overview of the Animal Feed Safety System (AFSS). The FDA began modernizing its animal feed safety program in 2003. The new program, the AFSS, is being designed to be comprehensive, preventive, and risk-based so that the FDA and collaborating states can ensure the safety of feed intended for food animals and pets, as well as the safety of human food derived from food-producing animals. The AFSS has six components:

- ingredients and the approval process;
- limits for animal feed contaminants;
- process control for the production of feed ingredients and mixed feed;
- reporting of unsafe feed;
- regulatory oversight; and
- education and outreach.

These are all presented in the AFSS Framework Document, which is available on the FDA-CVM Web site (www.fda.gov/cvm). The Framework Document also identifies gaps for each component as well as the manner in which the FDA intends to address each gap. To incorporate the concepts of risk-assessment in AFSS, the AFSS Team developing the program has drafted a risk-assessment tool. The tool evaluates the hazard, the health consequences for humans and animals and the exposure potential. A risk scoring algorithm has been developed which is currently based on the relative level of health consequences times the exposure potential. The team is continuing to collect data that can be used for the model and is working to validate the model. AFSS has also been revised to include provisions of the FDA Amendments Act of 2007 concerning the safety of pet food and feed ingredients. The AFSS initiative fits well into FDA's overarching Food Protection Plan, which was designed to integrate all federal, state, and local food safety and food defense (counterterrorism) programs in the United States. AFSS and the Food Protection Plan have many cross-cutting principles. Detailed information on the AFSS project is available at the following link: www.fda.gov/cvm/afss.htm.

Committee Business:

After the scientific presentations, Chair Lafontaine opened the Committee's business meeting. In May 2008, the United States Animal Health Association (USAHA) Executive Committee (EC) approved the merger of the Committees on Food Safety and Feed Safety. USAHA recommended that the merged Committee consider three items: 1) continue to address both food and feed safety issues within its agenda, based on current topics relevant to animal health. 2) explore the establishment of a Feed Safety Subcommittee to monitor and address
emerging issues in feed safety. 3) revise the mission statement to reflect the topics [feed and food safety]. This year’s program fulfilled the first recommendation and the Committee will continue to do so in future years. Members of the former Committee on Feed Safety who were in attendance were polled by Chair Lafontaine for comments regarding the formation of a Feed Safety Subcommittee. The consensus was that a Subcommittee is unnecessary as long as the newly formed Committee continued to address issues of interest to the feed safety community. Regarding the third recommendation, the Chair offered a proposed combined mission statement to the membership. Discussion from the floor resulted in several changes. After incorporating the recommended changes, the following was approved as the new mission statement:

The purpose of the Committee on Food and Feed Safety is to serve as a focal point for consideration of food safety and feed safety issues within USAHA. The Committee should recommend food/feed safety policies to protect animal and human health and be active in all areas of food/feed safety concerning foods of animal origin. Further, the Committee should provide a national forum for debate on minimizing chemical, microbial and physical contamination in the feed of food producing animals and provide specific recommendations, using the latest available knowledge to enhance the safety of animal feeds.
The Committee met on October 28, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 8:00 a.m. to 5:45 p.m. There were 142 members and an estimated 50 guests present. The Chair introduced the new Vice-Chair, Dr. Paul Gibbs and both the Chair and Vice Chair thanked Dr. Corrie Brown (unfortunately absent at this meeting) for her many years of service as the Chair of this Committee and for her work in making the 8th Editions of the Foreign Animal Disease book a reality. A summary of the discussions and Resolutions was presented before the start of the presentations. A summary of the presentations, in chronological order, is presented here. Except for one presentation, all authors provided copies of their presentations for posting at the Committee page of the USAHA website, at www.usaha.org/committees/fe/fe.shtml.


Dr. Garland summarized the reasons of why the United States (U.S.) needs a new biocontainment facility, known as NBAF to replace the Plum Island Animal Disease Center (PIADC). The Homeland Security Act of 2002 recognized that protection of US agriculture is a critical element of Homeland Security and transferred ownership from the United States Department of Agriculture (USDA) to DHS in 2003. PIADC is a critical national asset and essential to protecting the US agriculture economy and food supply. It has served the nation well for over 50 years as our first line of agro defense. However, with expanding mission as well as facility limitations at Plum Island, such as no Biosafety Level 4 (BSL4), the need has been identified to enhance the current research capabilities in the animal agricultural field to protect the nation and surrounding communities. Plum Island is also an aging facility that is costly to maintain, because of its outdated infrastructure and design. Therefore, DHS initiated a competitive selection process to select additional alternatives to the Plum Island site. This was required so we could consider a range of alternatives for the NBAF which includes Plum Island.

DHS published a request for Expressions of Interest in January 2006. DHS originally received twenty nine expressions of interest from across the Nation, and narrowed down the sites to eighteen sites to compete in the 2nd round. Following evaluation of the additional information, DHS visited seventeen sites in April and May this year, and at the end of this process selected six sites for Environmental Impact Statement (EIS) analysis. Because the proposed NBAF is a major federal agency action,
DHS is required by the National Environmental Policy Act (NEPA) to conduct an EIS to evaluate its potential impacts.

The mission of the NBAF is to study animal infectious diseases that threaten our agricultural livestock and agricultural economy. These diseases include: Nipah virus, African swine fever, classical swine fever, contagious bovine pleuropneumonia, foot-and-mouth disease (FMD), Hendra virus, Japanese encephalitis virus, and Rift Valley fever. Zoonotic diseases would be studied and diagnosed in livestock; however, the NBAF would not study anthrax, Ebola, plague or smallpox, as these diseases are already studied at other Federal laboratories. The NBAF is committed to maintain the research, diagnostic and teaching missions of USDA, Agriculture Research Service (ARS) and USDA, Animal and Plant Health Inspection Service (APHIS), and will add biocontainment capabilities at the BSL-4 level, not currently available in the US for work with livestock species.

It is estimated that the NBAF will have 504,000 gross square feet (GSF) of construction allocated as follows: 30,000 GSF (6 percent) of BSL-2 space; 372,000 GSF (73 percent) of BSL-3 space; 55,000 GSF (10.9 percent) of BSL-4 space; 12,000 GSF (2.4 percent) for vaccine production; and 35,000 GSF (6.9 percent) for administration and office space.

The NEPA specifically requires that federal agencies evaluate the range of all reasonable alternatives to the proposed action. NEPA guidance defines reasonable alternatives as those which are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant. Because of that there are two decision alternatives: One is a no action alternative and the other one is build the NBAF. The Animal Disease Center on Plum Island is considered the no action option. In other words, if no site within the continental US is found to be acceptable upon which to build NBAF, then Plum Island will continue to operate within its current mission capabilities. In evaluating reasonable alternatives for constructing and operating the NBAF, DHS conducted a competitive selection process to identify and evaluate potential candidate sites, in addition to Plum Island. DHS announced on July 11, 2007 five Site Alternatives that are reasonable prospective locations for the construction and operation of the NBAF in addition to Plum Island:

- South Milledge Avenue Site – Athens, Georgia
- Manhattan Campus Site – Manhattan, Kansas
- Flora Industrial Park Site – Flora, Mississippi
- Umstead Research Farm Site – Butner, North Carolina
- Texas Research Park Site – San Antonio, Texas

Final selection will be determined after review of the following reports:

- NBAF Environmental Impact Statement (including agency and public comments)
- Threat and Risk Assessment
FOREIGN AND EMERGING DISEASES

- Site Cost Analysis
- Site Characterization Study
- Plum Island Facility Closure and Transition Cost Study

It was indicated that if Plum Island is selected, the NBAF located there will be a completely new facility.

Dr. Garland indicated that due to the very large number (>20,000) of comments received for the final EIS, and the need for DHS to answer all of them, the final decision may not take place during this Presidential administration. She also indicated that all this information has been posted at the DHS website.

Foot-and-Mouth Disease (FMD) Response Planning Update was presented by José R. Díez, Emergency Management and Diagnostics (EMD), Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), USDA.

Dr. Díez explained that the Emergency Management and Diagnostics (EMD) section of APHIS-VS has three divisions: 1) the Interagency Coordination (IC) responsible for creating partnerships with Federal, State, and local entities to strengthen early disease detection and rapid response at all levels taking the lead role for the implementation of the National Incident Management System. The group has staff liaisons working directly with DHS, US Department of Health and Human Services (USDHHS), Centers for Disease Control (CDC), and the US Department of Defense (USDOD) to ensure that subject matter expertise is available within these agencies for all necessary planning and communications activities. 2) The Preparedness and Incident Coordination (PIC) staff that develops agency response plans for the most dangerous animal diseases that pose a risk to US agriculture. This staff works closely with industry and stakeholders to identify the highest risk diseases, resource availability, and best strategies in disease mitigation; and 3) The National Veterinary Stockpile (NVS) that is tasked with providing the best possible protection against an intentional or unintentional foreign animal disease (FAD) introduction or the occurrence of a natural disaster affecting animal agriculture and the food system, as well as tasked with establishing methodology needed to address the most important FADs and has begun to stockpile identified supplies, vaccines, and materials needed for a response to these FADs.

APHIS Emergency Response Plans are based on some key aspects that include partnership between State, Federal, industry, and Tribal entities; an integrated and coordinated response to emergencies, a plan to communicate, prepare, assess, test, and exercise; response capabilities (Finance/Administration-Logistics-Ops-Planning), and a commitment to integrate, synchronize, and cooperate. He also indicated that while the old approach was response oriented, the new approach
REPORT OF THE COMMITTEE

is prevention, preparedness, mitigation, and recovery oriented, with a focus on being an all-hazards and multi-agency plan, applicable to intentional and catastrophic incidents, designed to operate with large scale interagency coordination and applicable to incidents with single or multiple sites. Several examples on the advances on the preparation and distribution and implementation of the FMD response plans were presented. Those included revisions of policy memoranda, development of animal disease models, tests exercises, and the enhancements of the North American FMD Vaccine Bank, coordination with DHS, and continuity of business plans.

Potential Strategies for the Detection, Monitoring, and Management of Selected Diseases in Wildlife was given by Jack C. Rhyan, VS-APHIS-USDA.

Dr. Rhyan briefly reviewed the need for studies of the impact of FADs, particularly FMD on wildlife using historical examples. He then reported on the Workshop on the Science of Surveillance, Control and Eradication of Catastrophic Diseases in Wildlife” held in Colorado on August 7-9, 2007. He then summarized for the audience the advances in newer technologies to conduct work on diseases of wildlife that included infrared imaging as a screening tool for the early and remote detection of animals with fever, particularly by observing the heat images of feet and coronary bands. Another technology being developed includes the use of drones or unmanned aerial vehicles that could serve as a tool for carrying infrared cameras used for census and disease detection. A third novel technology is the use of delivery systems for the targeted oral or intranasal (nebulized) vaccines to wild species.

Theresa Bernardo, College of Veterinary Medicine, Michigan State University presented Collaborative Technologies for Disease Prevention, Early Detection and Rapid Response.

Dr. Bernardo presented an excellent summary of modern internet-based technologies with great applications in animal health fields. Using examples she illustrated how the use of the Web have evolved from being used to find information, like using Wikipedia or Google searches, to now being about interacting with each other through the use of blogs, wikis, Facebook, MySpace, Twitter, texting, web-enabled cell-phones and many types of personal digital assistant (PDAs). Today, people in the field could, with very simple and ubiquitous hand-held devices, could update a blog, send a picture and consult an expert. Several examples of the use of these technologies for animal health were presented. These technologies have an animal health corollary, in the development of collaborative tools leading to enhancement of rapid response to emergencies. Other evolving technologies are available through internet corporations like Google in the form of improved internet search engines with the ability to receive electronic messages with alerts about events.
of interest. Dr. Bernardo also illustrated the increase benefit of using Google maps, HealthMaps, and other collaborative tools. Finally she suggested that wikis could be used for the development of regulations. One example mentioned was the project of New Zealand using a wiki-based system for the development of new laws.

Kenneth J. Linthicum, Center for Medical Agricultural and Veterinary Entomology, ARS-USDA, presented a Time Specific Paper, titled, Rift Valley Fever (RVF) Overview and Recent Developments at USDA. Dr. Linthicum divided his presentation into four components: 1) RVF ecology and epidemiology in Africa and Arabian Peninsula; 2) Prediction of recent RVF outbreaks in Africa; 3) RVF threat to the U.S.; and 4) RVF interagency working group. The full paper of this presentation is provided following this Report.

Rift Valley Fever Outbreak in East Africa, 2006-2007 was presented by Linda L. Logan, APHIS- USDA Attaché, North Africa, East Africa, Middle East. The primary author of the paper is Sherrilyn H. Wainwright, Centers for Epidemiology and Animal Health, (CEAH) VS-APHIS-USDA. Dr. Logan presented this paper on behalf of the main author who could not attend the meeting. This paper provided an overview of the 2006-2007 Rift Valley fever (RVF) outbreak in East Africa; identified the response and control measures used during the outbreak; and outlines the lessons learned for better prevention and response to future RVF outbreaks. These outbreaks occurred from November 30, 2006 until March 12, 2007. During this period of time there were countless animal cases in four provinces in eastern Kenya that generated 684 human cases with 155 deaths. The calculated case-fatality rate was 23 percent. However, it is estimated that this value is inflated due to the lack of a real denominator, not knowing how many people were infected. Only the seriously ill people sought medical attention. A large number of Kenyan and international agencies, including several from the US were involved in different aspects of these outbreaks. A number of animal interventions implemented including livestock movement controls imposed on infected Districts, slaughterhouses were closed and home slaughter was banned, bans were enforcement through education and use of Imams and Law enforcers. This was a challenge due to the major Muslim holiday of Eid-ul-Azha (Dec 12, 2006), ending a time of fasting, resulting on the ban of the traditional sacrifice of young lamb or calf was banned. Export markets were closed, and due to the closure of the border with Somalia by the government of Kenya on January 2, 2007, further investigations were hindered. Vaccination with the Smithburn live-attenuated vaccine began on January 8, 2007 in the Northeastern Province and extended to other known endemic districts. Vaccination was carried out in herds of goats, sheep, cattle and camels. A total of 2,550,330 doses of RVF vaccine was used in the control efforts. Many lessons were
learned, particularly in regard to the lack of laboratory capacity, lack of coordination and preparation to deal with an outbreak of this magnitude. The value of the early warning system based on satellite and global weather analysis was reinforced by these experiences.


Dr. Holt outlined the planning and preparation for an upcoming training exercise on RVF to be hosted by the Florida Department of Agriculture and Consumer Services/Division of Animal Industry and prepared by Dr. Paul Gibbs, College of Veterinary Medicine, University of Florida. The purpose of this exercise will be 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 in Florida. The exercise will focus on multiagency coordination and the critical decisions of key state regulatory and emergency response agencies in the first days of the simulated disease outbreak. This test will involve many state and several federal agencies. Given the ecological conditions of Florida, quite favorable for the development of an outbreak of vector-borne diseases, this exercise is expected to be very valuable to enhance Florida’s level of preparedness for an event of this type.

Luis Rodriguez, Plum Island Animal Disease Center (PIADC), ARS-USDA presented Review of ARS Programs at PIADC.

As it is customary in this Committee, Dr. Rodriguez provided an update on the research activities of ARS at the PIADC. The most recent research activities at PIADC include studies on the early events in bovine FMD pathogenesis; genetically engineered FMD virus for production of a safe inactivated vaccine; the use of cytokines as antivirals and immunomodulators; and the development of a novel classical swine fever (CSF) live attenuated vaccine. Dr. Rodriguez reported on the development of important strategic alliances with other government agencies, academia and the private industry to further develop research and the potential commercialization of the novel vaccine products. He finalized his presentation with a summary of the activities of the Global Foot-and-Mouth Disease Research Alliance (GFRA). The mission of GFRA is to establish and sustain global research partnerships to generate scientific knowledge and discover the tools to successfully prevent, control and eradicate FMD, with a broader vision of creating a coordinated global alliance of scientists producing evidence and innovation that enables the progressive control and eradication of FMD. Current members of this alliance include PIADC; the Institute of Animal Health Pirbright-UK; Canadian Food and Agriculture Institute, Winnipeg Canada; INTA-Argentina, the Department of Livestock Development–Thailand; and Australian Animal Health Laboratory.
Research Update on Avian Influenza was provided by David L. Suarez, Southeast Poultry Research Laboratory (SEPRL), ARS-USDA. Dr. Suarez summarized the activity of H5N1 highly pathogenic avian influenza (HPAI) in the world during 2008. Research at SEPRL has concentrated in areas of pathogenesis of HPAI using reverse genetics and microarrays to further understand host specificity for these viruses. Research on the development and use of Differentiating Infected from Vaccinated Animals (DIVA) vaccines for the prevention and control of HPAI continue, as well as the further understanding of the molecular epidemiology of avian influenza viruses collected from poultry and wild birds during domestic and international outbreaks. Work continues in the development of new tests, and the evaluation and revision of existing tests. A copy of the presentation is available at http://www.usaha.org/committees/fe/fe.shtml.

Kimberly Forde-Folle, VS-APHIS-USDA, presented The North American Animal Disease Spread Model. The North American Animal Disease Spread Model (NAADSM) is a stochastic, spatial, state-transition simulation model designed to simulate the spread and control of highly contagious diseases in a population of susceptible animals. The model can be used to prepare emergency responders for disease outbreaks, demonstrate to policy makers the potential scope and impact of an animal disease outbreak, compare disease control strategies, and estimate the resources needed in the event of an outbreak. User-established parameters define model behavior in terms of disease progression, disease spread by direct and indirect contact and airborne dissemination and the implementation of control measures such as movement restriction, mass depopulation, and vaccination. Resources available to implement mass depopulation and vaccination programs, as well as the calculation of estimates for direct costs associated with the control strategies implemented, are taken into consideration. The model calculates detailed and summary statistics which can be used to reconstruct and analyze the simulated outbreaks. Geographical information can be used to produce maps, which can serve as visual aids to understand the distribution characteristics of a simulated outbreak. Currently, the model is being used to evaluate outbreak scenarios and potential control strategies for several economically important highly contagious animal diseases in the United States, Canada, and elsewhere. The model has been developed by professionals from the USDA, the Canadian Food Inspection Agency, the Ontario Ministry of Agriculture Food and Rural Affairs, Colorado State University, and the University of Guelph and is freely available via
Foot and Mouth Disease in North American Wildlife: Susceptibility, Clinical Signs and Lesions was presented by Jack C. Rhyan, VS-APHIS-USDA.

Dr. Rhyan presented a summary of the results on the experimental infections of native North American wildlife species to FMD virus (O1 Manisa) conducted at the Plum Island Animal Disease Center. These experiments were design to try to increase the general knowledge on susceptibility, clinical and pathological manifestations, intra- and interspecies transmission with cattle, as well as to determine if conventional laboratory methods detect infection, if species may be long term carriers, and to conduct vaccine studies when indicated. In summary these results demonstrated that for all practical purposes, bison infections with FMD resemble those observed in cattle. Bison developed severe clinical FMD but as typical for wildlife animals, they were stoic to pain and distress. Cattle transmitted FMD to bison, but at least during the time frame of the study bison did not transmit to calves, and at least under the conditions of the experiments, there was no conclusive evidence of long term (>28 d) infection or shedding (RT-PCR + tissue 37 dpi.). In contrast, and unexpectedly, while inoculated elk (Wapiti) developed clinical signs of fever and mild lesions, contact exposed elk did not develop clinical signs. Cattle exposed to inoculated elk did not develop clinical disease, while inoculated steer and contact steer developed severe disease. Two inoculated elk and one contact elk had only laboratory evidence of FMD (serology and/or virus isolation). Studies in hand raise pronghorn resulted in all pronghorn and cattle developing clinical FMD (high fever, lesions). Pronghorn foot lesions were severe, mouth lesions mild, and intra and interspecies transmission occurred. Decubital ulcers in all pronghorn were observed. In conclusion, pronghorn are very susceptible to and capable of transmitting FMD, lesions can be severe and in the wild would likely result in death. The last study involved mule deer. All mule deer developed FMD oral and foot lesions, and intra and interspecies transmission occurred, with several deer died acutely during study due to severe myocarditis. While great advances in the knowledge of the effect of FMD in North American wildlife have been achieved, there is still the need to know about the effect of vaccination in FMD susceptible species as well as their role as potential long term carriers and on the best practices to manage outbreaks of FMD affecting wildlife. A copy of the presentation is available at http://www.usaha.org/committees/fe/fe.shtml.
Environment, Food, and Rural Affairs, United Kingdom.

Dr. Drummond summarized the events associated to the 2007 FMD outbreak in the UK, highlighting some of the key features of the event, including a description of impact on industry and stakeholders, the outcome of several official reviews and the implications for the future. The outbreak occurred in the vicinity of the Pirbright FMD laboratories and included two phases. One from August 3 to September 7, with two cases, and a second phase from September 12 to September 30 with six cases. Protection and surveillance zones were established and a large amount of sero-surveillance was done. These outbreaks were identified and controlled much faster and efficiently than the large outbreaks in 2001, and clearly the lessons learned from the latter outbreaks resulted in rapid and efficient responses in 2007. While there was no loss of consumer confidence in meat and the media coverage was fair, the attention was focused more on virus handling laboratory facilities. Six official reviews were initiated regarding the events that lead to this outbreak. As a result, the regulatory authority for high biosecurity laboratories was transferred from Defra to the Health and Safety Executive. The re-build of the Pirbright laboratory is likely to go ahead but the exact details have not been finalized. A copy of the presentation is available at http://www.usaha.org/committees/fe/fe.shtml.

Foot-and-Mouth Disease in Humans: A Literature Review, a Search for the Risk Factors was presented by Suzanne Burnham, Texas Department of State Health Services.

Dr. Burnham reported on an extensive literature search on the potential of FMD infection and disease in humans. The authors reviewed 468 references from the 1800’s to the present, including 5 bibliographies, 11 dissertations, and 119 clinical reports with 381 case descriptions, many of them from Germany in the 1830’s. Some studies in the US were reported in the 1910’s. Collectively, putative FMD cases in humans were associated with the consumption of high quantity of raw FMDV infected milk, direct contact with FMD with broken skin, and laboratory accidents, all in the context of a predisposing existing disease conditions or immune suppression. In conclusion the paper determined that while some may consider that FMD is potentially a zoonotic disease, there is no evidence of contagious among animals, symptoms were usually very mild, and the practice of drinking large amounts of unpasteurized infected milk is very unlikely today. Several Committee members recommended that the final publication of the paper carefully state their final findings as to not create unnecessary concern or regulatory actions by misinterpreting this data. A copy of the presentation is available at http://www.usaha.org/committees/fe/fe.shtml.

Preben Willeberg, Center for Animal Disease Modeling and Surveillance, School of Veterinary Medicine, University of California-
Davis shared his presentation FMD/AI BioPortal Update. The FMD/AI BioPortal has been developed as a system for global emerging animal disease surveillance, to provide real time management of multiple streams of information with international involvement (data providers and users). The portal offers spatial and temporal visualization of data as well as phylogenetic analysis, cluster analysis and anomaly detection in support of the decision making process and prediction models. Several excellent examples of the utility and power of this portal were presented by Dr. Willeberg. A copy of the presentation is available at http://www.usaha.org/committees/fe/fe.shtml.

Equine Influenza and Hendra in Australia: Lessons from the 2007 Outbreaks was presented jointly by Peter D. Kirkland, Virology Laboratory, Emergency Management Australia Institute (EMAI) and Hugh Millar, Chief Veterinary Officer, Victoria, Australia. The presenters summarized the epidemiological aspects of the large equine Influenza outbreak that occurred in Australia from August to December, 2007. This was the first occurrence of this disease in Australia. Ample description of several aspects of the outbreak including control measures, vaccination actions, regulatory controls and communication with the equine industry were presented. This outbreak was a good example of the devastating effects of a highly contagious disease in a large population of naïve susceptible animals in a large geographic area. The Presenters also summarized the latest activity of Hendra virus in Australia. A copy of the presentation is available at http://www.usaha.org/committees/fe/fe.shtml.

African Swine Fever (ASF) in the Caucasus, 2007 – 2008 was presented by Linda L. Logan, APHIS-USDA, on behalf of Robert Tanaka, APHIS-USDA Attaché, Vienna. These outbreaks were the first occurrence of ASF in Georgia. All the outbreaks reported were in domestic swine. The origin of the outbreaks is officially inconclusive. But it is suspected that imported pork products from Africa to the shipping Port of Poti. Introduced from ship’s waste, and spread by garbage feeding to pigs. These outbreaks have spilled into Armenia, Russia and Azerbaijan. Many lessons have been learned from this outbreak that has connections with geographic, cultural, and geopolitical situations in the Caucasus region. A copy of the presentation is available at http://www.usaha.org/committees/fe/fe.shtml.

The final set of papers were related to educational activities regarding foreign and/or emerging animal diseases. These presentations included the following titles and presenters, and all presentations were provided for posting on the web site:

- School for Global Health at Washington State University, presented by Terry McElwain, Washington State University
FOREIGN AND EMERGING DISEASES

- Up-date on Animal Health Initiatives in Afghanistan, presented by Bob Smith, United States Agency for International Development, USDA, Kabul, Afghanistan
- Combating Infectious Animal Diseases on a Global Scale: Capacity Building of National Animal Health Programs in Newly Established Countries, paper prepared by Mo Salman, Colorado State University and presented by Paula Cowen, APHIS-USDA.
- Gulf Region Animal Health Overview, presented by Alfonso Torres, Cornell University
- Foreign Animal Disease Training, presented by Paula Cowen, VS-APHIS-USDA
- Harmonization of Diagnostic Tests in North America, presented by Paul Kitching, British Columbia, Canada

Committee Business:

Three Resolutions were proposed from the floor and having an ample quorum, the Committee discussed them and approved the three Resolutions, which were forwarded to the Committee on Nominations and Resolutions.
Rift Valley fever (RVF) is a mosquito-borne viral disease with significant health and economic impacts to domestic animals and humans in much of sub-Saharan Africa. Human infections are believed to occur mainly from mosquito bites and from infectious aerosols. The available strategies for protection of humans are limited to use of mosquito repellents and other mosquito vector control. Epidemic disease can probably be prevented by vaccination of domestic animals which serve as virus amplifiers for arthropod transmission; however, there are no licensed vaccines available for use in the United States. Epizootics and epidemics of RVF are closely linked to the occurrence of the warm phase of the El Niño/Southern Oscillation (ENSO) phenomenon. We have developed a monitoring and risk mapping system using normalized
difference vegetation index (NDVI) times series data derived from the Advanced Very High Resolution Radiometer (AVHRR) instrument on polar orbiting National Oceanographic and Atmospheric Administration (NOAA) satellites to map areas with a potential for an RVF outbreak in sub-Saharan Africa. This system is 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. A Geographic Information System (GIS)-based remotely sensed early warning system for potential RVF vectors in the US and elsewhere is being developed. Mosquito forecasting information will be disseminated throughout the US, granting several months warning before conditions are suitable for elevated mosquito populations, permitting targeted implementation of mosquito control, animal quarantine and vaccine strategies in time to lessen or prevent animal and human disease.

Introduction

Rift Valley fever (RVF) is a mosquito-borne viral disease with pronounced health and economic impacts to domestic animals and humans in much of sub-Saharan Africa. The disease causes high mortality and abortion in domestic animals, and significant morbidity and mortality in humans (Tables 1-3). The virus is endemic in sub-Saharan Africa, but a large epidemic/epizootic in Egypt in 1977 demonstrated the possibility that the disease could be exported into new ecological regions. Many mosquito species worldwide are capable of biological transmission of Rift Valley fever virus (RVFV). A list of mosquitoes which may be potential vectors in the United States is shown in Table 5. The disease in humans begins with fever, chills, and myalgias and typically is self-limiting after 2-5 days (Table 4). However, in a small number of cases hemorrhagic fever, or encephalitis may occur. Human infections are believed to occur following bites from infected mosquitoes and from infectious aerosols. The available strategies for protection of humans are limited to use of mosquito repellents and other mosquito vector control. Epidemic disease can probably be prevented by vaccination of domestic animals which serve as virus amplifiers for arthropod transmission; however, there are no licensed vaccines available for use in the United States.

The most important animal species in RVF epidemics are sheep and cattle. (Tables 2 and 3). Both suffer significant mortality (20% in pregnant ewes, greater than 90% in newborn lambs) and virtually 100% abortion after infection; and their viremia is sufficient to infect many mosquito vector species. Most transmission to domestic animals is by arthropod bite. It is likely that vaccination of domestic animals will curtail epidemic transmission of RVF virus and an effective vaccine would also protect the recipient animal from disease and, with more difficulty,
abortion. Both inactivated and live attenuated vaccines are available within endemic areas of sub-Saharan Africa, but both have significant disadvantages.

RVF epidemics in West Africa, Madagascar and the Arabian Peninsula have emphasized the importance of irrigation in the continuing emergence of this virus as a major agricultural and human pathogen in Africa and the Arabia Peninsula. The emergence of intense transmission in new geographical areas in Africa and Arabia have increased the potential for exploitation of the virus to distant receptive areas such as may exist in the Middle East, the Mediterranean, and the Americas.

Risk Assessment and Linkage to El Niño-Southern Oscillation (ENSO) phenomenon

RVF epizootics and epidemics are closely linked to the occurrence of the warm phase of the ENSO phenomenon. We have developed a monitoring and risk mapping system using normalized difference vegetation index (NDVI) times series data derived from the Advanced Very High Resolution Radiometer (AVHRR) instrument on polar orbiting National Oceanographic and Atmospheric Administration (NOAA) satellites to map areas with a potential for an RVF outbreak. This surveillance system operates in near-real time to monitor RVF risk on a monthly basis and offers the opportunity to identify eco-climatic conditions associated with disease outbreaks over a large area. This system is 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. The RVF outbreak on the West coast of the Arabian Peninsula in 2000 demonstrated that other regions of the world can be at risk of the disease. The surveillance system developed for Africa has been modified to include the Arabian Peninsula, and can potentially be adapted to assess the risk of RVF and other arthropod-borne disease outbreaks in new ecological settings. We are currently developing a Geographic Information System (GIS) early warning system for RVF vectors in the US using mosquito surveillance data collected by mosquito control and public health agencies, and climate data derived from satellite measurements and terrestrial weather stations. The GIS predicts disease transmission patterns based on the quantitative relationship between mosquito activity and patterns of local and global climate, and identifies early warning parameters associated with elevated populations of potential RVF vectors. Linkages between climate and mosquito densities are evaluated with spatial and temporal statistics, generating risk maps to inform vector control agencies. Mosquito prediction information will be disseminated throughout the U.S., granting several months warning before conditions are suitable for elevated mosquito populations, permitting targeted implementation of mosquito control, animal quarantine and vaccine strategies in time to
FOREIGN AND EMERGING DISEASES

lessen or prevent animal and human disease. The infrastructure and systems we develop in preparation for RVF can be laterally transferred to inform strategies against any other mosquito-borne disease threat.

Potential for RVF Risk Assessment in the US

The documented expansion on RVF beyond sub-Saharan Africa into Egypt in 1977 and more recently the emergence of the disease in Saudi Arabia and Yemen in 2000 makes RVF a possible candidate for further globalization. Like the introduction of WNV into the U.S. in 1999 an introduction of RVF into the U.S. would pose a significant risk to the humans, domestic animals and wildlife. RVF would also present significant effects on the agricultural and public health community. The effect on the US economy at large, including livestock feed suppliers, health care insurance, the food-service industry, and loss of confidence in the food supply, would be significant. The BSE outbreak in the United Kingdom in 1986 cost the European Union more than $100 billion. The US had beef-related exports in 2003 of $5.7 billion. Additionally, the OIE imposes a 4-year trade ban on any country with confirmed RVF transmission and the ban is lifted only after a country is disease free for 6 months. It is important to now consider methods to adapt the RVF risk mapping methodologies developed for Africa for its application in other regions of the world, specifically the US.

There are two cases for predicting likelihood maps of RVF mosquito vectors, and thus the dispersal of RVF, in the U.S. The first depends upon the presence, vector competence, and vectorial capacity of mosquito vectors at the time and place of introduction of RVF in the US, which in turn depends on the historical climate patterns of vector abundances, and the climate in Africa and the magnitude of RVF activity there at that time. The second depends on the status of vectors after introduction takes place, which is driven by climate in the U.S. and historical patterns of vector abundances. The second case leads to informed predictions of changes and movement of vector abundances across the landscape, and thus spatially-explicit patterns of risk for the appearance of RVF.

Each case highlights an important concept in handling the possibility of RVF in the US. By monitoring climate in the US and in Africa, reports of RVF activity in Africa and worldwide, trade and movement of people between the US and Africa, and the status of candidate vectors and reservoirs at nodes of potential arrival pathways of RVF, we can do a great deal to minimize the constellation of favorable conditions needed for RVF to arrive in the US in the first place. On the other hand, by keeping a close eye on the status of candidate RVF vectors in the US, and developing predictive risk models of where vectors could be at any given time, we can more efficiently target, mobilize, and implement control and containment strategies (including vaccines, test kits, education, and vector control) should RVF actually be detected in the U.S.
REPORT OF THE COMMITTEE

Both cases hinge on the biogeographic links between organisms and climate. In Africa remotely sensed climate data are routinely and successfully used to flag areas at high risk of vector outbreaks and thus the earliest stages of a RVF epizootic.\textsuperscript{2,3} We are developing a companion approach in the US, but since RVF is not present in the US, and there is no historical climate precedent for RVF outbreaks there, we are instead looking at the predictive power of climate to inform us of vector population dynamics.

Summary

In summary, RVF is a mosquito-borne viral disease that causes significant periodic morbidity and mortality to domestic animals and humans in much of sub-Saharan Africa. Our current monitoring and risk mapping system, based upon NDVI and SST data from AVHRR instruments on polar orbiting NOAA satellites, is effective in assessing the potential spatial and temporal distribution of RVF transmission. RVF has demonstrated its ability to expand its distribution outside of the African continent. To prepare for the potential introduction into the US we are developing a GIS/remotely sensed early warning system for RVF vectors in the US using mosquito surveillance data collected by mosquito control and public health agencies, and climate data measured by satellites and terrestrial weather stations. The GIS predicts disease transmission patterns based on the quantitative relationship between mosquito activity and patterns of local and global climate, and identifies early warning parameters associated with elevated populations of potential RVF vectors. Linkages between climate and mosquito densities are evaluated with spatial and temporal statistics, generating risk maps to inform vector control agencies. Mosquito prediction information will be disseminated throughout the US, granting several months warning before conditions are suitable for elevated mosquito populations, permitting targeted implementation of mosquito control, animal quarantine and vaccine strategies in time to lessen or prevent animal and human disease. Many of the systems we develop in preparation for RVF can be laterally transferred to inform strategies against any mosquito-borne disease threat. Additionally the methodologies that we are developing could be used for RVF surveillance could be adapted for use in neighboring countries in North America, other continents such as South America, Europe, Eurasia, Asia, and Australia.

Acknowledgement.

This study was supported in part by the Department of Defense Global Emerging Infections Surveillance and Response System.
FOREIGN AND EMERGING DISEASES

References
Table 1. Clinical disease in Cattle

<table>
<thead>
<tr>
<th>Feature</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incubation period</td>
<td>1-6 days</td>
</tr>
<tr>
<td>Clinical signs</td>
<td>Calves:</td>
</tr>
<tr>
<td></td>
<td>—Fever of 40°-42°C (104°-106°F)</td>
</tr>
<tr>
<td></td>
<td>—Depression</td>
</tr>
<tr>
<td></td>
<td>—Icterus</td>
</tr>
<tr>
<td></td>
<td>—Anorexia and weakness</td>
</tr>
<tr>
<td></td>
<td>—Listlessness</td>
</tr>
<tr>
<td></td>
<td>—Evident abdominal pain</td>
</tr>
<tr>
<td>Adults:</td>
<td>—Fever of 40°-42°C (104°-106°F)</td>
</tr>
<tr>
<td></td>
<td>—Excessive salivation</td>
</tr>
<tr>
<td></td>
<td>—Anorexia</td>
</tr>
<tr>
<td></td>
<td>—Weakness</td>
</tr>
<tr>
<td></td>
<td>—Near 100% abortion, Fetid diarrhea</td>
</tr>
<tr>
<td></td>
<td>—Fall in milk yield</td>
</tr>
<tr>
<td></td>
<td>—Nasal discharge</td>
</tr>
<tr>
<td>Case-fatality rate</td>
<td>Calves: 10%-70%</td>
</tr>
<tr>
<td></td>
<td>Adults: &lt;10% in indigenous breeds</td>
</tr>
</tbody>
</table>
## FOREIGN AND EMERGING DISEASES

### Table 2. Clinical disease in Sheep and Goats

<table>
<thead>
<tr>
<th>Feature</th>
<th>Characteristics</th>
</tr>
</thead>
</table>
| Incubation period     | Lambs: 12-36 hours  
                       | Adults: 1-6 days                                                                                                                                   |
| Clinical signs        | Lambs:  
                       | —Fever of 40°-42°C (104°-107°F)  
                       | —Anorexia and weakness  
                       | —Listlessness  
                       | —Evident abdominal pain  
                       | Adults:  
                       | —Fever of 40°-41°C (104°-106°F)  
                       | —Mucopurulent nasal discharge  
                       | —Vomiting  
                       | —Anorexia  
                       | —Listlessness  
                       | —Diarrhea  
                       | —Icterus                                                                                                                                   |
| Complications         | —Abortion rates can reach 100% (aborted fetus often autolysed)  
                       | —Peracute hepatic disease in lambs and kids <1 wk of age  
                       | —Hepatitis  
                       | —Cerebral infections  
                       | —Ocular infections                                                                                                                              |
| Case-fatality rate    | Lambs  
                       | —<1 wk of age: as high as 100%  
                       | —>1 wk of age: as high as 20%  
<pre><code>                   | Adults: 20%-30%                                                                                                                                  |
</code></pre>
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incubation period</td>
<td>2-6 days</td>
</tr>
<tr>
<td>Prodrome</td>
<td>Fever, headache, photophobia, retro-orbital pain</td>
</tr>
<tr>
<td>Clinical signs/symptoms</td>
<td>—Subclinical infection common</td>
</tr>
<tr>
<td></td>
<td>—Four clinical patterns:</td>
</tr>
<tr>
<td></td>
<td>~Undifferentiated fever lasting 2-7 days (&gt;90% of cases; often associated with nausea, vomiting, and abdominal pain)</td>
</tr>
<tr>
<td></td>
<td>~Hemorrhagic fever with marked hepatitis and bleeding manifestations (&lt;1% of cases; occurs 2-4 days after onset of fever)</td>
</tr>
<tr>
<td></td>
<td>~Encephalitis (&lt;1% of cases; occurs 1-4 wk after onset of fever)</td>
</tr>
<tr>
<td></td>
<td>~Retinitis (up to 10% of cases; occurs 1-4 wk after onset of fever; often bilateral; hemorrhages, exudates, and cotton wool spots may be visible on macula; retinal detachment may occur)</td>
</tr>
<tr>
<td></td>
<td>—Common bleeding manifestations include gastrointestinal bleeding and epistaxis</td>
</tr>
<tr>
<td></td>
<td>—Neurologic symptoms include confusion, lethargy, tremors, ataxia, coma, seizures, meningismus, vertigo, choreiform movements</td>
</tr>
<tr>
<td></td>
<td>—Hepatitis, hepatic failure, and renal failure may occur</td>
</tr>
<tr>
<td></td>
<td>—A report of the 2000 outbreak in Saudi Arabia identified the following clinical features for 683 laboratory-confirmed cases:</td>
</tr>
<tr>
<td></td>
<td>~Fever: 92.6%</td>
</tr>
<tr>
<td></td>
<td>~Nausea: 59.4%</td>
</tr>
<tr>
<td></td>
<td>~Vomiting: 52.6%</td>
</tr>
<tr>
<td></td>
<td>~Abdominal pain: 38.0%</td>
</tr>
<tr>
<td></td>
<td>~Diarrhea: 22.1%</td>
</tr>
<tr>
<td></td>
<td>~Jaundice: 18.1%</td>
</tr>
<tr>
<td></td>
<td>~Neurologic manifestations: 17.1%</td>
</tr>
<tr>
<td></td>
<td>~Hemorrhagic manifestations: 7.1%</td>
</tr>
</tbody>
</table>
Table 4. A partial list of potential vectors of RVF in the United States

<table>
<thead>
<tr>
<th>RVFV Vector Competence</th>
<th>Transovarial Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aedes vexans</td>
<td>Yes</td>
</tr>
<tr>
<td>Aedes taeniorhynchus</td>
<td>Yes</td>
</tr>
<tr>
<td>Aedes sollicitans</td>
<td>Yes</td>
</tr>
<tr>
<td>Aedes canadensis</td>
<td>Yes*</td>
</tr>
<tr>
<td>Aedes excrucians</td>
<td>Yes*</td>
</tr>
<tr>
<td>Aedes triseriatus</td>
<td>Yes*</td>
</tr>
<tr>
<td>Aedes albopictus</td>
<td>Yes*</td>
</tr>
<tr>
<td>Anopheles species</td>
<td>No</td>
</tr>
<tr>
<td>Culex salinarius</td>
<td>Yes*</td>
</tr>
<tr>
<td>Culex tarsalis</td>
<td>Yes</td>
</tr>
<tr>
<td>Culex territans</td>
<td>Yes*</td>
</tr>
<tr>
<td>Culex pipiens</td>
<td>Unknown*</td>
</tr>
<tr>
<td>Culex quinquefasciatus</td>
<td>Unknown*</td>
</tr>
<tr>
<td>Psorophora columbiae</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

*Probably of lower importance

**Varies from inefficient to efficient for various African and European strains. Little to no data on North American strains.
On Tuesday, the Committee met first with the American Veterinary Medical Association (AVMA) and the American Association of Veterinary Medical Colleges (AAVMC), at the AVMA Government Relations Division offices. Dr. Ron DeHaven, Executive Vice President of the AVMA, first addressed and commended the great partnerships that existed among AVMA, AAVMC, USAHA, and AAVLD in very challenging times of transition and necessary expansion. The veterinary profession is at a crossroads: its public workforce and activities (public practice, public health) need to be expanded, production animal veterinary medicine needs to be supported to ensure the health of the national livestock herd, poultry flock and aquatic animal populations, with still high demands of companion animal private practice.

AVMA is supporting five strategic priorities which are animal welfare, animal workforce, veterinary education, veterinary economics, and advocacy. In particular regarding animal welfare, AVMA is committed to balanced, science based representation of all relevant viewpoints, and currently faces a challenge from an emergent, single focused Humane Society Veterinary Medical Association.

Dr. DeHaven briefly explained the functions of the Communications, Convention and Meeting Planning, Education, Government Relations, and Science divisions of AVMA; in particular its outreach and communications work which raises awareness for the challenges that the profession faces and the needs for a strong professional body; the integration of human, animal and environmental health into the One Health concept; AVMA's role in education not only of veterinarians, but of veterinary technicians as
well; and its overarching function of bringing professionals together at the yearly AVMA meeting, and at leadership conferences.

Dr. DeHaven initiated a discussion on AVMA's work influencing U.S. legislature for the benefit of animal health and welfare and the profession in general.

Dr. Mark Lutschaunig, AVMA Director of the Government Relations Division, provided details on current legislative initiatives. He addressed the needs for support of the pending Veterinary Public Health Workforce Expansion Act (VPHWEA) and for appropriations and implementation of the National Veterinary Medical Service Act. The Food Animal Residue Avoidance Databank (FARAD) in particular is threatened if permanent multi-year funding cannot be assured and may cease to operate mid-to-late 2008, and the reauthorization of the 2003 Animal Drug User Fee Act (ADUFA) may lead to language changes that could result in restrictions on antibiotic use in food animals.

Dr. Michael Chaddock, Deputy Executive Director of the AAVMC, presented the charge and structure of the AAVMC, whose members include all US and Canadian, as well as several European and Australian veterinary colleges, and veterinary science and comparative medicine departments across the US. Dr. Marguerite Pappaioanou recently joined the organization as its new Executive Director. Mr. Brian Smith, Director of AAVMC Government Affairs further elaborated on the VPHWEA, which currently has 91 co-sponsors on Capitol Hill.

The Committee next met with the Animal Ag Coalition (AAC), as part of their regular monthly meeting. Following introductions, including those on teleconference, the AAC proceeded with updates from AAC members.

Reports included the Coalition for Food and Agriculture Research (C-FAR) and the Food and Agriculture Sector Coordinating Council (FASCC). AAC Chairman Paul Rodgers indicated DHS would be presenting the Food and Ag Sector Strategic Vision at the next meeting. Barb Powers provided an update on the National Animal Health Laboratories review, highlighting the interest of AAVLD to gather input from industry stakeholders.

The AAC next reviewed appropriation activities, indicating that AAC members should forward requests to chairman for consideration. It was noted that USDA, Agriculture Research Service (ARS) and USDA, Cooperative State Research, Education and Extension (CSREES) have taken a $238 million decrease. Also presented was a proposal to continue levels of support for Centers of Excellence at Texas A&M and the University of Minnesota.

The Committee next gathered an update on other legislative and regulatory activities, including the Farm Bill, concerns regarding the cafeteria vendor used in the House of Representatives, and the ongoing need for funding FARAD. The AAC is also addressing a recent draft standards from the American National Standards Institute (ANSI) on defining sustainable agriculture.

REPORT OF THE COMMITTEE

Representative John Dingell has approached the AAC for input regarding this. AAC is considering developing a white paper on this issue to outline the roles of PIADC and the NBAF for the future.

On Tuesday afternoon, the Committee met with Food and Drug Administration (FDA), Center for Veterinary Medicine [Bruce] representative, Dr. Neal Bataller, Director, Division of Compliance.

Bataller first addressed bovine spongiform encephalopathy (BSE). A new regulation will be published soon to restrict certain Bovine materials (not just the current Specified Risk Materials) from all animal feeds. Based on field inspections, there is a high rate of compliance with the current rule (compliance violations were at zero for the last round of inspections). They are working with the transportation industry to ensure the prevention of cross-contamination of feedstuffs during hauling. The FDA doesn’t regulate environmental issues, the Environmental Protection Agency (EPA) does, so environmental contamination and disposal issues are not within their purview. FDA doesn’t know what will happen with the increased amount of condemned material, hoping a new industry will develop to make use of it? The new rule will be published as a Final Rule with a defined implementation time line of several months.

He then addressed pet food regulation. The melamine contamination last year illustrated that FDA-CVM doesn’t have the staff needed to cover such emergencies and needs to partner with other groups to handle these. This outbreak showed there was a gap in laboratory coverage for feed toxicology. A new National Animal Health Laboratory Network (NAHLN) Toxicology Working Group was formed as a result and will focus on building infrastructure starting by identifying potential funding streams. FDA-CVM is currently giving extra attention to the use of distiller’s grains and byproducts from biofuels plants that may be used for feed ingredients. The Food Safety and Import Amendments Act of 2007 requires the codifying of feed ingredients, use of Good Manufacturing Practices by feed manufacturers and new labeling requirements for pet food.

Bataller next mentioned the cloning risk assessment. A risk assessment has been published and some 30,000 were received in response to that publication that must be answered.

National Antibiotic Resistance Monitoring System (NARMS) was the next subject. The program was reviewed in 2007 by the FDA Science Board and a 10 year strategic plan created that will include the support of hypotheses-driven research in that area.

Regarding Minor Use Minor Species (MUMS) drugs, there are several new drugs in the pipeline for consideration for a MUMS designation, including drugs for wildlife.

Integrated Consortium of Laboratory Networks (ICLN) comprises the Food Emergency Response Network (FERN), Laboratory Response Network (LRN), National Plant Diagnostic Network (NP DN) and the National Animal Health Laboratory Network (NAHLN) whose goals are
to work cooperatively to optimize national laboratory preparedness and provide mutual support wherever possible, consistent with applicable authorities and funding restrictions.

The Committee concluded the day with an update from the Food and Agriculture Sector of the Government Coordinating Council (GCC), including representatives Leann Jackson, FDA, and Jessica Fantinato, USDA.

HSPD7 calls for Critical Infrastructure Identification, prioritization and protection: Two key activities are the National Infrastructure Protection Plan (NIPP) and Sector Specific Plans (SSP). The NIPP is available at www.dhs.gov/nipp. All critical sectors had to develop SSPs that describe how federal, state, tribal, local and industry groups will work together to protect its infrastructure. The sector of most interest to us is the Food and Agriculture sector which began in 2006 and organized a GCC and Sector Specified Council (SSC). The GCC includes representatives from USDA, DHS, FDA, USAHA, AAVLD, among many others. There are monthly conference calls and quarterly meetings.

One activity of the GCC was the formation of a joint research committee to identify industry and state research and development needs as regards to detection, decontamination and disposal of threat agents. A white paper is being developed to request assistance/resources from DHS National Center for Food Protection and Defense.

The GCC and SCC also have annual tabletop exercises. In 2006, in Raleigh, NC, the topic was contamination of bottled water; in 2007, in Washington, DC, the topic was a FMD outbreak; in 2007, in Harrisburg, the topic was an animal feed contamination; in 2008, a late response and recovery issue is planned. To-date, these table tops have identified issues with communications among agencies, federal to state, and to the private sector and public. Other issues identified include lack of clarity of roles and responsibilities of federal and state agencies, roles of different laboratory networks, lack of business continuity planning, confusion of funding authorities, and lack of economic recovery plans. Strengths include good cooperation among agencies, existence of expertise, good informal communications, and good state level response plans.

Another effort underway is the criticality tool development to identify the critical components of the Food and Agriculture Sector. This is called the FASCAT (Food and Agriculture Sector Criticality Assessment Tool). Version 1 of FASCAT was released to a few groups, reviewed and refined to Version 2. Version 2 of the FASCAT was recently released, and information is being gathered, starting with a targeted state plan to be expanded nationally.

A final development is the HSIN (Homeland Security Information Network), a web-based network that has been developed that has extensive information on innumerable items of interest to the Food and Agriculture Sector. Two Webinars on the use of the HSIN have been
On Wednesday, Deputy Under Secretary for Food Safety Dr. Scott Hurd and Food Safety Inspection Service (FSIS) Administrator Al Almanza met with the group beginning at 8:30 a.m. in the Jamie L. Whitten Building.

The first topic of discussion was welfare issues relating to the California/Hallmark investigation, which is ongoing. Preliminary comments indicate a need for more random review on-site and possible use of cameras, in addition to on-site inspectors. FSIS is currently evaluating how much more staffing is needed (different/additional staffing options), initial focus on audit of plants supplying schools and those slaughtering high risk animals. Decisions are pending completion of current review. An evaluation including what could have been done differently as well as new approaches and solutions. FSIS expects to have the review complete, a plan, and initiatives to present in the next 60 to 90 days. The key message is that industry will need to be self-regulating, with regulators setting boundaries.

As discussion continued, USAHA shared comments, which are summarized as follows.

The need to place limitations on “shades of grey” exemptions for downer cows. Better definition needed of downer for discrimination from acute injury (e.g. obvious acute injury vs. more subjective and marginal cows).

Potential for introducing producers to a HACCP-type process?

The need for more presence in the plants day-to-day (current limitations with inspectors primarily tied-up/focused on the postmortem line). Ante-mortem is as important as post-mortem, inspector presence should be continuous.

FSIS incentives to producers for not waiting until the cull cow is downer/difficult to assess.

Comfortable that on-site veterinarians can determine acute injury (e.g. broken leg), but marginal animals are area of concern.

FSIS using the unfortunate situation as an opportunity to change the current process.

Plant had record of 17 external and 15 internal audits, emphasizing that cannot rely on existing audit process alone, need for more FSIS staffing.

A second topic focused on the increase in E. coli 0157. A meeting is scheduled for April 9, and an American Meat Institute meeting has been held and they will bring forth from that meeting the bigger issues. E. coli 0157 numbers reported as of March 11, were half of December 2007. The decline was not linked to seasonal differences e.g. cold weather or feed. The industry is looking at different ways of addressing E. coli, noting difficulty in interpreting due to normal biologic variation. The past increase reported may not be a true increase in prevalence. FSIS does not anticipate this to be a sustained problem. The same level of testing
is ongoing, however FSIS has been using a different methodology since January 2007, using a different media. These changes in media are published on web site for reference. Industry reported before media change they were already seeing an increase in 0157. FSIS’ new media is much more sensitive than previously, moving in 2008 to an even more sensitive media.

The third discussion item involved interstate shipment of state inspected product which is in different versions in House and in Senate Farm Bills. Regarding plans for implementation, FSIS at this time has no position. FSIS has looked at fiscal impact of increased testing and how to support the initiative, such as the need for additional information technology structure and supervisors.

The Committee next met with USDA, Agriculture Research Service (ARS), Drs. Caird Rexroad, Steve Kappes and Dan Strickman: At the 2008 House budget hearing, ARS continued to advocate its basic mission, although overall the ARS budget request declined from $1.121 billion to $1.037 billion. The ARS budget will absorb this $143 million budget impact through reduction and reorganization of science staff and some facilities. ARS is responding to National Academy of Science, and Office of Management and Budget guidance to increase investments in societal oriented research and less on the animal production sector, including the role of native insects as vectors of foreign animal diseases, basic adaptive immunity and host-pathogen relations, the genomic underpinning of wildlife-livestock disease interface, and the implications of climate change for emergence and prevalence of zoonotic diseases. The ARS Office of Technology Transfer will continue to work to improve the availability and relevance of ARS research to industry and APHIS-Veterinary Services.

National Animal Health Laboratory Network updates were given by Dr. Barb Martin. She provided a summary report and recommendations coming from a 5-year review of the NAHLN. The summary included the following points.

- the review did not provide surprises, but helped re-enforce assumptions
- survey questions forwarded to laboratory directors and will go to other stakeholders
- Steering Committee met in January ‘08
- key recommendation: pull issues together and then communicate regularly
- Considerable discussion occurred regarding broad-based reportable disease system
- a “central” IT system is needed
- a system-wide mechanism/foundation should be established

GOVERNMENT RELATIONS
REPORT OF THE COMMITTEE

- IT investments have historically been made at end of year vs. upfront now

The initial goal of NAHLN was to have a laboratory in each state; however, that concept is now being reconsidered, using CEAH modeling to determine concept viability – target is to achieve best possible coverage with the best possible use of funds.

Toxicology in the NAHLN – Dr. Steve Hooser provided an update. There has been teamwork, but lack of good communication/coordination among universities, private industry and federal government. A Working Committee created a white paper and a toxicology survey has been recently completed. They are addressing communication/partnering with the National Poison Control Center. The consensus is that the “toxicology concept” should continue to move forward. NVSL has lost 2 positions and there is not new money for toxicology. APHIS supports the concept of toxicology in the NAHLN. Dr. Martin believes the short term will require leveraging of existing funds. Justifying toxicology funding via food supply protection, and pose the question, would FERN be a better partner? Toxicology may be more related to emergency response than surveillance. The Committee was reminded to consider the Environmental Protection Agency (EPA) as well. It was noted that the FDA is recognizing its role in food supply.

Martin then discussed VS Memo 580.4, which covers Foreign Animal Disease (FAD) investigations:
- the NAHLN Steering Committee began edits and revisions of 2004 version
- 3 groups: Policy, Laboratory Issues and Response/Communication
- next step: working group actions
- Business continuity remains a major concern – attempting to establish best practices for the laboratories.
- AI Table Top Exercises – upcoming and Barb Powers encourages/expects State Veterinarians to
- Participate. The EPA is also being considered as a stakeholder in this.

The NVSL was next. Dr. Beth Lautner provided an update on the Quality Assurance Program, the Laboratory Information Management System (LIMS), expected cost of utilities, and an early move into the new facilities. The move will require some duplication to provide adequate capability and coverage.

There is support for melding NAHLN and laboratory integration into national surveillance programs, including flow of information, sample identification and tracking and flow of resulting.

A State Reportable Diseases Network blended with NAHLN is supported.
Dr. Jere Dick, Associate Deputy Administrator, Veterinary Services (VS), along with Dr. Mark Davidson met with the committee for approximately one hour and updated the group on several VS programs. A summary is provided below.

Bovine Tuberculosis: The regulatory process has been very frustrating, as it is defined by the Administrative Procedures Act of which APHIS only controls a small portion of that process. TB is a 90 year old program that needs modernizing. APHIS views primary risk as from three sources: 1) Mexican livestock, 2) wildlife, and 3) dairy cattle. Anticipate both Domestic and International rules to be released for comment sometime in the summer of 2008. There are currently inconsistencies between the CFR and the UMR. TB is one of 42 rules that APHIS has in process that they view as top priority. The TB “roping steer rule” is at Office of Management and Budget (OMB), and they have requested a more rigorous economic impact statement. APHIS is considering a “TB Retreat”, bringing together state and federal TB epidemiologists to discuss the issues. The Mexican TB eradication program is requiring extensive investment of funds and resources, particularly regarding state reviews. APHIS has significant concerns with Mexico’s proposed rules (they do not address dairy cattle) and do not view it as “equivalent” as written. They will conduct a review of the Mexican program in early 2009, will release the proposed International Rule in the summer of 2008, and will compose a 5 year Strategic Plan (2008-2012) addressing metrics, measurements, and accomplishment standards.

Cattle Fever Tick: This issue is of concern to APHIS as the tick has been identified as expanding into the former “free” zone. They are attempting to identify alternative funding, and will ask for more in the 2010 budget.

All USAHA resolutions directed to VS were approved, with responses and should be at USAHA offices shortly.

Johnes Disease: APHIS is currently studying the issue of allowing non-veterinarians to submit official Johnes disease samples.

NAIS: USDA has already purchased $1.5 million worth of RFID tags. It would be cost prohibitive and not possible to supply tags with individual state codes on them. They are amenable to working with the USAHA Animal Identification Committee to look into alternative solutions.

Veterinary Services Process Streamlining (VSPS): The VSPS process streamlining system is being used by accredited veterinarians in 27 states and 39 destination states. There are deficiencies within the system, particularly with regards to generating reports. The system will be upgraded within the next month with anticipated improved performance. John Piscanso has been hired as the new IT coordinator and will be developing an all encompassing IT Strategic Plan. They are very fortunate to be able to bring John on staff.

Scrapie: APHIS-VS had received a request to increase the 2010 Scrapie budget an additional $10 million to a total of $28 million. This will
not be possible as there are huge other needs and any increases have to be offset in other areas.

Outdoor Access for Organic Poultry: This issue comes under the jurisdiction of the Agricultural Marketing Service which sets the standards for “organic” claims. AMS has reaffirmed the requirement and regulation and APHIS will not be able to affect change on another section’s rules.

Dr. Dick led a general discussion involving the future of livestock and poultry disease surveillance. He indicated a trend toward a comprehensive surveillance program, by species, to maximize resources. He used swine as an example, where testing could occur for vesicular diseases, pseudorabies, brucellosis, trichinae, and other emerging diseases on a sample set from one animal.

Dr. Dick concluded his session by expressing his appreciation for the chance to interact with the GRC, and his support for the work of the USAHA and the AAVLD.

Under Secretary Bruce Knight took a moment to address the group, covering topics such as the National Animal Identification System and its progress and goals. NAIS remains a priority for the administration. Mr. Knight expressed his appreciation of the work of USAHA, and the role it plays in providing input to USDA.

The Committee requested a joint meeting with USDA-APHIS and DHS to clarify roles, responsibilities and authorities specifically for responding to animal health emergencies. Participants in the meeting included Dr. John Clifford, Deputy Administrator, APHIS-VS, Dr. Jose Diez, Emergency Management and Diagnostics Associate Deputy Administrator, APHIS/VS and Dr. Donald Noah, Acting Deputy Assistant Secretary (WMD and Biodefense), DHS.

Within DHS, animal health emergencies are coordinated within Food, Agriculture, and Veterinary Defense. Dr. Tom McGinn, Director, one of four divisions under the Office of WMD and Biodefense, which is one of four offices within the Office of Health Affairs, Dr. Jeff Runge, Assistant Secretary and Chief Medical Officer.

In an animal health emergency larger than a single agency could handle, Dr. Noah stated that his Office’s role is to coordinate response efforts among multiple agencies and provide briefings to the Secretary of Homeland Security and the President. Specifically, DHS would be responsible for inter-departmental support that goes to the lead agency, in this case, USDA. Dr. Clifford confirmed that USDA is the lead agency to respond to animal health emergencies. Dr. Diez added that DHS and USDA staff are meeting regularly to coordinate response efforts.

Dr. Noah has identified the Strategic Guidance Statement for FMD as a priority deliverable for this year. This will serve as an outline for a national operational plan. DHS will work closely with USDA to develop this guidance document with a goal of completion by October. USAHA invited
DHS and USDA to present the highlights of this plan at our 2008 October meeting.

USAHA would benefit from future Committee meetings jointly with DHS and USDA.

The Committee then met with Dr. John Clifford and Mr. Kevin Shea, Associate Administrator, APHIS, to discuss administrative level issues. The summary is outlined below.

Aquatic Health: Dr. Clifford participated in a committee with the Department of Interior and Department of Commerce to address the National Aquatic Animal Health Program (NAAHP), and garner input from industry. A plan has been developed and is awaiting approval. Discussions on the role of the NAHLN regarding aquaculture were held, with a survey being completed regarding the interest among laboratories. The involvement is still in early stages of discussion, but the idea of surveillance does tend to point to areas where disease is most likely to exist.

NAHLN funding is flat for FY 2008, though APHIS is requesting an increase for FY 2009.

Brucellosis: Questions still surround the Greater Yellowstone Area as leaders continue to press for action on brucellosis, though agreements for moving ahead still have concerns at the state level. APHIS will plan to meet with the governors to address these issues. In relation to the laboratory structure for testing, VS is in agreement with the USAHA resolution to restructure, though exact details have not been finalized. VS is interested in supporting an event at USAHA to celebrate the eradication in cattle in all 50 states.

National Centers for Animal Health: VS recognizes it is costly to operate the facility, however does not want to rely on staff cuts to continue.

Federal Rulemaking Process: USAHA expressed concern on the timeliness of the rulemaking process. APHIS is aware of the concern, and noted they must still abide by regulations of that process, particularly in light of many rules that face various levels of litigation. There was discussion of streamlining the process to promulgate rules that are not disease specific.

John Picanso joined by teleconference with John Clifford, Barb Martin and Beth Lautner to discuss the National Animal Health Laboratory Network (NAHLN) Information Technology (IT) and Laboratory Integration to National Surveillance Programs.

USDA-APHIS-VS has identified five priority IT issues: (1) VSPS module, (2) Select Agent Program Reporting Module (CDC requirement), AHSM module, Remedy System (centralized Helpdesk), NAIS module, and e-permit module. The cost for the 5 systems was projected at
$150 million, and will require several years to complete. NAHLN IT funding is not in the current priority list.

USDA-APHIS-VS historically funded IT from end-of-year resources, and is currently developing a more business-oriented IT project plan.

USDA-APHIS-VS has scheduled an IT forum for March 17-18, in Denver, Colorado, to gather National Assembly members’ input on improvements/needs for the national IT system.

A NAHLN IT review was recently completed. VS subject experts are currently reviewing findings.

The Committee concluded its meetings with, Dr. Aaron Scott, Director, National Surveillance Unit (NSU), presented goals, approaches and accomplishments of Veterinary Services’ National Surveillance Unit (NSU) in conception, planning and design of National Animal Health Surveillance Systems (NAHSS). These are broadly cooperative projects and programs, involving and relying on multiple units within VS, as well as outside collaborations with livestock industries and other stakeholders.

The NSU has been established in 2004, following recommendations of the National Animal Health Safeguarding Review. A NAHSS Strategic Plan and a Surveillance and Data Standards document were developed to guide the development of surveillance on a regional and national level. Since its inception, the NSU has had a major role in BSE surveillance planning and implementation, as well as analyses of data and modeling to estimate maximum prevalence of BSE in the national beef and dairy cattle herd. The NSU has also been instrumental in coordinating VS’s participation in national avian influenza surveillance activities, and most recently has studied and designed a program for viral hemorrhagic septicemia which is emerging in fish populations in the Great Lakes region of the United States. The NSU also is evaluating existing programs like brucellosis and scrapie surveillance, providing recommendations for changes to improve their efficacy.

The first national surveillance plan to be implemented and which was developed under NSU leadership is the classical swine fever (CSF) surveillance plan. This is the first foreign animal disease surveillance program to fully integrate the newly created National Animal Health Laboratory Network capabilities and capacities. A National Pseudorabies (PRV) Surveillance Plan, as well as a Vesicular Disease Surveillance Plan concept have been presented to and approved by the VS Management Team. Dr. Scott described that NAHSS is to move away from ‘stovepiping’ programs on a specific disease basis, and that, although plans up to now all have been developed for specific diseases, new plans are designed to take advantage and be integrated into prior plan activities. The new PRV plan thus is designed to take advantage of features of the implemented CSF plan, and the new vesicular disease surveillance plan is building on capacities of the previous plans, based on common epidemiologic characteristics (risk factors, introduction pathways) of...
the diseases and common/combined sampling designs. Integration of surveillance programs, at least on a species basis, is essential for increased efficiencies and efficacy of national animal health surveillance given resource limitations. To date integration of swine disease surveillance programs has progressed furthest and serves as a pilot for the development of integrated surveillance programs in other species.

Dr. Scott was asked to comment on the Surveillance Inventory (at www.aphis.usda.gov/vs/nahss/inventory.htm), a searchable database on all federal and many State surveillance activities, as well as on the quarterly produced web based report Outlook (at www.aphis.usda.gov/vs/ceah/ncahs/nsu/outlook/index.htm) which highlights selected VS surveillance activities. Dr. Myers suggested greater distribution of Outlook.

Following a question and some concern about communications shortcomings across VS units from President Leafstedt, Dr. Scott briefly commented on the application of HACCP principles in the development of surveillance, which, although not fully applicable, may provide some means of adding flexibility to surveillance development for various diseases on a State basis.

Funding and resource needs were the subject of follow-up discussions. The NSU, in its 3.5 years of operation, was stocked up from 6 to 21 staff members which clearly shows great commitment of VS management to surveillance (21 members when fully staffed, including student help; up to now not having exceeded 15 staff members). High priority requests (BSE, AI) frequently took priority over surveillance plan development activities. Vesicular disease surveillance for multiple species and diseases, but with greatest emphasis on first detection of Foot and Mouth disease, needs extensive further planning and development of surveillance during a potential FMD outbreak. Surveillance for FMD in particular is not only essential in the outbreak zone, but is also crucial to determine disease freedom in non-affected parts of the country and freedom from disease post outbreak. Such a plan will help determine resource and operational needs for the NAHLN among others. Outbreak and post-outbreak surveillance is essential to ensure continuity and/or restoration of business and its development of vesicular disease surveillance plans needs to gain higher priority. A notable development is the newly produced “Surveillance Toolbox,” designed to help responders plan surveillance during disease outbreaks (see Outlook, 2008 Quarter 1 issue). Drs. Lautner and Martin proposed to test the toolbox in upcoming avian influenza outbreak exercises.
Bob H. Bokma, MD; John L. Braly, CO; Timothy R. Cordes, MD; Linda A. Detwiler, NJ; Mark J. Engle, TN; J Amelita Facchiano, TX; William H. Fales, MO; Bob Frost, CA; Chester A. Gipson, MD; Mara Elma E. Gonzalez, SLV; Steven G. Hennager, IA; Robert B. Hillman, NY; Robert Hilsenroth, PA; Donald E. Hoenig, ME; Floyd P. Horn, MD; Oscar Kennedy, VA; Ralph C. Knowles, FL; Elizabeth A. Lautner, IA; Amy W. Mann, VA; Richard D. Mitchell, CT; Lee M. Myers, GA; Elizabeth J. Parker, DC; James E. Pearson, IA; Gerardo Quaassdorff, VT; Paul E. Rodgers, CO; Susan W. Tellez, TX; Lynn Anne Tesar, SD; Lee Ann Thomas, MD; Kerry Thompson, DC; Peter J. Timoney, KY; Charles D. Vail, CO; James A. Watson, MS; Gary M. Weber, MD; William C. Wilson, WY; David W. Winters, TX; Richard W. Winters, Jr., TX; Cindy B. Wolf, MN.

The Committee met on October 27, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina from 1:00 to 5:00 p.m. There were 10 members and 32 guests present.

The Committee meeting was opened by the Chair and the agenda was reviewed. The Committee reviewed Resolutions passed last year, along with the United States Department of Agriculture (USDA) Animal Plant Inspection Service (APHIS) Veterinary Services (VS) responses. Dr. Peter Merrill, Assistant Director Animal Imports answered Committee questions as to the status of USDA actions regarding each Resolution. In the case of each Resolution, except Resolution 65, USDA-APHIS-VS appears to have completed the actions promised or made significant progress in completing the actions promised. A letter from the Chair will be sent to Dr. John Clifford, requesting USDA-APHIS-VS to pursue a final rule on Resolution 65.

Activities of the National Center for Import and Export (NCIE): Live Animals and Germplasm was presented by Dr. Peter Merrill, Animal Imports, NCIE-VS-APHIS. The complete text of this presentation is included at the end to this report.

Activities and Responsibilities of NCIE Animal Products Section was presented by Tracye R. (Butler) Hernandez, NCIE-VS-APHIS. A summary of this presentation is included at the end of this report.

USDA-APHIS-VS Updates on Equine Issues was given by Dr. Peter Merrill for Dr. Ellen Buck. A summary presentation is included at the end of this report.
Canadian Food Inspection Agency (CFIA) Pending Actions Regarding the Import Requirements for Sheep and Goats was presented by Dr. Pierre LaFortune. He reported to the Committee on pending changes in import requirements of Canada for sheep and goats. A summary of this presentation is included at the end of this report.

Legislative Actions and Pending Legislative Actions and Impacts on Trade was given by Mr. Bobby Accord. He spoke to the Committee and discussed the pending legislation in Congress proposing to ban the importation of beef from Argentina and the recently passed legislation banning the harvesting of horses for food or the transport of horses for export for human consumption. The net effect of the pending legislation regarding beef from Argentina will be compromising the United States’ responsibilities to follow the Sanitary and Phytosanitary (SPS) rules for trade, override USDA-APHIS-VS technical competence and responsibilities and may start retaliatory actions from Argentina – all having negative effects on US import and export businesses. The net effect of the horse legislation will be to negatively affect the health and welfare of horses, as the horses that would have been used for human consumption will not be humanely disposed of and many will be abandoned. The Committee felt strongly that Congress should not adopt legislation or propose legislation regarding trade or animal care that does not have a strong grounding in science and a complete picture of the trade or of the animal welfare and care consequences. USDA’s technical expertise in these areas should be requested and thoroughly considered prior to legislative action.

Factors Affecting Import and Export of Livestock was given by Effingham Embree, Livestock Exporters Association. A summary of this presentation is included at the end of this report.

Bluetongue Situation in the European Union (EU) and Animal Movement Regulations was presented by Francisco Javier Reviriego Gorgejo, European Commission Health and Consumers Directorate-General. A summary presentation regarding the history, membership and how the EU functions in general and summary of the current and potential future EU intra-community trade regulations concerning animal movement within and between different bluetongue zones within the EU was given. This complete written presentation is included in the report of the Committee on Bluetongue and Related Orbiviruses.

The Committee had no resolutions presented by members or non-members to consider.
The National Center for Import and Export (NCIE) is focused on protecting American agriculture and gaining, expanding or retaining market access for animals and products of animal origin while providing customer service to stakeholders and the general public.

I. ANIMALS
   A. ANIMAL EXPORT
      1. Trade negotiations
         NCIE develops export protocols, participates in negotiations, and provides technical expertise in developing, retaining, and expanding export markets for United States (US) origin animals and germplasm. In FY 2008, NCIE opened over 39 commodity markets for animals in over 24 countries and advanced protocols for over 100 other different country/commodity combinations.
## IMPORT-EXPORT

### Table 1. NEW MARKETS (FY 2008)

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>COMODITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>turkey hatching eggs and one day poults</td>
</tr>
<tr>
<td>Brazil</td>
<td>horses, day-old chicks</td>
</tr>
<tr>
<td>Bolivia</td>
<td>bovine semen</td>
</tr>
<tr>
<td>Canada</td>
<td>cervids, cervid semen</td>
</tr>
<tr>
<td>Colombia</td>
<td>pet birds</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>sheep, goats, horses, horse semen</td>
</tr>
<tr>
<td>Ecuador</td>
<td>sheep, goats</td>
</tr>
<tr>
<td>Egypt</td>
<td>cattle</td>
</tr>
<tr>
<td>EU</td>
<td>Manilla clam seed, SPF eggs</td>
</tr>
<tr>
<td>Guatemala</td>
<td>awine</td>
</tr>
<tr>
<td>India</td>
<td>bovine semen</td>
</tr>
<tr>
<td>Iran</td>
<td>cattle</td>
</tr>
<tr>
<td>Japan</td>
<td>honeybees (Queen bees from HI), horses</td>
</tr>
<tr>
<td>Jordan</td>
<td>horses</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>cattle</td>
</tr>
<tr>
<td>Mexico</td>
<td>poultry, breeding cattle, equine semen</td>
</tr>
<tr>
<td>Mongolia</td>
<td>bovine semen</td>
</tr>
<tr>
<td>Morocco</td>
<td>breeding cattle, day-old poults</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>horse semen</td>
</tr>
<tr>
<td>Peru</td>
<td>hatching eggs/day-old guinea chicks, bovine embryos</td>
</tr>
<tr>
<td>Russia</td>
<td>cattle, swine, bovine embryos, horses</td>
</tr>
<tr>
<td>South Africa</td>
<td>day-old chicks</td>
</tr>
<tr>
<td>Turkey</td>
<td>hatching eggs</td>
</tr>
<tr>
<td>Uruguay</td>
<td>bovine semen</td>
</tr>
</tbody>
</table>
**REPORT OF THE COMMITTEE**

**Table 2. NEGOTIATIONS IN PROGRESS TO OPEN NEW MARKETS, RETAIN OLD, OR IMPROVE EXPORT CONDITIONS (FY 2008)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Animal Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>cattle, horses</td>
</tr>
<tr>
<td>Barbados</td>
<td>breeding cattle, sheep, goats, swine, horses</td>
</tr>
<tr>
<td>Bolivia</td>
<td>bovine semen</td>
</tr>
<tr>
<td>Chile</td>
<td>hatching eggs, day-old chicks, pullets, bovine semen, bovine embryos, swine, swine semen</td>
</tr>
<tr>
<td>China</td>
<td>rabbits, aquaculture, turtles, pets, mink/ferrets, swine, IVF bovine embryos, horses</td>
</tr>
<tr>
<td>Colombia</td>
<td>trout eggs</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>breeding cattle</td>
</tr>
<tr>
<td>Ecuador</td>
<td>poultry genetics</td>
</tr>
<tr>
<td>EU</td>
<td>swine, swine semen, day-old chicks, laying hens, finfish, mollusks</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</td>
</tr>
<tr>
<td>Indonesia</td>
<td>cattle, poultry</td>
</tr>
<tr>
<td>Israel</td>
<td>bovine embryos, cattle</td>
</tr>
<tr>
<td>Jamaica</td>
<td>swine</td>
</tr>
<tr>
<td>Japan</td>
<td>bovine semen, rodents</td>
</tr>
<tr>
<td>Korea</td>
<td>canine semen, cattle, equine semen</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>bovine semen, bovine embryos</td>
</tr>
<tr>
<td>Madagascar</td>
<td>swine, swine semen</td>
</tr>
<tr>
<td>Malaysia</td>
<td>cattle, poultry</td>
</tr>
<tr>
<td>Mexico</td>
<td>swine semen</td>
</tr>
<tr>
<td>Mongolia</td>
<td>bovine embryos</td>
</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>cattle, small ruminants</td>
</tr>
<tr>
<td>Pakistan</td>
<td>cattle</td>
</tr>
<tr>
<td>Peru</td>
<td>breeding cattle, bovine semen</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>Taiwan</td>
<td>primates, swine, swine semen, cattle, bovine embryos, horses/donkey, rabies status of HI, aquaculture, cervid semen, laboratory animals</td>
</tr>
<tr>
<td>Thailand</td>
<td>swine, swine semen, hatching eggs/day-old chicks, sheep/goats, bovine semen, bovine embryos, cattle, horses</td>
</tr>
<tr>
<td>Turkey</td>
<td>breeding bulls</td>
</tr>
<tr>
<td>Ukraine</td>
<td>horses, swine, cattle</td>
</tr>
</tbody>
</table>

2. **Additional Examples of NCIE Animal Export Activities in FY 2008**

In addition to negotiating export protocols, NCIE facilitated international trade by serving as the technical liaison between USDA and foreign governments. VS, NCIE was also serving on committees, attending meetings, participating in conference calls, preparing reports and
delivering briefings. NCIE negotiated the release of detained shipments and requested derogations from foreign requirements to facilitate trade in animals. NCIE staff officers support the VS field staff by providing and responding to questions from VS Regional and Area Offices.

In FY 2008, NCIE met with industry groups such as the Livestock Exporters Association and provided a speaker to the American Embryo Transfer Association annual meeting. In FY 2008, NCIE participated in: bilateral animal health technical negotiations with Thailand; bilateral meetings with Australia; the trilateral meeting with Mexico, Canada and the US; the Australia Standing Technical Working Group; attended the EU Animal Health Technical Working Group meetings and teleconferences and the US-EU Joint Management Committee meeting.

NCIE organized and led several foreign delegations on audits of the U.S. system of veterinary involvement with animal production. The EU sent a team to audit production of swine and swine semen. Chinese officials inspected bovine semen, swine semen and bovine embryo facilities. An Andean Mission visit involved BSE and the US cattle industry which was necessary to open the market for US cattle to the Andean countries. Chilean officials audited US primary poultry breeders. Staff members also met with a delegation from Korea and answered questions about APHIS structure.

NCIE continues to develop US trade in aquaculture. The U.S. now qualifies to ship Manila clam seed to the EU and NCIE is continuing to develop laboratory and surveillance systems for mollusk diseases and develop training workshops for VS aquaculture liaisons across the U.S. NCIE is also negotiating export of trout and salmon eggs to Chile and certain EU member countries. Negotiations are continuing with Russia and China for many types of aquatic animals. NCIE and the National Oceanic and Atmospheric Agency (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.

USDA has opened some markets and continues to work to open, foreign markets for cattle. US cattle export came to a standstill after bovine spongiform encephalopathy was reported in the US in December of 2003. In fiscal year 2008, USDA-APHIS opened cattle markets in Mexico, Russia, Egypt, Morocco and Kazakhstan. U.S. cattle are already moving into overseas markets and USDA-APHIS-VS is providing technical assistance to US exporters to assure that the required veterinary standards are met. This includes technical advice on the selection of cattle, pre-export isolation, interpretation of testing requirements and qualifications of the ocean-going vessels that carry the animals. 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. In spite of the US receiving a bovine spongiform encephalopathy (BSE) controlled risk status from the
World Organization for Animal Health (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 is emphasizing the importance of following the guidance of OIE.

Opportunities for trade in germplasm (primarily bovine semen, bovine embryos, porcine semen and equine semen) are also being developed around the world. Foreign countries raise an array of objections to accepting trade protocols based on: the disease status of the U.S. (e.g., BSE); inspection requirements; testing requirements (e.g., bluetongue); 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 requirements. Some countries are unresponsive to diplomatic inquiries others are simply obstreperous. NCIE continues to provide technical evidence and arguments for assuring animal health and collaborates with APHIS-International Services and USDA-Foreign Agricultural Services to address diplomatic and political issues. Trade in germplasm that is already established must be maintained by routine USDA-APHIS-VS inspection of semen collection centers and embryo transfer teams.

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, Malaysia, Indonesia 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. 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. Russia has authorized APHIS inspection of primary poultry breeding facilities and the particular details are being negotiated. Detailed (and lengthy) technical responses to questions on U.S. control and surveillance programs for AI and salmonella were provided to the EU.

NCIE has provided extensive information to the EU and hosted an audit on U.S. swine and swine semen health and production. Opening the EU for trade in swine would also facilitate trade in Eastern Europe by allowing swine to transit EU Member States. Difficulties in finalizing export protocols for swine semen often involve the type of tests needed to assure the health of the donors.

Horses are shipped around the world to new owners or in association with sporting events. The US advises foreign countries of our equine disease status and reports of outbreaks in FY 2008 have resulted in restrictions on equine movements and NCIE efforts to provide status reports and, eventually, lift the restrictions. For example, letters on the
status of contagious equine metritis (CEM) in the US had to be sent to Japan, India and Thailand and information was provided to Korea on CEM and West Nile Virus. Equine export to Australia was renegotiated and appropriate mitigation measures for horses in pre-export quarantine were developed along with an amendment to export requirements on equine influenza.

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 on testing requirements especially the validity of testing requirements for those particular species. New Zealand, for example, needed an abundance of information before accepting results from a presumptive diagnostic assay for anaplasmosis as false positives (as clarified by negative results on confirmatory testing).

USDA-APHIS-VS Area Offices review and endorse veterinary health certificates for the international movement of pets (primarily dogs, cats and birds). NCIE interprets the requirements of foreign countries and assists with procuring the safe disposition of animals that have been detained at a port of entry.

B. ANIMAL IMPORT

Among other activities, NCIE import staff participated in international meetings, developed import protocols, responded to requests for special projects, and developed policy for the movement of ruminants into the U.S. Mexico and the US meet three times each year to discuss trade requirements for tuberculosis, brucellosis, and tick-borne diseases. Technical representatives from Canada, the US, and Mexico also meet every six months to discuss current trade issues. In January 2008, Canada, Mexico and the US agreed to allow the transit of Canadian cattle through the US to Mexico under seal and if necessary stop in an approved VS Feed Water and Rest (FWR) stop facility. At the FWR stop the cattle would be unloaded for a minimum of 5 hours feed water and rest. The approved FWR facility’s accredited veterinarian will break the seals upon arrival at the facility, monitor the animals during the rest period, and reseal the shipment.

In April 2007, NCIE implemented an electronic permits system that has greatly facilitated the application and processing of import applications for live birds, poultry, and hatching eggs. Several thousand permits have been issued using this new system, with positive feedback from the public.

On November 19, 2007, the APHIS final rule, entitled Bovine spongiform encephalopathy; Minimal-risk Regions; Importation of Live Bovines and Products Derived from Bovines became effective. This rule provided the import conditions for all bovines, including those 30 months of age or older, and established the effective date of the Canadian ruminant-to-ruminant feed ban as March 1, 1999. The import requirements for sheep and goats were not changed.

APHIS is in the process of rule making to revise the regulations to establish science-based import requirements for sheep, goats, and
wild/exotic ruminants that coincide with the proposed VS comprehensive BSE rule and OIE country classifications. The proposed revisions would provide equal market access based on disease status while protecting US livestock from known risks associated with BSE or scrapie for sheep, goats, and wild/exotic ruminants. We will also propose to allow importation of genetic stock to support endangered species survival plans.

The first shipment of cattle from an approved privately owned ruminant import quarantine facility was released in August 2008 for entry into the US Title 9, Code of Federal Regulations (9 CFR), section 9.1, allows for the approval of privately owned ruminant quarantine facilities that may be capable of holding large numbers of animals. These facilities must satisfy the conditions that are necessary to ensure that adequate safeguards are in place, to monitor the health status of the ruminants in quarantine, and to prevent the transmission of animal disease or disease agents into, within, or from the minimum or medium security quarantine facility. A privately owned minimum security quarantine facility is used for the quarantine of ruminants that pose no significant risk, as determined by the Administrator, of introducing or transmitting to the U.S. livestock population any livestock disease that is biologically transmissible by vectors and provides the necessary level of quarantine services for the outdoor holding of ruminants, prior to the animals’ entry into the U.S. A privately owned medium security quarantine facility (medium security facility) is a facility that provides the necessary level of quarantine services for the holding of ruminants in an indoor, vector-proof environment prior to the animals’ entry into the United States.

Special ruminant project requests included development of conditions for import of oryx from Saudi Arabia, gerenuk semen from Kenya, bovine embryos and semen from Brazil, big horn sheep from Mexico, elk and wood bison from Elk Island National Park, Alberta, Canada, transgenic goats from Canada, and the import of wild ruminants from South Africa. NCIE is currently working with VS programs staff and Foreign Animal Disease Diagnostic Laboratory (FADDL) to develop import protocols to accommodate these types of requests.

NCIE is in the process of placing the current import protocols on the APHIS web site. Currently the import requirements for poultry, hatching eggs, pet birds, commercial birds, ratites, cattle from Canada, transit bovines from Canada to Mexico, fish, federalized eggs and gametes from spring viremia of carp (SVC) susceptible species, and equine import may be viewed on our web site. www.aphis.usda.gov/import_export/animals/animal_import/animal_imports.shtml.

Standard Operating Procedures (SOP’s) for the inspection of cattle for ticks at Mexican/U.S. ports have been revised and updated to achieve consistent results among different port personnel. The revised documents will provide guidelines to USDA-APHIS personnel when cattle is presented for inspection at the land border ports and found to be infested with ticks.

Revision of VS Notice 08-07: The Notice includes tuberculosis testing
IMPORT-EXPORT

requirements for cattle according to the Mexican State of origin, as well as the testing requirements for spayed, neutered and intact cattle. Other import requirements have been removed from VS Notice 08-07 and will be addressed in the Mexican Bovine Import Protocol for Feeding and Breeding Cattle, respectively.

On January 29, 2008, APHIS published a proposed rule to allow cattle infested with or exposed to cattle fever tick to move through the port of San Luis, Arizona, into the United States. Currently, these cattle must be imported through certain ports in Texas and New Mexico. A new facility for the handling of animals is to be constructed on the Mexican side of the border at the port of San Luis that will be equipped with facilities necessary for the proper chute inspection, dipping, and testing that are required for such cattle under the regulations. The comment period on the proposed rule closed March 31, 2008. Program officers have evaluated the comments, and the final rule is in the draft stage. We expect publication in spring 2009.

In response to the Contagious Equine Metritis (CEM) Program Review of April 2007, APHIS conducted a day long training session for State CEM coordinators in April 2008. The training included both lecture and laboratory segments. Training for laboratory personnel was offered at the National Veterinary Services Laboratory (NVSL) in July and August 2008. NCIE has also initiated a work plan for regulatory changes necessary in Title 9 of Code of Federal Regulations (CFR) Part 93.301.

The final rule on “Temporary Importation of Horses: Noncompetitive Entertainment Horses from Countries Affected with Contagious Equine Metritis” was published in June 2008 with an effective date of July 7, 2008.

The final rule on “Standards for Permanent, Privately Owned Horse Quarantine Facilities” has been drafted. Publication is anticipated during the first quarter of 2009.

For FY 2008 (Oct 1, 2007 through Sep 30, 2008), NCIE issued 1,870 electronic permits for fish regulated under USDA-APHIS-VS SVC import requirements. Approximately 14 million koi and goldfish were successfully imported from more than 20 countries. Few SVC outbreaks were reported internationally during that time period, and no incidents of SVC resulted in the U.S. from imported fish. APHIS is in the process of finalizing this rule.

NCIE also contributed to the development of an interim rule for fish susceptible to viral hemorrhagic septicemia (VHS), an important disease of many fish species worldwide, and which could cause devastating problems to farmed fish populations. A novel genotype of virus causing VHS has been detected in a number of outbreaks in the U.S. in wild fish located in the Great Lakes watershed. The new regulations (which are currently scheduled to be implemented on Nov. 10, 2008, and which replace the Federal Order that is currently in effect) establish testing and movement restrictions on 28 fish species imported from the Canadian provinces of Ontario and Quebec, and govern interstate movements of these fish as well.
REPORT OF THE COMMITTEE

As facilitated by APHIS, bilateral cooperation for infectious salmon anemia (ISA) issues continued between the US and Canada for Atlantic salmon movements between Maine and New Brunswick, Canada. No additional cases of ISA were reported during FY 08; Maine now meets OIE criteria to establish ISA disease freedom. NCIE is continuing to develop a proposed rule for ISA that will incorporate many of the previous and ongoing elements of oversight for this disease, based on extensive risk and environmental analyses.
The National Center for Import and Export (NCIE) continues to issue numerous import permits for animal products and animal by-products. For FY 2008 there were a total of 6830 permits issued. Of those, 983 were amendments, 2422 were new permits and 3425 were renewed permits. Animal products and by-products include the commonly recognized products such as blood, tissues and specimens of livestock, swine and birds as well as the not so recognized products, including nutraceutical gelatin capsules, chondroitin sulfate, breaded seafood that contains milk and/or eggs in the breading, antivenom produced in horses, Asian mooncakes, and pet food ingredients.

Import Animal Products
NCIE Import Animal Products staff works closely with Plant Protection and Quarantine (PPQ), Safeguarding Intervention and Trade Compliance (SITC) to authorize recalls on products containing animal origin ingredients that are found in the marketplace to have been imported in non-compliance. The Products Staff also works with PPQ, Veterinary Regulatory Support (VRS) to provide guidance to the Department of Homeland Security (DHS), Customs and Border Protection (CBP) regarding importation procedures of animal products and to facilitate resolution of import problems faced at ports of entry.

The Import Products staff is currently working to develop import protocols for the importation of: fetal bovine serum (FBS) from regions considered by USDA to be affected with foot-and-mouth disease (FMD), bovine blood from Canada, and spray dried bovine blood from Canada. The Import Products Staff is also working on regulations to harmonize with World Organization for Animal Health (OIE) the importation of bovine products regarding bovine spongiform encephalopathy.

In addition, the Import Products Staff is a major APHIS contributor in the DHS initiative to establish an Automated Commercial Environment (ACE) within the International Trade Data System (ITDS). APHIS is but one agency in the multiagency initiative. The ACE/ITDS initiative when fully implemented will provide a centralized on-line access point for communication and information related to cargo shipments. It will fully automate cargo processing capabilities across all modes of transportation and will replace existing systems with a single multimodal manifest system for land, air, rail and sea. The Import Products Staff facilitated the APHIS Deep Dive that identified multilevel requirements regarding import of animal products and provided this information to the developers for inclusion into ACE/ITDS.
REPORT OF THE COMMITTEE

Export Animal Products

NCIE Export Animal Products works to facilitate trade and open foreign markets to US animal products using science based approaches. As a result, markets have re-established that were lost or diminished due to bovine spongiform encephalopathy (BSE) and low pathogenic notifiable avian influenza (LPNAI). The Export Animal Products staff also provides technical support regarding export certification, training, and assistance to the field. The staff attends Industry meetings as well as approves exporting facilities in the US to ensure that they comply with the requirements set by its trading partners.
Equine Piroplasmosis in Florida

Only Canada has instituted any new entry requirements for U.S. horses. The following requirements apply to horses from Florida:

- an import permit issued by the Canadian Food Inspection Agency (CFIA)
- veterinary inspection in the U.S. within 15 days of export (previous requirement was 30 days)
- certification that horse has not been on a premises with serologic or clinical evidence of piroplasmosis within 60 days, nor has the disease occurred on any adjacent premises
- negative cELISA (or alternative acceptable to CFIA) within 15 days of export

For U.S. horses originating from States other than Florida, the health certificate must say that the horse has not been in Florida within the previous 21 days.

Equine Exports to Australia

Australia experienced an outbreak of equine influenza in 2007. The disease essentially shut down the movement of horses in Australia for some time, and cost the country millions of dollars to eradicate. The probable source of the outbreak was an imported horse, most likely from Japan. The disease was able to escape the quarantine center. Australia has instituted some very restrictive import requirements for all horses, including those from the US. USDA continues to negotiate to have these restrictions eased.

Some of the new requirements include:

- horses in pre export quarantine (PEQ) must be kept a minimum of 100 meters from horses that are not part of the quarantine (this is farther than previously required).
- a blood sample must be taken from each horse during PEQ. Half of this sample must be stored in the US in an approved lab. The importer must take the other half of the sample (no less than 2.5 ml of serum) to the Australian Animal Health Laboratory (AAHL). Both parts of the samples must be retained for at least three months.
- during PEQ each horse of the export consignment must have rectal temperatures measured and recorded twice daily. The records are to be made available to Australian Quarantine and Inspection Service (AQIS) on request.
- the Official Veterinarian must provide certification, in the form of a checklist, that health certificates and health records including measurement of rectal temperatures have been inspected.
The Canadian Food Inspection Agency (CFIA) wishes to inform the sheep and goat industries in the United States (U.S.) that the Agency intends to amend its requirements for the importation of female breeding sheep and goats imported into Canada from the U.S. that pertain to scrapie certification.

At the present time, Canada requires that the flock/herd of origin must be enrolled in either the export certified pathway or the complete monitored pathway (as long as the flock/herd is testing all on-farm deads) of the U.S. scrapie flock/herd certification program.

Canada intends to amend its import conditions to require that the flock/herd of origin:

- has been enrolled in the U.S. scrapie flock/herd certification program for a specified period of time,
- has been in compliance with the requirements of the export pathway or the complete monitored pathway plus testing of all on-farm deads, for a specified period of time.

For example: two years of enrollment in the flock/herd certification program, with at least 12 months of compliance with the export certified pathway requirements or 12 months of testing all on-farm deads on the complete monitored pathway.

It is expected that these new conditions for the importation of female breeding sheep and goats will come into effect in the fall of 2009.

For more information, contact:
Dr. Samira Belaissoui, Senior Staff Veterinarian, Import Programs, CFIA, Telephone: (613) 221-4005 Fax: (613) 2286630, E-mail: sainira.belaissoui@inspection.ac.ca
Dr. Penny Greenwood, Senior Staff Veterinarian, Animal Disease Control, CFIA, Telephone: (613) 221-4612 Fax: (613) 228-6144 E-mail: penny.greenwood@inspection.nc.ca
The Livestock Exporters Association (LEA) was founded in 1980 to give livestock exporters an organization that could speak for their common interest, and work to find solutions to problems of common concern. Our membership is now at an all time high with about 55 members from 23 States. Over the years many of our biggest concerns have been over issues related to health protocols. We have seen both the best and worst of times.

It would be hard to find a lower point than the discovery of the first case of bovine spongiform encephalopathy (BSE) in the US. Even though the BSE cow was an imported cow, almost all U.S. cattle exports came to a halt. Exporters were frustrated and vented that frustration regularly to the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), and Foreign Agriculture Service (FAS).

However time proved that USDA had taken the right path when the World Organization for Animal Health (OIE) granted Controlled Risk status to the US. The world markets started to open up, and there has been unprecedented demand for US cattle ever since. Recent developments indicate that the demand will hold up for some time in the future.

The weak US dollar helps when the buyer country’s currency in based on the Euro. It is not any particular benefit in countries with currency tied to the dollar. It has been a big benefit to buyers in the Middle East and Eastern Europe creating huge savings and incentives for buyers. Even a small move in the exchange rate, if in the right direction, could result in a huge savings for the buyer.

Finance is a major problem for exporters because of the inflated value of both cattle and shipping. A shipload of 2000 cattle could have a total value of $8 to 10 million, all of which has to be financed somehow until the animals are shipped and paid for. The risk can be too much for some exporters. The possibility of another disease outbreak that could cause a shipment to be cancelled after the great expense of contracting the ship, buying the cattle, testing and the assembly cost, is just too great for some exporters.

There has also been a shortage of ships, inadequate to satisfy demand. Some buyer and sellers found themselves in a situation where the sale was possible, but there was no way to get it to the destination. If too many projects come at the same time it causes a shipping crisis.

In order to find 2000 head of cattle for a shipment, you will have to have connections with the new super sized dairies in order to find enough cattle. The big dairies keep control of their heifer calves, and they contract them to growers to assure that they have enough cattle for their own needs. When milk prices and profits are high, and they are expanding, it
can be difficult to find enough cattle.

When oil was at its peak, the price of transportation was increasing at an unprecedented rate and shipping companies would not guarantee their rates for more than a few days. This made it very difficult to sell anything for future delivery.

Consolidation, concentration and integration are trends all over the world. Exporters realize that in many areas their customer base is decreasing. In Central America, where most of the grain is imported, it is particularly difficult for producers to remain profitable, and compete with imported meat, when grain prices are high. We know that they will only buy things when they are making money. In the long run, we have to be concerned about their long term survival.

The closing of the Indiantown, Florida quarantine has raised concerns, that in the event of a large cattle shipment to Latin America, there may not be adequate quarantine space to accommodate it. We have to assume that we are working with reasonable people both in government and industry, and that if that kind of need occurs in Florida or elsewhere, that a temporary facility might be approved.

User fees have always been a negative force related to exports. Inflation assures us that user fees will always increase and continue to contribute to the rising cost of animals, ultimately making it harder to sell U.S. livestock. User fees on exports are a bad policy.

In the short run, the outlook for livestock exports is great. Feed and fuel have come down in price. Heifers may be coming down in price and demand is up. New markets are opening and the interest in U.S. livestock exports of all species is stronger that it has been in many years.
REPORT OF THE COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS

Chair: Howard D. Lehmkuhl, Ames, IA
Vice Chair: James F. Evermann, Pullman, WA

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; Darla R. Ewalt, IA; Bob Frost, CA; Robert W. Fulton, OK; Jennifer L. Greiner, DC; Dale M. Grotelueschen, NE; Burke L. Healey, NC; Del E. Hensel, CO; David L. Hunter, MT; John C. Lawrence, ME; James W. Leafstedt, SD; Janet E. Maass, CO; Chuck E. Massengill, MO; Annette M. O’Connor, IA; Jeannine M. Rankin, MT; Julia F. Ridpath, IA; Les C. Stutzman, NY; R. Flint Taylor, NM; George A. Teagarden, KS; Susan W. Tellez, TX; Robert M. S. Temple, OH; Marsharee Wilcox, MD; Brad L. Williams, TX; William C. Wilson, WY.

The Committee met on October 6, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 1:00 to 5:00 pm. There were 15 members and 5 guests present. Members and guests were welcomed and the agenda, procedures and expectations outlined. Members were asked to provide names for a new Vice Chair.

In a summary of efforts supporting the development of bovine viral diarrhea virus (BVDV) control programs, Julia Ridpath, National Animal Disease Center (NADC), Agriculture Research Service (ARS), United States Department of Agriculture (USDA), reported that BVDV1b continues to be predominant subgenotype isolated from persistently infected (PI) cattle in the US. Regional control efforts in the upper Michigan Peninsula, Montana, Washington and Alabama are ongoing. Efforts are voluntary but producer costs are offset by various combinations of federal, state and commercial funding. The control effort focusing on the upper Michigan Peninsula is in its first year of a three year plan. Thus far, 130 herds (5668 animals) have been tested. The Montana program is in the second year of testing which has included 526 herds (173,473 animals). Similarly a two year effort in Alabama has resulted in the testing of 140 herds (12,000 animals). The testing of spring 2008 calves in Washington State involved 48 herds (7020 animals). In these studies the incidence of PI animals ranged from 0.50 to 0.14 percent of the animals tested and the incidence of herds including a PI animal ranged between 10 and 20 percent. Studies of BVDV infections in deer confirm development of persistent infection and transmission between cattle and deer. New tools for BVDV control include newly licensed commercial tests and new vaccines. The HoBi virus has been identified as a potential problem for BVDV control programs.
Dr. James Evermann detailed a study of the outcome of BVDV persistent and transient infection of alpaca crias. Based on these studies it appears that persistent infection of crias is a rare event that tends to occur in clusters. The PI crias studied were unthrifty and none survived to breeding age. It was not possible, based on repeated testing over a six month period, to determine the infection status of one cria in this study. Testing for BVDV infection in this animal was positive based on positive polymerase chain reaction (PCR) testing but negative based on virus isolation. Serum neutralization tests did not detect antibodies. There are no vaccines licensed for use in this species and their use would preclude the surveillance of alpaca populations by serology.

The objective of a study summarized by Dr. Clayton Kelling, University of Nebraska, was to determine the current prevalence of BVDV-infected alpaca herds in the United States by testing crias from a randomly selected sample of herds for BVDV neutralizing antibodies, BVDV ribonucleic acid (RNA) and BVDV. Sixty three breeders, representing 26 states, participated in the study by submitting blood samples from crias during a 14-month period extending from May 2006 to July 2007. Sixteen of the herds (25.4 percent) had crias with BVDV neutralizing antibody titers. PCR and virus isolation assays showed that one seropositive herd had a PI cria. Case studies revealed that three additional herds recently had PI crias. Infections in three of the four infected herds were linked based on genetic homologies of viruses. In addition to PI crias, ingestion of bovine colostrum provided at birth, as well as colostrum from dams previously exposed to BVDV in other herds was associated with seropositive herd status. Based on these findings the use of untested colostrums for supplemental feeding of neonates was discouraged. These findings confirm the importance of BVDV infections in US alpacas and the importance of determining the BVDV infection status of animals before they are commingled to limit exposure of herds to BVDV infection.

Dr. Robert W. Fulton, Oklahoma State University, reported that research priorities have been discussed for BVDV at each of the prior international symposiums for BVDV since 2002 in Ames, Iowa, 2004 in Davis, California and at the meeting held in conjunction with the National Cattleman’s Beef Association (NCBA) in January 2006. A set of research priorities was developed by a Committee composed of Dr. Julia Rhipdath, NADC-ARS- USDA, Dr. Fulton, and Dr. Mike Sanderson, Kansas State University. The Committee had its beginning with the NCBA BVD Research Subcommittee of the NCBA BVD Working Group. Initial research objectives were prepared and input was provided by the Academy of Veterinary Consultants BVDV Committee along with input from representatives from the American Association of Bovine Practitioners (AABP) BVDV Ad Hoc Committee. At the NCBA meeting in Reno, Nevada February 2008 an open forum was available to veterinarians and producers regarding the research objectives. After the input of the various groups the following objectives were developed and
submitted to the NCBA Health and Well-Being Committee. There are seven major objectives with subcategories for each major objective. For each objective there are issues.

Mr. John Lawrence, IDEXX Laboratories, Inc., presented information on Product Development, Licensing and Kit Quality Control Considerations providing BVDV Antigen ELISA-specific examples. Veterinary biologics companies must obtain USDA product licenses prior to marketing various products (i.e. ELISA kits). This presentation review USDA diagnostic kit licensing requirements along with company-specific development activities that support licensure. BVDV Antigen ELISA-specific examples were shown, including assay validation during product development, routine quality control and practical performance aspects.

Dr. Susan Taus, ARS-USDA, Washington State University, provided the Committee a malignant catarrhal fever research update. Sheep-associated malignant catarrhal fever (SA-MCF), a frequently fatal lymphoproliferative disease, continues to be a major concern of bison producers in North America. Ovine herpes virus 2 (OvHV-2), carried as a subclinical infection in sheep, is the causative virus of SA-MCF. No vaccine is available to protect against SA-MCF and separation of bison from sheep is the only available management tool to control the disease. Major objectives of the ARS-MCF research project includes defining host-virus interactions in sheep and developing immunological control strategies, including vaccination for MCF in clinically susceptible ruminants. A recent study in sheep indicates that OvHV-2 replicates primarily in lungs during initial infection and that this replication is promptly controlled by host defense mechanisms. In contrast, data from experimentally infected bison indicate that OvHV-2 replication occurs in all tissues of bison with SA-MCF. Current research is directed toward detailed characterization of immune control of OvHV-2 replication in sheep and bison and evaluation of the differences in the initial immune responses between the two species. This work will provide fundamental knowledge to be used in developing vaccine strategies to protect clinically susceptible hosts, particularly bison, from SA-MCF.

Ms. Susan W. Tellez, Camelid Alliance, presented an update on bluetongue virus (BTV) in Europe and the United States. European information has been gathered from personal contacts in France, Germany and Switzerland. Additional facts were presented in the Committee on Bluetongue and Related Orbiviruses meeting. All European countries plus the UK have animals susceptible to BTV infection. From 1998-2008, Serotypes 1, 2, 8, 12, and 16 have been identified. France and Germany have accrued annual case numbers from 12,000 – 21,500. The very newest strain to hit Europe was identified as BTV-6, with origin from Africa and/or Central America. Vaccination products from Merial and Intervet have been tested; Recommendations for cattle, sheep, goats and cameldids are two doses 21 days apart, with annual booster.
Europe’s first case in camelid was in 2007 in Germany documented by M. Heinrich. Suspect cases in France have not been documented at the present time. Recommended vaccination protocol is two doses, 21 days apart, with annual booster. The first camelid case of BTV in the US was identified in 2002 at Colorado State University with positive lung tissue and virus isolation. In the fall of 2007 numerous cases of severe respiratory distress were tested, without any documentation of positive BTV infection. Symptoms of other livestock diseases have been noted, but no positive identifications have been reported. Camelids are susceptible to BTV, West Nile virus, bovine viral diarrhea virus; therefore the importance of biosecurity is being stressed for owners of camelids co-mingling at shows or under transportation stresses.

Dr. Steve Olsen, NADC-ARS- USDA, presented an update on brucellosis research in cattle and bison. Brucellosis continues to be of concern in the Greater Yellowstone Area (GYA). Two cattle herds were infected with brucellosis, probably from wildlife reservoirs, within the last year. Elk remain the most likely source of transmission of brucellosis to livestock in the GYA. Research continues on the developing existing and new vaccines, and vaccine delivery systems for use in vaccination of wildlife. It is likely that species-specific vaccination strategies will need to be developed for the GYA.

Committee Business:

One Resolution was passed unanimously by the Committee and submitted to the Committee on Nominations and Resolutions. The Resolution addressed surveillance for bluetongue and epizootic hemorrhagic disease in the United States and Caribbean Region.
The Committee convened at 1:00 pm Monday, October 27, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina. The meeting adjourned at 6:15 pm. There were 29 members and 55 guests present. The meeting was Chaired by Peter Timoney 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 topical 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.

The opening presentation, a Time-Specific Paper entitled, Potential Threat of African Horse Sickness to the United States was given by William White, Foreign Animal Disease Diagnostic Laboratory (FADDL), Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS). The following areas were covered by the speaker in his presentation: the salient clinical features of the disease in different equid species; a historical perspective of major occurrences of African horsesickness (AHS) outside of the African continent; a summarized
REPORT OF THE COMMITTEE

account of current knowledge on the species of Culicoides responsible for the transmission of this disease with special reference to the potential vector competency and geographic distribution of particular Culicoides species, e.g. C. sonorensis, found in the United States, and an overview of the potential modes AHS could be introduced into the United States or Europe with possible strategies for mitigation of the risk of such an event. The full text of Dr. White’s paper is included in these proceedings.

Josie Traub-Dargatz, Colorado State University and Centers for Epidemiology and Animal Health (CEAH), VS-APHIS provided a final report on a project on equine herpesvirus myeloencephalopathy that was undertaken by the Center for Emerging Diseases (CED) at CEAH. The primary aim of the project was to identify what could be learned from past outbreaks of this disease that could improve our understanding of the circumstances under which it occurs and hopefully, formulate more effective strategies for handling future outbreaks of this and other equine infectious diseases. The report entitled Equine Herpesvirus Myeloencephalopathy: Mitigation Experiences, Lessons Learned, and Future Needs is a highly informative source of information on the subject. It provides a basis for future discussion by veterinary officials and those in the equine industry regarding prevention and control of this disease and the research that is needed to develop the best management practices for dealing with future occurrences including defining the regulatory framework needed to respond efficiently in such circumstances. The report contains a comprehensive description of research, education and other needs related to equine herpesvirus myeloencephalopathy. Special mention is made of the importance of establishing validation criteria for polymerase chain reaction (PCR) testing for the disease and of being able to differentiate neuropathogenic from non-neuropathogenic strains of equine herpesvirus 1. Previous occurrences of equine herpesvirus myeloencephalopathy highlight the lack of efficacy of current commercial vaccines in preventing the disease and the need to develop more effective immunogens if the industry is to be successful in significantly reducing the risk of such occurrence in the future. A copy of the full report is available at no cost from USDA-APHIS-VS-CEAH.

A second Time-Specific Paper entitled, Development of the Use of Tick-borne Transmission Models to Test the Efficacy of Imidocarb Diproprionate and Ponazuril in the Clearance of Babesia caballi and Babesia (Theileria) equi from Persistently Infected Horses was presented by Donald Knowles, Agricultural Research Service (ARS) and Washington State University. The basis for conducting this research was to minimize restrictions on the international movement of horses and furthermore, to prevent establishment of an area or areas of endemicity of B. caballi and/or B. equi in the US. Under the conditions of
a controlled study of a limited number of horses persistently infected with a field strain of *B. caballi*, a single course of treatment with imidocarb dipropionate used at maximum therapeutic dosage level, eliminated the infection from the treated animals. The test horses continue to be monitored many months after they went negative for evidence of persistent infection based on various parasite detection tests, antibody determination assays, and a failure to successfully infect *Dermacentor nitens* ticks fed upon them. The author urged caution in extrapolation from this finding to cases of natural *B. caballi* infection in horses which are infected with drug resistant strains of the parasite as a possible result of prior treatment with imidocarb dipropionate used at sub-optimal levels necessary to clear the infection. Also, the results of this study are very promising, the number of test animals involved was very limited. The parallel study on the possible efficacy of imidocarb dipropionate for eliminating persistent *B. equi* infection in horses is currently in progress at the USDA’s National Veterinary Services Laboratories (NVSL). Initial indications of drug efficacy do not appear promising. Dr. Knowles alluded to an additional study that is being carried out on the possible effectiveness of ponazuril (Marquis®, Bayer) for the treatment of *B. equi* infection in horses. In vitro studies with the drug reduced levels of *B. equi* in erythrocyte cultures but measurable parasite levels returned upon cessation of treatment. Results of the studies conducted to date confirm the need for further in-depth evaluation of these and other possible drugs with respect to their efficacy in eliminating persistent infection with either *B. caballi* in horses. The full text of this Time Specific Paper is included in these Proceedings.

Kent Fowler, California Department of Food and Agriculture (CDFA) and Chair of the Subcommittee on Equine Piroplasmosis, gave the Subcommittee Report. The Subcommittee was very active over the past year devoting itself to three major issues:

1. a seroprevalence survey of a representative sampling of horses throughout the US for evidence of *B. caballi* or *B. equi* infection.
2. promotion of the need for additional federal funding for research on finding therapeutic means of clearing persistent *B. caballi* and *B. equi* infection in the horse.
3. organized the Third conference of Equine Piroplasmosis which took place on October 24, 2008.

The seroprevalence survey is to be based on equine infectious anemia residual sera submitted by the National Animal Health Laboratory Network (NAHLN). Response to the request for samples exceeded expectations with over 43,000 samples submitted to NVSL for testing.

There is an urgent need to expand the piroplasmosis studies that have been conducted during the past year. Expansion of the studies will require the availability of additional funding.

Dr. Fowler overviewed the Third Conference for Experts on
REPORT OF THE COMMITTEE

Piroplasmosis program and highlighted the more significant issues that emerged, from current knowledge about equine piroplasmosis infection in the U.S., to a recommendation for establishment of a working group to evaluate the results of the national serosurveillance study, to discussion on a draft policy document on management of seropositive piroplasmosis infected horses. A report of the complete proceedings of the Third Conference for Experts on Equine Piroplasmosis will be available in the near future. The Subcommittee Report was approved by the committee and is included in these proceedings.

Peter Kirkland, Elizabeth MacArthur Agriculture Institute, Menangle, Australia, presented an overview of the widespread occurrence of equine influenza in New South Wales and Southeastern Queensland in 2007. The introduction of the disease into Australia for the first time resulted in extensive spread of the virus in the non-vaccinated, naïve population in the two affected states with transmission rates and clinical disease approaching 100 percent on many premises. The disease was more severe in horses kept in close contact. Virus spread was believed to occur by aerosol transmission and also by indirect contact with contaminated fomites. Equine influenza viral nucleic acid was detectable on nasal swabs prior to the onset of clinical signs in acutely infected animals. Diagnosis of the disease was accomplished using a real-time reverse transcriptase-polymerase chain reaction assay and a blocking EWSA. A commercial Canary pox vectored vaccine which was approved for use on a restricted basis, induced a rapid immune response and provided the ability to distinguish between naturally infected and vaccinated horses. Overall, vaccination together with stringent restrictions on animal movement proved to be effective in curtailing further spread of the disease and limiting it to the two states in which it was originally introduced. Based on very extensive field surveillance and laboratory testing, there has been no evidence of residual equine influenza infection in the domestic equid population in Australia since early 2008. The disease is therefore considered to have been eradicated.

Ellen Buck, National Import Center (NIC), VS-APHIS, provided updates on a range of issues of current concern to the horse industry. She confirmed that the Non-Competition Entertainment Horse Rule came into effect July 2008. Legal review of the permanent private quarantine proposed rule is proceeding quickly and guidelines are being developed to approve such premises. Preparations for the World Equestrian Games in 2010 which will be held in Lexington, Kentucky, are in an advanced stage with Northern Kentucky International Airport, Cincinnati, Ohio the site for post-entry holding and testing of the majority of horses approved for three-day quarantine. A plan has been developed on how equine piroplasmosis seropositive horses will be managed at the
Kentucky Horse Park, the site of the 2010 Games, as well as measures to mitigate the possible risk of transmission of either Babesia infection in the course of piroplasmosis seropositive horses competing in non-arena events. There has been continued progress in implementation of the recommendations provided in the 2007 Contagious Equine Metritis (CEM) Review Report. A training program was initiated in early 2008 dealing with aspects of the disease, how to sample the sites of persistence of the bacterium in the carrier mare and stallion, and how to submit such specimens for laboratory examination to optimize the chances of detection of the bacterium. A training program for laboratory personnel in states carrying out the diagnosis of this disease has also been implemented by NVSL. Efforts are also underway to address some of the other recommendations of the CEM Review Report. Dr. Buck overviewed the issue of the optimal time to hold horses on post-entry into the US during which they are serologically tested for equine infections, anemia, dourine, glanders and equine piroplasmosis. Following a meeting with representatives of the equine industry, the American Horse Council and the American Association of Equine Practitioners, and realizing the significant careens of the industry over keeping performance horses in confinement for three days, USDA came to the decision that 42 hours was the minimum period such horses must be held under federal control following post-entry into the US.

The final update provided was on the current status of the Proposed Rule for Equine Viral Arteritis. Dr. Timothy Cordes, VS-APHIS-USDA confirmed that the docket pertaining to the proposed rule had been finalized and that the latter should be published within the first half of 2009. The intent of the proposed rule is not to restrict the entry of carrier stallions or equine arteritis virus infective semen into the US, merely to identify virus positive animals and semen and share that information with the appropriate regulatory officials and the consignee of a particular shipment.

Dee Ellis, Texas Animal Health Commission and Subcommittee Chair on Equine Infectious Anemia (EIA) gave the Subcommittee Report. The primary focus of the Subcommittee’s activities in 2007 and 2008 was to assess the feasibility of promoting a change in the current National EIA Control Program with the ultimate goal or achieving eradication of this disease. The outcome of the Subcommittee’s deliberations over the past many months are summarized in a Resolution that was presented and approved with amendment by the Committee.

The main points proposed by the Subcommittee are:
1. request USDA-APHIS-VS to seek new money to fully fund an enhanced control program that eventually leads to disease eradication
2. focus funding of states with the highest seroprevalence of
REPORT OF THE COMMITTEE

infection
3. incorporate needed changes into the DFR
4. establish a National EIA Prevalence Working Group
5. refine the existing EIA laboratory reporting system
6. revise existing EIA diagnostic protocols

An overriding concern expressed by the Subcommittee Chair was the apparent lack of encouragement and support from the equine industry for a change in the status quo of the current National EIA Control Program. The Subcommittee Report was approved and is included in these proceedings.

Committee Business:

Following conclusion of the scientific program, the Committee went into the Business Session. Three resolutions on equine piroplasmosis and equine infectious anemia were considered, approved and forwarded to the Committee on Nominations and Resolutions for approval by the general membership. In addition, the Committee recommended that a letter be sent to USDA urging the finalization of the draft policy on handling of positive equine piroplasmosis horses. The Committee also recommended removal of the second option, which allows for the treatment and release from quarantine of positive horses.
The Subcommittee was formed March 2006 to better identify the risk of EP becoming an endemic disease within the U.S. Additional direction of the Subcommittee was based upon identified needs to estimate the prevalence of seropositive EP horses within the U.S. and to identify a more cohesive policy at both state and federal level for identification and disposition of EP seropositive imported horses. The Subcommittee has also strongly encouraged USDA to fund research to find an effective treatment for EP.

As a result of Subcommittee work and the preceding work of others, the following conclusions have been drawn:

1) The status of EP in the United States is in question. EP is classified as a foreign animal disease to the United States. Prior to February 1, 2004, the official test for piroplasmosis, on equidae presented for importation into the US, was the complement fixation (CF) test, a test that is known to occasionally yield false negative results. Unscrupulous owners, importers or agents compounded the problem by purposely treating EP infected horses with immunosuppressive medications to give rise to a false negative reaction in the CF test. The CF test was replaced by an upgraded c-ELISA test that was specified as the official test on August 22, 2005. The competitive enzyme linked immunsorbent assay (c-ELISA) is less likely to yield false negative results on adult horses. Because of the compromised reliability of the CF test to detect long-term carriers of B. caballi or B. equi. It is plausible that infection from either parasite exists at an undefined prevalence in horses that have been imported into the United States and perhaps in horses native to the United States.

2) Potential tick vectors exist, but the dynamics for transmission remain unclear. EP infected horses may exist in the US at a sufficient prevalence level to infect various competent resident tick vectors and potentially result in the establishment of endemicity of B. caballi or B. equi in the resident equine population in the United States.

3) Treatment is not yet a validated viable option. There is no conclusive evidence that treatment of a carrier of either or the two causal agents of EP (Babesia caballi and Babesia equi) is a viable option in successfully eliminating the carrier
state. Ongoing research by Dr. Don Knowles, ARS-USDA, and research at NVSL, has encouraging early results for successful treatment of *B. caballi*.

4) Validated research risk assessment is required. It is crucial to 1.) maintain stringent import restrictions that prevent the importation of seropositive horses into the United States, 2.) develop a cohesive and acceptable policy at both federal and state levels for identifying and dealing with resident EP seropositive horses, and 3.) request funding for research to devise effective treatment protocols for EP.

The Equine Piroplasmosis Subcommittee introduced two resolutions at the 2007 USAHA Annual Meeting. The two resolutions were approved:

**Resolution 19**

**REQUEST FOR SERUM FROM THE NATIONAL ANIMAL HEALTH LABORATORY NETWORK (NAHLN) FOR AN EQUINE PIROPLASMOSIS SEROLOGICAL SURVEY**

**Resolution:**

The United States Animal Health Association (USAHA) requests that NAHLN laboratories make available and submit residual banked equine serum samples to the National Veterinary Services Laboratory (NVSL) for testing by competitive enzyme linked immunosorbent assay (C-ELISA) for the presence of antibodies to equine piroplasmosis (EP). The absolute requirement is that all samples submitted for evaluation carry no identification (ID) whatsoever as to animal name/numerical ID, date of collection, premises of origin or the laboratory or state from which they originated.

USAHA also requests the United States Department of Agriculture (USDA) to determine what constitutes a representative number of samples from the above NAHLN submissions to provide meaningful estimates of the current prevalence of EP in the United States resident horse population or accept the previously statistically recommended number of 15,000 samples and use previously identified funding which was obtained through the slaughter surveillance initiative.

**Response:**

USDA-APHIS-Veterinary Services

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) recognizes the concerns of the United States Animal Health Association (USAHA) and appreciates the opportunity to respond. APHIS and the Agricultural Research Service (ARS) support this project and are in the process of planning the survey design, development, and implementation.
Resolution 20

SUBJECT MATTER: REQUEST FOR SERUM FROM THE NATIONAL ANIMAL HEALTH MONITORING SYSTEM (NAHMS) FOR AN EQUINE PIROPLASMOsis SEROLOGICAL SURVEY

The United States Animal Health Association (USAHA) requests that the Centers for Epidemiology and Animal Health (CEAH) provide residues of sera collected during the 1998 NAHMS survey to be tested by competitive enzyme linked immunosorbent assay (C-ELISA) for the presence of antibodies to Equine Piroplasmosis (EP). The sera would carry no identification (ID) whatsoever as to animal name/numerical ID, premises of origin or state from which they originated.

Response

USDA-APHIS-VS

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services recognizes the United States Animal Health Association’s concerns and appreciates the opportunity to respond. The decision was made by the EP Subcommittee to use the residual serum submitted to diagnostic laboratories (Resolution 19) as the basis of the survey rather than the 1998 NAHMS samples.

This past year four Subcommittee meetings took place via telephone conference call. The following decisions and discussions were a result of those meetings:

1) A decision to move forward with the possibility of testing the 1998 National Animal Health Monitoring System (NAHMS) Equine sera for the presence of antibodies to Babesia caballi and Babesia equi was delayed for several months as the request moved forward within USDA. In addition, only 8,000 equine NAHMS samples were collected in 1998, and testing serum gathered ten years previously would not have been very helpful to determine current national prevalence of EP. Therefore, it was decided to drop this survey proposal. In the meantime, plans to move ahead using National Animal Health Laboratory Network (NAHLN) laboratory Equine Infectious Anemia (EIA) banked sera samples were progressing nicely.

2) The response to date from the NAHLN laboratories to the EP survey project was tremendous. The participation of the laboratory was a critical element in constituting the critical mass for this very important survey. It was re-emphasized that all EIA residual sera samples that were submitted as part of this project shall remain unidentifiable as to source and remain strictly anonymous. Each participating laboratory was assigned a code number, and submitted samples were
REPORT OF THE COMMITTEE

not to be accompanied by any information whatsoever with respect to horse name or identification (ID), premises name, or name of state that would identify the source specimen. Sample shipping boxes were identified with the assigned unique laboratory code. This laboratory code will not appear in the data set comprising the survey results. This shall ensure that there is no link whatsoever between any laboratory and any positive test result. By design, this purposely blinds all participating laboratories from the study’s findings. Reporting of results will be at the national level and the prevalence estimate will have no links at a regional, state or laboratory level.

3) Center for Epidemiology and Animal Health (CEAH) developed a sample allocation plan for the EIA sera sent to NVSL. The plan allocated 17,000 samples with the expectation of completing 15,000 tests. The number of samples per laboratory will be proportional to the number of EIA tests performed by that laboratory. Samples will be selected at a specified interval for each laboratory. If a particular sample is untestable (eg, broken tube, hemolysis, etc.) then the next tube will be selected. The initial sampling timeframe proposed was October 2007 through April 2008. This was extended to June 2008.

4) Thirty-nine (39) NAHLN labs, in 35 states, were asked to participate in the EP national survey using EIA banked sera. CEAH assigned a unique code number to each laboratory to assist in assuring that no laboratory, state or region was identified with a positive sample. 35/39 laboratories submitted over 43,000 serum samples to NVSL.

5) Don Knowles agreed to direct the laboratory component of this project through collaboration with his laboratory and NVSL as follows:
   a. NVSL to receive samples and provide refrigerator space.
   b. NVSL to provide labor by utilizing additional wells in their routine testing process.
   c. Agricultural Research Service (ARS) (Pullman laboratory) to do Western Blot confirmatory testing on all c-ELISA positive NVSL samples.
   d. ARS (Pullman laboratory) to procure bulk-rate Veterinary Medical Research and Development (VMRD) kits.

6) Don Knowles estimated cELISA cost for 1 well per horse at $1.65. Therefore, with 15,000 horses the total cost would be $24,750 and then doubled to test for both B. equi and B. caballi.

7) Don Knowles offered for ARS to match APHIS funding for this project, which means $49,500 divided, or $24,750 per agency.

8) A working group would then be formed to develop recommendations for dealing with EP in the U.S. based on
their evaluation of the survey results.

9) A need for a Third Conference for Experts on EP was identified and discussed on Subcommittee conference calls. Initially, this conference was proposed for June 2008 in Riverdale, Maryland, but the inability to select a date for the majority of the Subcommittee dictated it be rescheduled in Greensboro, North Carolina to coordinate with participants' travel to USAHA. The Third Conference for Experts on Equine Piroplasmosis is scheduled for October 24, 2008, in Greensboro, North Carolina.

10) Appreciation was noted for the hard work and productive efforts of Dr. Tim Boone, California Department of Food and Agriculture (CDFA), as a member of the Equine Piroplasmosis Subcommittee. Dr. Boone, Equine Program Lead, retired this past year from CDFA after 24 years of service in the Animal Health Branch.

Upon majority consensus of the Subcommittee and industry interaction, the following resolutions for progressively dealing with the current status of EP in the United States are as follows:

1) Resolve that USAHA request USDA-APHIS-VS to form an EP Working Group to evaluate the results of the National EP Survey and to provide recommendations for distribution of those results. It is also requested that the EP Working Group provide Committee with the survey results.


3) That USAHA urge USDA-APHIS-VS to expand the funding for research to find an effective and safe treatment that eliminates the carrier state for *B. caballi* and *B. equi*.

4) That USAHA urge USDA-APHIS-VS to implement provisions in the 2007 Resolution 40 that requires all horses imported into, or returning to, the US be identified with radio frequency identification (RFID) microchips that comply with the International Organization for Standardization (ISO) 11784 and 11785 standards (134.2 kHz). Universal RFID readers should be present at all import centers and border stations to read both 125 and 134.2 kHz microchips.

Challenges of the Subcommittee includes gathering continued feedback from the equine industry and developing science-based recommendations for dealing with all existing and evolving issues pertaining to the impact of EP on the US. The vision of the Subcommittee should be to do what it takes to ensure that EP does not become endemic in the resident horse population of the US.
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON EQUINE INFECTIOUS ANEMIA

Dee Ellis, Chair
Texas Animal Health Commission

The focus of the equine infectious anemia (EIA) Subcommittee activities in 2007-2008 was to determine the feasibility and necessity of encouraging/facilitating change from a national EIA control program to an eradication program. The Subcommittee had a number of conference calls over the year. First to discuss the pros and cons of a national eradication program, then how to go about making it happen.

As the new Subcommittee Chair, I traveled to Kentucky in February to discuss EIA program issues with Dr.’s Issel, Timoney, and Cordes. I also visited with a number of other participants in the existing EIA program activities to be fully aware of the many concerns. I would like to thank the Gluck Center and the University of Kentucky for their hospitality.

Members of the Subcommittee initiated dialogue in a number of outside venues on this subject to garner input, including Regional USAHA meetings, the National Assembly of Animal Health Officials (NASAHO), and the National Institute of Animal Agriculture (NIAA).

The state veterinarians from the 4 at-risk states met in Dallas, Texas in August to discuss the viability of an eradication program. They agreed that they could support an eradication effort if properly funded and written.

The Subcommittee recommends that a resolution be approved that encourages and supports a national eradication program which includes the following necessary actions by the USDA-APHIS-VS:

- fully fund eradication efforts with new money
- focus the funding in a small number of at-risk states
- incorporate needed changes into the Code of Federal Regulations (CFR)
- create a national Prevalence EIA Working Group
- refine the existing EIA Lab reporting system
- revise the existing EIA diagnostic protocols

The most important unfinished business of the Subcommittee is to continue to support outreach efforts with stakeholders, and continue to garner support for a national eradication program from the many industry partners.

I would like to especially thank Amelita Facchiano for her help in supporting the group.
Introduction

African horse sickness virus (AHSV) and bluetongue virus (BTV) are both members of the genus Orbivirus of the family Reoviridae. Both cause serious, non-contagious but infectious, arthropod-borne diseases in equids and ruminants respectively. AHSV infects all equids, causing asymptomatic infection in zebra and African donkeys, but it causes the most lethal infectious disease of horses known, with mortality as high as 95 percent (1). BTV is thought to infect all known species of ruminant, however, severe disease usually occurs only in certain breeds of sheep, particularly the fine-wool and mutton breeds and some species of deer, most notably the North American white-tailed deer (2). Zebra are thought to be the reservoir host of AHSV and cattle of BTV. Both diseases are OIE listed diseases that disrupt international trade in live animals and animal products from countries or regions with enzootic or epizootic occurrence.

The distribution of both diseases is a reflection of the distribution of their infected arthropod vectors, which are certain species of Culicoides biting midges, the temperature required for viral replication in these vectors, and transmission by these vectors. AHSV is confined to Sub-Saharan Africa and possibly Yemen and the Arabian Peninsula, but it has made brief excursions into Spain and Portugal in the west and into India and Pakistan in the east (3). BTV occurs much more widely, traditionally stretching in a band around the world from latitude 40° N to 35° S (4), but in certain areas like western North America it may extend up to 50° N. Those midges that transmit AHSV also transmit BTV, and the reverse is likely true. Culicoides imicola is the major vector of AHSV and the major Old World vector of BTV. Culicoides imicola is an Afro-Asiatic species that extended its distribution into the Mediterranean Basin of Europe from North Africa and the Middle East, causing the emergence of BTV into parts of Europe never before affected and causing the largest bluetongue disease epizootic on record (5, 6, and 7) with over one million sheep deaths. The reasons for this unexpected change in BTV epidemiology are complex but involve recent geographic extension of the distribution of C. imicola, involvement of novel and locally residing Culicoides sp. vector(s), and on-going climate change (7). Culicoides imicola is now found as far north as France and Switzerland, and overlapping in distribution with...
local C. obsoletus and C. pulicaris which are able to transmit BTV and extend BTV further north.

In addition, BTV unexpectedly entered northern Europe in August of 2006, creating a rapidly spreading bluetongue epizootic in The Netherlands, Belgium, Germany, France and Luxembourg with over 2,000 cases (6, 8 and 9). Northern Europe was experiencing a very hot summer with daily average 6° C higher than normal (P. Mertens, personal communication). The virus overwintered by an unknown mechanism, although the 2006-2007 winter was the second mildest winter in northern Europe on record. The epizootic continued into 2007 causing 45,000 cases and expanding to include the United Kingdom (UK), Denmark, Switzerland and the Czech Republic. Models had predicted the disease by wind-borne vectors to jump the English Channel into the UK which occurred in September 2007 following the wettest May to July period in 250 years (10, 11). In September 2008 Sweden also reported its first BTV case. The outbreaks were caused by BTV serotype 8, which had never been identified in the European Union before, and the exact origin and route of introduction still remains unknown. No importation of semen or embryos occurred during the period of interest, and importation of possible infected ruminants could not be identified. In addition, BTV serotype 8 is absent from southern Europe, and significant geographical barriers exist (Alps and Pyrenees Mountain chains) to prevent wind-borne spread from the south.

Since discovered in the Cape Colony of South Africa in the early eighteenth century, South Africa has had major epizootics of AHS every 10 to 15 years on average. The cause of this pattern was uncertain until Baylis et al (12) found a very strong association between the timing of these epizootics and the warm (El Nino) phase of the El Nino/Southern Oscillation (ENSO). When the ENSO caused heavy rain followed by drought, as occurred in 42 ENSOs since 1803, no AHS outbreak occurred. However, when the reverse occurred as a subset ENSOs, i.e. drought was followed by heavy rain, 13 of 14 major epizootics occurred. It was suggested by the authors that drought causes congregation of zebra near remaining water holes leading to more contact and infection of vectors, which then disperse rapidly once rain provides more breeding sites. Culicoides populations can increase by over 200-fold in this scenario. Monitoring this pattern during ENSOs will help predict future AHS epizootics in South Africa.

Because of the recent dramatic change in epidemiologic status of BTV and its Culicoides sp. vectors in Europe, both the United States equine and ruminant industries have become concerned about their potential for entry into the U.S. Potential pathways for the entry of AHSV will be briefly described, as well as possible AHS disease scenarios in the U.S. if entry were successful.
The ultimate purpose of a pathways analysis is to provide information to decision makers about the feasible route(s) that a disease agent (e.g. AHSV) can use to enter a geographic region so that a surveillance plan can be developed for rapid detection of the organism (13). A pathways analysis may then lead to a qualitative or quantitative risk assessment that measures the likelihood of a disease outbreak occurring from an identified pathway(s) and the consequence of such an outbreak. The following discussion is meant to identify feasible routes for entry of AHSV into the US that could be evaluated during a formal pathways analysis for AHSV.

1. Importation of AHSV-infected animals

Federal regulations exist for the legal importation of domestic and wild equidae from countries the USDA-APHIS considers to be affected with AHS. Specifically, in the Code of Federal Regulations, Title 9, Part 93, paragraph 93.308a2:

Horses intended for importation from regions APHIS considers to be affected with African horse sickness may enter the United States only at the port of New York, and must be quarantined at the New York Animal Import Center (NYAIC) in Newburgh, New York, for at least 60 days. This restriction also applies to horses that have stopped in or transited a region considered affected with African horse sickness. APHIS considers the following regions to be affected with African horse sickness: Oman, Saudi Arabia, the Yemen Arab Republic, and all the regions on the continent of Africa except Morocco.

Further regulations are available on the USDA-APHIS-VS-NCIE website regarding the minimum 60 day quarantine for all equines originating in AHS-affected countries: http://www.aphis.usda.gov/import_export/animals/animal_import/equine/equine_import60day.shtml. Quarantine charges are currently $210 for day 1-3, $195 for day 4-7, and $166 for all remaining days.

Regarding equine traffic through the NYAIC during the last three years, only 16 horses and no zebra entered from AHS-affected countries. There were 15 horses in one shipment in 2006 and one horse in 2008 (K. Davis, NYAIC, personal communication). Zebras are not generally imported into the U.S. because of the expense and presence of successful breeding programs in the U.S. In contrast several thousand horses from non-affected countries were quarantined at NYAIC. There were about 3800 in FY 2007 and 2600 in FY 2008.

The incubation period of AHSV in horses is 5-7 days experimentally with a range of 2-10 days. Viremia in horses is 4-8 days and has not been detected beyond 21 days, while in donkeys and zebra viremia may last up to 28 days (1). The maximum infectivity period would therefore be 31 days in horses and 38 days in donkeys and zebras. Therefore, 60 day quarantine in a vector-proof stable ensures that no equidae will leave
REPORT OF THE COMMITTEE

while still infectious. The OIE infectivity period for AHS is 40 days (2007 OIE Terrestrial Animal Health Code, online) which also indicates that a 60 day quarantine is more than adequate.

Despite early reports, there is little evidence of antibody to AHSV in domestic or wild ruminants, except possibly camels (1). Antibody was detected by ELISA in white and black rhinoceroses and neutralizing antibody was detected in elephants in Kenya. Clinical disease has never been described in camels, rhinoceroses and elephants, and no information is available on possible viremia. They are unlikely to play a role in the epidemiology of AHS. Dogs eating infected horse meat develop a peracute, highly fatal pulmonary form of AHS, but they also are unlikely to play a role in transmission since Culicoides spp. do not readily feed on them.

It is possible that equine semen collected from a viremic donor could contain AHSV and expose a mare during breeding by artificial insemination or live cover. Semen, urine and all secretions may contain virus, and semen may also be contaminated by red blood cells with adhering virus. It is extremely unlikely an imported stallion would be viremic during mating in view of the 60 day quarantine.

2. Introduction of infected vectors

Wind-borne: Dispersion of Culicoides spp. over distances up to 700 km over water and 150 km over land (8) has been postulated. However, the shortest distance from Africa to the U.S. is 4830 km. Global wind speed is typically 6.64 m/s (14.9 miles/h) near (10 m [ft]) the ocean surface but faster (8.6 m/s [19.3 miles/h]) when at a higher (80 m [262 ft]) altitude (10). Thus it would require 6 to 8 days for wind leaving Africa to reach the continental United States. Because the maximum adult life span is 10 to 14 days, AHSV-infected midges are unlikely to survive being transported from Africa to the continental United States on wind currents, even those of a hurricane. To cover such long distances transport would need to be at high altitude (6,000 m), at which air temperature is far below 0°C, and Culicoides spp. would not survive (8).

Factors affecting the potential windborne spread of Culicoides spp. (9).

a. Distance. The successful transport of infected midges decreases with increasing distance.

b. Warm temperatures. Temperatures at 27-30°C are optimal for AHSV transmission in the laboratory, while temperatures below 15°C inhibit virus replication within the midge. As temperatures increase, midge infection rates increase and virogenesis quickens, but midge survival rates decrease. At cooler temperatures, AHSV within the Culicoides spp. vector becomes ‘latent’, but replication commences rapidly as temperatures warm. This may be a viral overwintering mechanism (3).

c. Light wind speeds around dusk and night when the midges are
most active. Wind speeds of greater than 3 m/sec reduce midge activity
d. Minimal/no precipitation. Midge activity is substantially reduced
during rain.
e. A steady wind from the origin to the U.S. Steady winds reduces
midge mortality.
f. Relative humidity (RH) of 75-85%. The midge can become
desiccated at low RH, and oversaturated at high levels.
g. Susceptible equidae at the end of the transit. The minimum size
of a zebra population to maintain an enzootic infection is unknown.

Plants: There are no references available describing Culicoides
spp. in cargo, including imported flowers or plants (8, 13). If present,
Culicoides would have to be infected adult females, since transovarial
transmission of AHSV has not been demonstrated. In addition,
Culicoides spp. associate much more closely with their mammalian hosts
than with plant species normally sold in the export trade.

Airplanes and Ships: When originating from an AHS-affected
country, they may theoretically contain infected Culicoides spp. Although
mosquitoes have been commonly documented, there are almost no data
recording the presence of Culicoides spp. on aircraft. Reye in 1964
(1) reported a probable spread of Culicoides spp. by aircraft from Fiji to
the Society Islands. For more comprehensive data on the mechanical
transport of insect vectors from Africa to the U.S., see Kasari 2008 (13).

3. Introduction of other infected materials
Contaminated biologicals, like equine serum and fetal equine serum,
should also be considered since they are used for growth of hybridomas
and cell cultures. For example, BTV was found in contaminated canine
vaccine leading to abortion and death in pregnant bitches (8, 15), and
epizootic hemorrhagic disease virus was found in contaminated bovine
serum imported into Germany (8, 16).

Outbreak Scenario in US
The U.S. has multiple components that would support at least a focal
outbreak of AHS:
1. horse population estimated to be 9.2 million, concentrated in
   Texas (1 million), California (700,000) and Florida (500,000) (17),
2. warm temperate climate in several southern and western states
   that would encourage viability of an introduced vector, and
3. highly competent laboratory vector for AHSV, Culicoides
sonorensis. This vector has a wide US distribution (absent
only from the northeastern states), and is the biological vector
for BTV. If a foreign midge vector was to successfully invade
C. sonorensis eco-niche and begin an AHSV epizootic, C.
sonorensis would soon become infected and the likely primary
vector.
REPORT OF THE COMMITTEE

The only component missing for establishment of enzootic areas in the US is the occurrence of zebra or another yet unknown reservoir host. However, the number of zebra needed to establish an area enzootic for AHS is unknown, and safari and hunting lodges with zebra do occur in Texas and other states. In addition, several enzootic countries in Africa do not have zebra. In these countries an unknown animal or “biological mechanism” must serve as the reservoir host and allow overwintering. In parts of Africa, it has been suggested the African donkey may be the reservoir host.

In contrast to the above, it is believed that the hunting and removing of zebras from most of South Africa has prevented the country from becoming enzootic (18). The only enzootic region in South Africa is in the northeast portion where continuous circulation of the virus occurs between C. imicola and herds of zebra in the Kruger National Park. Outbreaks occur each year in a southerly direction as climatic conditions become favorable for the infected midge to reach susceptible equine populations.

References


DEVELOPMENT AND USE OF TICK-BORNE TRANSMISSION MODELS TO TEST THE EFFICACY OF IMIDOCARB DIPROPIONATE AND PONAZURIL IN THE CLEARANCE OF BABESIA CABALLI AND BABESIA (THEILERIA) EQUI FROM PERSISTENTLY INFECTED HORSES

Don Knowles, Massaro Ueti, Nicolas Schwint, Guy Palmer, Lowell Kappmeyer, Nicki Wise and Glen Scoles
Animal Disease Research Unit, Agriculture Research Service, Washington State University

Equine piroplasmosis (babesiosis) caused by two distinct protozoan parasites presents significant challenges to the global veterinary profession. These challenges include protecting equine health while moderating the economic impact of restricted movement of infected horses within and between countries. Crucial to this effort is defining the ability of certain chemotherapeutics to clear persistently infected horses of these parasites and remove their transmission risk. Recent data have clearly established the tick-borne transmission risks of horses persistently infected with Babesia (Theileria) equi and Babesia caballi. Horses persistently infected with B. equi or B. caballi are efficient reservoirs for transmission by Rhipicephalus (Boophilus) microplus (13, 14) and D. nitens respectively (10). As previously reported B. caballi is transovarially transmitted, however without re-exposure of ticks to an infected horse, transmission is restricted to one generation in Dermacentor nitens (10). The experimental D. nitens transmission model was recently applied to testing the hypothesis that high dose imidocarb dipropionate treatment of horses persistently infected with B. caballi removes transmission risk. Collaborative efforts testing the efficacy of ponazuril in clearing persistent B. equi and/or B. caballi has been initiated.

Imidocarb is a carbanilide derivate usually administered as a dipropionate salt by intramuscular injection (1). A number of therapeutic protocols have been described in horses, however 2mg/kg administered in two doses at 24 hour interval is reported to be effective in eliminating B. caballi infection (5). For B. equi 4mg/kg administered for up to four doses at 72 hour interval is recommended, however the efficacy in eliminating B. equi infection in the horse is unclear. Previous reports (4, 5, 6, 7, & 12) indicated that imidocarb dipropionate cleared B. caballi but not B. equi. A recent study (2) reported that repeated high dose imidocarb dipropionate treatment did not eliminate Babesia caballi from naturally infected horses as determined by polymerase chain reaction (PCR)-reverse line blot hybridization. In this study five doses of imidocarb dipropionate (4.7 mg/kg, intramuscularly at 72 hour intervals) was tested. Further complicating interpretation of studies is the uncertain
treatment histories of horses. This is an important issue due to the possibility of the emergence of treatment resistant strains due to the use of drug dosages below levels necessary to provide parasite clearance. Also, due to an inherent lack of sensitivity in the complement fixation test (CFT), previous use of the CFT to determine efficacy of certain chemotherapeutics in the clearance of persistent infections with *B. equi* or *B. caballi* precludes definitive conclusions.

Due to these collective data and the importance of knowledge concerning the ability of chemotherapeutics, including imidocarb dipropionate to eliminate *B. caballi* from infected horses a research plan was developed. The first hypothesis tested was that imidocarb dipropionate at 4mg/kg given three times at seventy two hour interval would eliminate *B. caballi* infection. The elements of this plan include (1) the acquisition of a tick transmittable *B. caballi* isolate with a history unlikely of exposure to imidocarb dipropionate; (2) derivation of a tick colony from the field tick transmitting the acquired *B. caballi* isolate; (3) use of currently validated competitive enzyme linked immunsorbent assay (cELISA) to measure equine anti-*B. caballi* responses; (4) experimental establishment of horses persistently infected with *B. caballi*, and (5) testing the ability of imidocarb dipropionate to eliminate *B. caballi* infection by tick transmission and needle transfer of whole blood. The derivation and characterization of the *Dermacentor nitens* tick colony and associated *B. caballi* isolated was recently reported (10). The outcome of a recent experiment (11) testing the above hypothesis and using listed criteria will be reported.

Through collaboration with colleagues at the National Veterinary Services Laboratory (NVSL), Ames, Iowa the efficacy of imidocarb dipropionate in the elimination of *B. equi* is being tested. Additionally collaborations have been established to test the efficacy of ponazuril for efficacy in anti-*B. equi* activity. Ponazuril is currently used to treat equine protozoal myeloencephalitis (EPM) and has been shown to have efficacy in vitro against the apicomplexans *Neospora caninum*, *Sarcocystis neurona* and *Toxoplasma gondii* (8, 9). The use of ponazuril within the oral paste preparation referred to as Marquis (Bayer) showed an ability to reduce *B. equi* levels in vitro, however upon cessation of treatment, measurable parasite levels returned. The dosage of ponazuril necessary to eliminate *B. equi* from erythrocyte cultures is currently being determined and these data will be used to test ponazuril in horses persistently infected with *B. equi*. Similarly to the experimental protocol used for testing imidocarb dipropionate in elimination of *B. caballi*, the ability of ponazuril to eliminate *B. equi* infection will be tested using the established *B. equi* transmission model using *Rhipicephalus (Boophilus) microplus* (13,14).
References:


intrastadial tick-borne transmission of the apicomplexan parasite *Babesia equi*. Infect. Immun. 76:3525-3529.

REPORT OF THE COMMITTEE ON INTERNATIONAL STANDARDS

Chair: Richard D. Willer, Kahului, HI
Vice Chair: Norman G. Willis, Ottawa, ONT

Joan M. Arnoldi, WI; Corrie C. Brown, GA; 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; 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. Salman, CO; Larry A. Schuler, ND; Peter J. Timoney, KY; Alfonso Torres, NY; Jesse L. Vollmer, ND; Stephen E. Weber, CO; Rob S. Williams, DC.

The Committee met on Monday, October 27, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina from 1:00 to 6:00 p.m. The meeting, Chaired by Acting Chair Norman G. Willis and assisted by Michael David, was attended by 14 Committee members and 27 guests. Following a welcome and opening remarks by the Acting Chair, he briefly reviewed the topics of last year's Committee meeting.

Dr. Michael David, National Center for Import and Export (NCIE), Sanitary International Standards Team, Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture (USDA) gave an overview of the World Organization for Animal Health’s (OIE) 76th Annual General Session held during May 2008 in Paris, France. The main activities of the OIE have been focused on updating the Code Chapters on avian influenza, Newcastle disease, bovine spongiform encephalopathy, various equine disease chapters, the animal welfare guidelines for transport and slaughter of livestock and poultry, and various chapters of the Aquatic Animal Health Standards. Several new collaborating centers were approved, including one in the United States, and several new reference laboratories were also approved. The US continues to actively participate with the activities of the OIE and engages pertinent stakeholders to participate in these activities. A complete report of the OIE’s activities is included in these proceedings at the end of this Committee Report.

Dr. Beverly Schmitt, Diagnostic Virology Laboratory, National Veterinary Services Laboratories (NVSL), VS-APHIS and vice-president of the OIE’s Biological Laboratory Standards Commission, provided a summary of activities by the Laboratory Commission. The Laboratory Commission 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. The Laboratory Commission is now also getting involved in the approval of twinning projects which aim to improve the laboratory expertise in developing countries with respect to specific diseases. While the OIE supports increased networking between laboratories in different countries, the sharing and transfer of isolates between such laboratories is a challenge in some countries.

The Acting Chair, Dr. Norman Willis, offered several topics from the 76th OIE General Session that were of particular interest to the Committee. These topics were presented to stimulate attention and discussion within the Committee as potential influencing factors to be aware of. The topics included the debate on the definition of animal welfare, a re-introduction of the concept of zoning and compartmentalization and their growing importance, and the implications of the increasing use of private standards in international trade.

Dr. Sharon McGladdery, Aquatic Animal Health Division (AAHD), Canadian Food Inspection Agency (CFIA), Ottawa, Canada, gave an overview on aquatic global issues facing the OIE’s Aquatic Animal Health Standards Commission. McGladdery first presented a historical perspective of how the Aquatic Commission came into being and how this Commission has evolved into its present structure. She then described some of the challenges and opportunities facing OIE member countries and the OIE Aquatic Commission. A short summary of this presentation is included in these proceedings at the end of this Committee Report.

Dr. T.J. Myers, National Animal Health Programs and Policy, USDA-APHIS-VS, presented an overview on VS’ activities for implementing zoning and its planned activities for implementing the concept of compartmentalization. Some discussion ensued over the acceptance of the OIE’s country status recognition for a given the disease and the need for conducting our own risk assessments. There was also some discussion over the interpretation of what makes up a compartment and the impact of its implementation on a country’s veterinary services. A summary of his presentation is included in these proceedings at the end of this Committee Report.

Dr. Cyril Gay, Office of National Programs, Agricultural Research Service (ARS), USDA, provided an update on the Global FMD Research Alliance (GFRA) efforts. The basic mission of GFRA is to establish and sustain global research partnerships to generate scientific knowledge and to discover the tools to successfully prevent, control and eradicate FMD. A summary of the future goals and direction of GFRA is included in these proceedings at the end of this Committee Report.

Dr. Mo Salman, College of Veterinary Medicine and Biomedical Science, Colorado State University, presented a paper on the
effectiveness of detecting and controlling highly infectious diseases in the global arena by training selected individuals in disease investigation and basic veterinary epidemiology. Highly pathogenic avian influenza H5N1 Asia strain was used as the model disease in several high risk countries. The complete text of Salman’s presentation is included in these proceedings at the end of this Committee Report.

Dr. Paul Kitching, Director of the Animal Health Laboratory, Ministry of Agriculture and Lands, British Columbia, Canada, updated the Committee on the North American Animal Health Laboratory Network collaborative effort. The integration of animal production systems across North America requires that the diagnostic laboratories supporting the movement of live animals between the United States, Mexico and Canada develop harmonized testing procedures, thereby avoiding border delays or other disputes which can result from discrepant test results. The initiative to harmonize the protocols used by testing laboratories involved in certifying exports and national surveillance programs has been supported by the three governments and encouraged by United States Animal Health Association (USAHA). Currently the focus has been on harmonizing tests for vesicular diseases, avian influenza and tuberculosis, with workshops being held in the participating national laboratories and the sharing of proficiency panels. Additional tests will be included in the future, reliant on 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.

Dr. Alfonso Torres, Associate Dean for Public Policy, College of Veterinary Medicine, Cornell University, summarized the objectives and resulting recommendations of the American Association of Veterinary Medical Colleges’ (AAMVC) workshop that was held at the OIE offices in Paris, France in April of 2008. This summary is included in these proceedings at the end of this Committee Report.

Dr. Michael Chaddock, Deputy Director of the AAVMC presented its work on the Global Initiatives in Veterinary Education (GIVE). Chaddock explained that the AAMVC’s GIVE program is designed to complement veterinary education in developing countries and promote long-term, mutually beneficial relationships between the AAVMC institutions and companion colleges. The program helps foreign veterinary schools with curricular materials, journal subscriptions, distant learning modules, short courses, and faculty and student exchanges. Costs are covered by seeking funding from corporations, foundations, national and international organizations, and individual donors. Finally, Chaddock talked about AAMVC’s work to begin to address what veterinary medical
education will look like in 30 or 40 years from today, how societal needs will be met, and what the international implications may be. AAVMC is looking for one member of the Committee to assist them with this initiative. The Chair of the Committee agreed to send a request to its members to determine interest in participating in the AAVMC initiative.

Robert Frost, Western Institute of Food Safety and Security, School of Veterinary Medicine, University of California-Davis attended the October 13, 2008 meeting of the XXI Pan-American Congress 16th Annual Meeting of the National Confederation of Animal Health, Guadalajard, Mexico. Mr. Frost reported to the congress on the veterinarian's role in animal and public health. The text of his presentation is included in these proceedings at the end of this report.
REPORT OF THE COMMITTEE

The World Organization for Animal Health (OIE)
Summary of the 76th Annual General Session

Michael J. David
National Center for Import and Export
APHIS-Veterinary Services

Introduction
The 76th General Session of the World Organization for Animal Health (OIE) took place in Paris, France, from May 25-30, 2008. Approximately 600 participants, representing 172 member countries and territories, as well as observers from more than 20 regional and international organizations, attended the 76th Annual General Session of the International Committee of the OIE. The OIE has been recognized by the World Trade Organization (WTO) 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.

Technical Items
The technical items presented at this year’s General Session were:

- Technical Item I: Participation of small farmers in animal health programs; and
- Technical Item II: Implications of private standards in the international trade of animals and animal products.

World Animal Health Situation
The OIE Animal Health Information Department provided a summary of the animal health situation worldwide relative to about 100 animal diseases. The new Web-based system for disease notification — the World Animal Health Information System (WAHIS) — has greatly facilitated the reporting of animal disease events. All OIE animal health information is now available through the OIE database commonly known as World Animal Health Information Database (WAHID).

Reports of the Specialist Commissions:
A. Scientific Commission (SC). The SC met three times during the year and reviewed, updated, or drafted over 15 chapters and appendices, reviewed country disease submission reports, addressed other issues, and established a network of blue tongue reference laboratories. Some of the SC’s specific activities and work addressed the following:
   a. Buffer Zone – The President of the Administrative Commission has requested that the Presidents of the Code Commission and the Scientific Commission work
to develop a feasible definition for buffer zones, in particular with respect to the Foot and Mouth Disease (FMD) Code chapter.

b. **Atypical Bovine Spongiform Encephalopathy (BSE)** – An ad hoc group on atypical transmissible spongiform encephalopathies (TSEs) concluded that the current science on atypical BSE was not enough to change the current Code Chapter on BSE.

c. **Atypical Scrapie** – The ad hoc group on atypical TSEs also concluded that the available science on atypical scrapie was not sufficient to justify standards specific to atypical scrapie.

d. **Surveillance** – In addition to developing a generic handbook on surveillance, the SC will, as needed, draft disease specific surveillance chapters for placement into the Code, such as those that already exist for BSE, FMD, and classical swine fever.

e. **Conference on FMD** – The SC will coordinate a world conference on FMD in 2009 in Paraguay.

f. **Epidemiological Modeling** – With assistance from experts at the Collaborating Center for Risk Analysis and Animal Disease Surveillance in Fort Collins, Colorado, the SC will develop guidelines on epidemiological modeling.

g. **Non-Structural Protein (NSP) Tests** – The SC will continue its work on the performance and interpretation of NSP tests.

h. **Dossier Guidelines** – The SC will develop a guideline to provide countries with a standard process on how dossiers should be submitted for OIE evaluation.

i. **Evaluation of Country Submissions for FMD, Rinderpest, Contagious Bovine Pleuropneumonia (CBPP), and/or BSE Status** – Through its various ad hoc groups, the SC reviewed country dossiers for status classification for FMD, rinderpest, CBPP and BSE.

B. **Terrestrial Animal Health Standards Commission (Code Commission).** Several Code chapters and appendices were adopted during the session. These chapters were sent to the delegates on two separate occasions during the course of the year for review and comment.

a. **Proposed Chapters and Appendices** – The following proposed chapters and appendices were adopted with either no discussion or minimal discussion and modification:

   i. General Obligations (Chapter 1.2.1);
   
   Certification procedures (Chapter 1.2.2);
Guidelines for import risk analysis (Chapter 1.3.2); Animal health measures applicable before and at departure (Chapter 1.4.1); Border ports and quarantine stations in the importing country (Chapter 1.4.3); Evaluation of the veterinary services (Chapters 1.3.3 and 1.3.4); Guidelines on compartmentalization (Appendix 3.x.x); Rabies (Chapter 2.2.5); Guidelines on FMD surveillance (Appendix 3.8.7); FMD virus inactivation procedures (Appendix 3.6.2); Rinderpest (Chapter 2.2.12); Contagious Caprine Pleuropneumonia (Chapter 2.4.6); Guidelines on bluetongue surveillance (Appendix 3.8.10); Prescribed and alternative diagnostic tests for OIE listed diseases (Appendix 3.1.1); Guidelines on surveillance for BSE (Appendix 3.5.4); Factors to consider when conducting the BSE risk assessment (Appendix 3.8.5); Equine influenza (Chapter 2.5.5); Equine rhinopneumonitis (Chapter 2.5.7); Equine viral arteritis (Chapter 2.5.10); African horse sickness (AHS) (Chapter 2.5.14); Guidelines on AHS surveillance (Appendix 3.8.x.2); African swine fever (Chapter 2.6.6); Classical swine fever surveillance (Appendix 3.8.8); Rabies (Chapter 2.2.5); Guidelines on the inactivation of the AI virus (Appendix 3.6.5); Guidelines on surveillance for avian influenza (AI) (Appendix 3.8.9); Guidelines on surveillance for Newcastle disease (Appendix 3.8.x); Aethina tumida (small hide beetle) infestation of bees (Chapter 2.9.x); International transfer and laboratory containment of animal pathogens (Chapter 1.4.5); Zoning and Compartmentalization (Chapter 1.3.5).

b. **Foot and Mouth Disease (Chapter 2.2.10)** – There was much discussion on the revised definition of buffer zone and its impact on the FMD chapter and country status recognition.

c. **Classical Swine Fever (Chapter 2.6.7)** – Following a request by the European Union (EU), the proposed changes to the chapter were not adopted. Instead, the chapter will remain as it currently exists in the 2007 edition of the Code.

d. **Bovine Spongiform Encephalopathy (Chapter 2.3.13)** – Several modifications to the chapter that helped clarify some text was adopted; however, the proposal
to relax the requirements on gelatin production were rejected. Opposition came primarily from the EU, Japan, Singapore, and Argentina. Without any scientific justification, these countries maintain that there is a risk of BSE transmission when gelatin is made from skulls and vertebrae sourced from countries having controlled or undetermined risk status.

e. **Avian Influenza (Chapter 2.7.12)** – A few changes and clarifications were made to the Code chapter on avian influenza (AI)

f. **Bovine Tuberculosis (Chapter 2.3.3)** – Although the modified chapter was approved, the United States, Australia, and New Zealand asked the president of the Code Commission to place the newly introduced Article 2.3.3.2 bis “under study” to allow sufficient time to properly review this text and to provide comments.

g. **Newcastle Disease (Chapter 2.7.13)** – This chapter was modified to more clearly reflect the fact that only virulent Newcastle disease (ND) in poultry, as defined in the chapter, is required to be reported, and that restrictions should be based only if virulent ND virus is present in poultry.

h. **Guidelines for Somatic Nuclear Cell Transfer in Livestock and Horses (Appendix 3.x.x)** – This is a new appendix, which was adopted with no modifications.

i. **Categorization of Diseases and Pathogenic Agents (Appendix 3.5.5)** – This appendix was updated to reflect the scientific findings of the International Embryo Transfer Society.

j. **Notification Criteria for Listing Diseases (Chapter 2.1.1)** – The list of reportable diseases was updated by removing malignant catarrhal fever (MCF) (wildebeest form) from the OIE list. MCF was removed because it is a disease that does not meet the criteria required for listing. This updated list becomes effective January 1, 2009.

k. **Role of Veterinary Services in Food Safety** – This is a paper that will be formatted into an appendix of the Code.

l. **Animal Welfare** – No new specific guidelines for animal welfare were adopted. However, the definition of animal welfare was revised. This definition introduces a certain amount of subjectivity to the term, which has prompted the United States, as well as several other member countries, to send in comments to the OIE asking that it be revised. In addition to the definition of animal welfare,
REPORT OF THE COMMITTEE

the OIE will also be producing a discussion paper that will address guidelines on housing and husbandry of terrestrial animals. This document should be available by November or December of 2008.

C. Aquatic Animal Health Standards Commission (AAHSC).
The Commission met twice during the year to address the following items:

a. Disease Chapters in the Aquatic Code – In addition to a number of generic or editorial changes proposed to existing Code chapters, the President mentioned several substantive changes. These included changes to Article 3 (Commodities) in each relevant Code chapter, by which chemically preserved products (e.g., smoked, salted, pickled, marinated, etc.) would be removed as safe commodities until additional scientific evidence can support that designation. The AAHSC also decided to remove references to mollusk larvae as safe commodities from all relevant Code chapters.

b. Changes to the Code chapters for *Gyrodactylus salaris*, infectious myonecrosis (IMN), white tail disease (WTD), and *Mikrocytos mackini* were proposed for adoption.

c. The president mentioned that an OIE Handbook for Aquatic Animal Health Surveillance, which will expand on the guidelines for surveillance in the Code, is in preparation and expected to be published in 2009. The AAHSC will review specific surveillance recommendations for selected aquatic animal diseases at its next meeting in October 2008.

d. The Guidelines for Control of Aquatic Animal Health Hazards in Aquatic Animal Feeds were proposed for adoption in the Aquatic Code, as was the Introduction to the Guidelines for the Welfare of Farmed Fish, which had received numerous Member suggestions for revisions.

e. The OIE plans to continue to develop additional standards for aquatic animal welfare over time, taking into account the substantially differing views of many Member countries regarding welfare. Revisions to the Code chapter on farmed fish transportation will be considered at a later date.

Regional Commission Meeting of the Americas

During the preceding year, several countries in the Americas Region hosted meetings and seminars, including a communications seminar in Buenos Aires, Argentina, a WAHIS training workshop in Panama City, Panama, a cost-benefit workshop in Trinidad and Tobago, and
an indemnity/compensation workshop in Buenos Aires, Argentina. Argentina will host a conference on Animal Identification and Traceability that is scheduled for March of 2009. In addition, the Regional Commission, with the assistance and coordination of the Regional Representative for the Americas, has organized and held several of its committee meetings on avian health, aquatic health and veterinary biologics. The next full general conference of the Regional Commission for the Americas will be held in Havana, Cuba during the week of November 17, 2008.

**US Activities**

The United States continues to actively engage the various pertinent industries, associations, State and Federal agencies and other stakeholders to involve them in the process of providing input into the various Code chapters which the OIE distributes for comment. The United States also continues to abide by its obligations of reporting disease events according to the OIE criteria for notification. The OIE Reference Laboratories and Collaborating Centers located in the United States continue to organize conferences and seminars on veterinary capacity building, epidemiology, and other methodologies. Experts from these collaborating centers provided assistance, led, organized or attended meetings and training programs on compensation (indemnity strategies), epidemiologic modeling, risk assessment methodologies, and veterinary biologic programs. In addition, the centers provided experts who went on official visits to assess the foot-and-mouth situation in South America, and hosted scientists from various countries for training in risk analysis, surveillance, and information systems.

**Next Meeting of the International Committee**

The dates for the 77th General Session of the OIE are May 24-29, 2009.
Aquatic animal health has been managed at an academic or local government level since the turn of the century. In the last 25-30 years, however, increased aquaculture diversity, intensification of production, and globalization of aquatic animal and seafood trade, has been related to the spread of several serious infectious diseases. This has raised international awareness of the need for health certification standards to help prevent further spread of such diseases. In the 1990’s uncontrolled spread of shrimp and fish diseases through many developing countries, with serious concomitant economic impacts, further reinforced the need for more effective international standards. The OIE, acknowledging disparity between Member Country’s attention to aquatics vs. terrestrial animals, asked countries to identify their national focal points for aquatic animal health, whether within or outside the Veterinary Authority. The OIE Director General also asked members to encourage greater feedback on Aquatic Animal Health Standards and tasked the Aquatic Animal Health Standards Commission (one of four specialist commissions, formerly the Fish Disease Commission) to revise the Aquatic Code and Manual of Diagnostic Tests for Aquatic Animals to align them more closely with the Code and Tests for OIE Listed Terrestrial Diseases. As a result, many countries are now revising their national infrastructure to ensure legislative, regulation and policies are in place to meet these increasingly stringent aquatics standards. The Food and Agriculture Organization (FAO) of the United Nations has also recognized the need to help developing countries build their capacities to meet these new standards. This sets the stage for a steep learning curve for many developed and developing countries infrastructures, which have traditionally focused animal health measures on terrestrial farm animals or wild fishery disease trend analyses. However, this history should provide a solid foundation for rapidly ascending the curve.
The growing interest in international agricultural trade has expanded the role of the Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) in ensuring that new trade opportunities are created while continuing to safeguard the Nation’s animal health. APHIS recognizes that there are gradations in the degree of disease risk presented by imported animals and animal products. When VS establishes regulations and policies, we consider science-based international standards and wherever possible use the World Organization for Animal Health’s (OIE) guidelines when negotiating protocols for importing or exporting animals and animal products. APHIS encourages its trading partners to follow the OIE science-based guidelines.

Regionalization, or zoning, is one of several VS activities that benefit trade while safeguarding animal health. Under the World Trade Organization’s (WTO) Sanitary and Phytosanitary Agreement and the North American Free Trade Agreement, Member countries must apply the concept of regionalization. Regionalization must be science based, and may include either a qualitative or quantitative risk assessment/analysis.

APHIS defines a region as any geographic land region identifiable by geological, political, or surveyed land boundaries, including national entities (country), part of a national entity (State, zone, county, municipality, etc.); parts of several national entities combined into an area; and a group of national entities combined into a single area.

Regionalization applies to the United States in three ways.

1. We evaluate the status of foreign regions for diseases such as foreign animal diseases, freedom from specific parasites, and for program diseases such as tuberculosis (TB).

2. We recognize zones in the United States with regard to program diseases, such as for TB. If a State formally requests its territory to be regionalized (e.g., split State status for TB), we will conduct risk assessments and site visits for zones within that State as we would for regions or zones within another country.

3. Other countries can designate regions or zones of the United States as free or affected with respect to a particular disease rather than designating the entire United States as affected for that disease.

Within VS, the National Center for Import and Export (NCIE) is responsible for responding to countries’ requests to recognize a zone as free of a given disease. Eleven factors, which are outlined in the
REPORT OF THE COMMITTEE

regulations (title 9 of the Code of Federal Regulations (9 CFR), section 92.2), are considered in the assessment of risk. The risk assessment is presented in the format recommended by the OIE. The analysis identifies risks and analyzes the effects of mitigation measures. The risk analysis provides the basis for rulemaking. Once the risk assessment is completed, VS provides recommendations to management based on the individual situation.

For example, recently, Surrey County in the United Kingdom had outbreaks of foot-and-mouth disease (FMD). In August 2007, APHIS placed restrictions on the importation of certain products from the United Kingdom derived from FMD-susceptible species. After evaluating the situation and finding that FMD is not known to exist outside Surrey County, APHIS localized the restrictions to just that county.

In another example, Namibia is considered free of FMD except for the region north of the Veterinary Cordon Fence. Namibia can export ruminants and ruminant products to the United States. However, the importation of these animals and products from the region north of the Veterinary Cordon Fence is prohibited.

How other countries responded to the diagnosis of high pathogenicity avian influenza in Texas in 2004 is an example of a domestic application of regionalization. With the exception of China, our biggest export markets for poultry either limited their ban to Texas from the very beginning or reduced their ban to Texas after initially banning the entire United States.

While regionalization has been in place for more than 10 years, compartmentalization is a relatively new concept in animal health management that has not yet been implemented either in the United States or internationally. The OIE recently added compartmentalization to its international standards on zoning and regionalization. Compartmentalization is offered as an option for countries not opting to pursue country or even zone freedom for a particular disease.

OIE defines compartment as: one or more establishments under a common biosecurity management system containing an animal subpopulation with a distinct health status with respect to a specific disease or specific diseases for which required surveillance, control and biosecurity measures have been applied for the purpose of international trade. Compartmentalization allows for animal populations of different health status (that is, compartments) to be defined on the basis of biosecurity measures ensured by management practices.

The compartment contains specific establishment or establishments under a common biosecurity management system. This status is maintained through a partnership between the relevant enterprise or industry and the veterinary services of the exporting country. By contrast, zoning or regionalization is defined on a geographical basis.

In both compartments and zones, the concepts are similar. The difference lies in who is responsible for applying biosecurity measures.
For zones, the official sector is responsible, and for compartments, the private sector is responsible. For both, oversight and certification will be needed by the official national veterinary services.

VS sees potential benefits to this approach. We are in the early stages of developing regulations to propose a framework and establish requirements for recognizing compartments that will be compatible with international standards.
Summary:
The effectiveness of detection and control of highly contagious animal diseases is based on a solid understanding and implemented by people who are well trained. The implementation of specific detection methods and tools requires training and application in natural as well as field conditions. This presentation will focus on the design and implementation of training in disease investigation and basic veterinary epidemiology in selected countries using the highly pathogenic avian influenza (HPAI) H5N1 Asia strain as a disease detection model. Indonesia, Egypt, Nigeria, Turkey, and Vietnam were identified as either a priority country, or a country at risk for infection where an opportunity exists. In each of these countries, a training program on epidemiological concepts, field investigation and detection of HPAI cases was conducted. The presentation highlighted the impact of these training sessions and has already been observed in its effectiveness. Animal health officers who have gone through these sessions have already been engaged in several of the activities that were presented.

Background
HPAI H5N1 Asia strain is a growing problem in the animal industries of the world with the added threat to human health in the case of a human adapted strain, which can cause a pandemic. Worldwide, countries are preparing and implementing response plans. The United States Department of Agriculture (USDA) is engaged in the delivery of technical capacity to various countries. During 2006-2008, several training and workshop sessions were conducted in various countries with technical and financial support of USDA: Foreign Agricultural Service (FAS) and USDA: Animal and Plant Health Inspection Service (APHIS). These sessions were convened in the following: Bangkok for countries of Asia; Vienna for the countries of Eastern Europe, the Middle East and countries of the former Soviet Union; Cairo for the countries of North and East Africa; and in Dakar for the countries of West Africa and Southern Africa. Two sessions for selected participants were held in Fort Collins, Colorado, with emphasis on the national surveillance system and implementation of a comprehensive national plan for the detection of HPAI, emergency planning, geographic information system (GIS)/global positioning system (GPS), and incident command system (ICS) application to HPAI. The criteria for selection were based on
INTERNATIONAL STANDARDS

greatest need, greatest number of human cases, lack of veterinarian infrastructure, and additional criteria. In each of these countries, a training program on epidemiological concepts, field investigation and detection of avian influenza (AI) cases were conducted. Cambodia was not covered during last year due to lack of funding and time allotment.

Purpose and Goals

An in-country network of veterinary epidemiologists in the official sector is a critical piece of infrastructure needed to combat HPAI. This is, however, only a complement, not a substitute, for a national network of well-trained veterinary epidemiologists across all sectors of animal health including not only the official sector but the private and academic sectors as well. It is critical that these affected countries identify and cultivate a broad cadre of epidemiologists that can participate in the development of national HPAI plans and strategies necessary for their implementation. Country-level sessions are necessary to reach a critical mass with a common experience.

The in-country training workshop was intended to prepare field personnel, not all of whom may be epidemiologists or even veterinarians. The knowledge of veterinary epidemiologic principles is fundamental in the field implementation of surveillance, control, and eradication activities. We addressed the training to a group of 30-50 field disease investigators in Indonesia, Egypt, Albania, Vietnam, Turkey, Nigeria, and Cambodia. They all had been prepared by a common, articulated program in veterinary epidemiology utilizing as much as possible the specific requirements for each of these countries.

Participants for these sessions were selected from the country’s national and provincial/district-level epidemiologists, or personnel who function in the capacity of HPAI prevention, control and eradication activities. Priority was given to those individuals identified as outstanding by their supervisors. Participants were selected from government, academia or the private industry. The purpose of these national-level veterinary epidemiology training sessions was to foment the further development of skills and the network among epidemiologists across the whole of these countries and across all sectors. Veterinary epidemiologists need to be prepared at all levels (district, regional, and national) to practice and implement plans in both national and provincial/district-levels. The anticipated outcome for the national training sessions was the standardization of epidemiological methodology, and to initiate and promote a measure of sustainability of the training within the priority countries. Colorado State University (CSU) has conceptualized, drafted, and prepared local and USDA headquarter personnel within the context of the workshops to engage in productive follow up activities in subsequent years.

The training sessions were designed around three principal goals in pursuit of these aims:
REPORT OF THE COMMITTEE

1. To demonstrate to animal health staff the role of international regulations and veterinary epidemiology in national animal health programs and protection of human and animal populations from diseases. The current global avian influenza situation presented and used as a prototype to illustrate the value of the approach of standardized international regulations and veterinarian epidemiology.

2. To prepare animal health government and private officers and veterinarians in conducting animal disease investigation, including the collection of samples, recruiting records and data that are relevant to the disease under investigation, examining potential sources of introduction of the disease, and using the appropriate preventive and control measures.

3. To prepare selected animal health officers to design and implement a national, comprehensive, surveillance system that will be recognized internationally and be able to control the spread of HPAI. This aim was accomplished after conducting the national training workshop and the selection of the appropriate participants to take part in the workshops at Fort Collins, Colorado.

Methods

USDA has partnered with CSU to prepare a critical mass of field-level veterinarians and animal health technicians in these selected countries due to the extraordinary crisis in these countries related to the spread of HPAI outbreaks in poultry and the number of human cases. While not creating epidemiologists, the workshops were structured to provide participants with a general understanding of epidemiologic principles, useful information systems, investigations, data collection, and biosecurity on farms during investigations, simple analytical techniques, and biologic sample packaging and transportation. These workshops were conducted in the prospective countries and were two weeks in duration, consisting of a week of didactic preparation followed by a week of tabletop and field simulations. These training sessions were conducted with simultaneous translation in the official language. The objective was to reach a critical mass of official sector employees, academics and private sector workers which were prepared to implement the national plan and strategy for HPAI prevention, control and eradication activities. Included in each of these sessions were 40-50 participants.

Outcomes

There were nine training sessions conducted in various locations in Indonesia, one in each of the following countries: Vietnam, Turkey, Nigeria, Egypt, and Albania. Two sessions were held in Fort Collins, Colorado; one in Spanish for selected animal health authorities from
Spanish-speaking countries and the other was in English for other countries. Representatives from 68 countries participated in these two sessions in Fort Collins, Colorado. Two training sessions will be held in Cambodia before the end of November 2008.

An international professional network has been established including the majority of the participants in these sessions. Participants in Nigeria’s session has established a list server within the country that was used as a disease reporting system. Sixteen field projects with application of the concepts addressed during the training sessions are currently executed in Indonesian. In addition there are similar projects in Albania, two projects in Nigeria, and one project in Egypt that are also being conducted at this time.

It is concluded that this type of training has improved the detection and control of highly contagious animal diseases mainly through improving the field infrastructure and presenting few practical tools for disease detection and control strategies.
REPORT OF THE COMMITTEE

Global Foot-and-Mouth Disease Research Alliance (GFRA): Future Goals and Direction

Cyril G. Gay*, Luis Rodriguez
Agriculture Research Service, United States Department of Agriculture

Martyn Jeggo
Commonwealth Scientific and Industrial Research, Australia

Soren Alexandersen, Paul Kitching
National Centre for Foreign Animal Diseases, Canada

Bryan Charleston, David Paton, Jef Hammond
Institute for Animal Health, United Kingdom

Kristian Møller, Thomas Krogh Nielsen
National Veterinary Institute of the Technical University of Denmark, Denmark

Introduction

A group of international animal health scientists met on Plum Island May 2008 to define the purpose and goals of the Global Foot-and-Mouth Disease Research Alliance (GFRA). The group agreed that the purpose of the 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 foot-and-mouth disease (FMD). The group also agreed that the following five strategic goals should drive the work of the 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.

Discussion

There are currently no research laboratories with the necessary critical mass and support structures to achieve the GFRA strategic goals. It is therefore imperative that laboratories worldwide with active FMD research programs work together to reach the critical mass needed to achieve the GFRA goals. Critical will be to establish research programs that will meet the needs of countries that are endemic for FMD and that are the most affected by the devastating economic impact of this disease. The current members of the GFRA have therefore agreed to the following action plan: 1) identify partnership opportunities and promote funding of collaborative research projects; 2) expand and coordinate the alliance; 3) promote mechanisms and bring together...
INTERNATIONAL STANDARDS

the necessary experts to do gap analysis and set research priorities; 4) organize and manage GFRA and related meetings including issues of sponsorship; and 5) seek funding for GFRA coordination activities.

Next Steps

The GFRA will continue to build the alliance by adding new GFRA members and reaching out to partners and stakeholders worldwide. The GFRA will hold at least one general meeting annually in seek input from stakeholders and report on progress. The GFRA will hold scientific meetings to establish research collaborations, develop research plans, and advance FMD research programs to meet its strategic goals and objectives.
REPORT OF THE COMMITTEE

American Association Veterinary Medical Colleges (AAMVC)
Workshop on Globalization of Veterinary Medicine
and International Trade

Alfonso Torres
Cornell University

World Organization for Animal Health (OIE), Paris, France,
April 2-4, 2008.

Workshop Objectives:

• To increase the awareness of the North American Deans of Colleges/Schools of Veterinary Medicine on the structure, functions and responsibilities of the OIE and its relation to the World Trade Organization (WTO), the Food and Agriculture Organization (FAO) and the World Health Organization (WHO), and their relationship in promoting animal health, public health, and international trade.

• To increase the awareness of the Deans on the roles and responsibilities of the North American Chief Veterinary Officers, and to enhance their understanding of the structure and functions of the Veterinary Authorities and their relation to veterinary academic institutions.

• To provide a forum for the evaluation of the AAVMC Foresight Report in the context of the future of veterinary education in support of international animal health activities.

• To increase the awareness of the OIE and other international animal health organizations on the challenges facing the veterinary education system in North America.

• To improve the dialogue between North American Deans, the chief veterinary officer (CVOs) and the OIE in the development of closer relationships in aligning veterinary curricula with today’s societal demands.

• To explore future collaborations and interactions between the OIE and the AAVMC member institutions.

• To support the principle of an OIE global conference of veterinary deans from the five continents. (To be held in October 2009 in Paris)

Workshop Recommendations:

• AAVMC should establish a clearing house of international opportunities with APHIS, OIE, FAO, WHO, and multinational corporations (e.g., Pfizer, Cargill, McDonalds), for students and
INTERNATIONAL STANDARDS

faculty for summer employment, sabbaticals, externships, study/research projects, to conduct disease surveillance, etc.

- AAVMC should facilitate getting faculty at member institutions onto the OIE list of experts, for future consideration in ad hoc groups.

- AAVMC should invite the current US, Canadian, and Mexican Chief Veterinary Officers to present and discuss shared interests at the AAVMC annual meeting.

- AAVMC member Colleges of Veterinary Medicine should designate a faculty member to serve as point of contact and champion of national and global regulatory veterinary medicine.

- AAVMC should encourage leadership and faculty of its member institutions to join the United States Animal Health Association (USAHA).

- AAVMC should encourage its member institutions to participate in Pan American Health Organization (PAHO) regional meetings, centers, and laboratories.

- AAVMC should encourage its member institutions to work with the OIE in exploring twinning opportunities between AAVMC member institution diagnostic laboratories and laboratories in developing countries.

- AAVMC should collaborate with APHIS and Cornell University to expand the Smith Kilborne Foreign Animal Disease Program.
Citizens as well as federal, state and local governments, and academic institutions in the North American countries, demand a safe, wholesome and plentiful food supply that is reasonably priced. However, because of the increasing vigilance of the North American consumer, all entities involved in the food supply chain are driven to explore safer, yet less expensive food production and distribution methodologies. While profit continues to be a major driver of business operations, that must now be balanced against the increasing intolerance of consumers to food safety failures and with the resulting partial or total damage to those businesses and industries.

Veterinarians play a key role in public health as a result of their responsibilities in ensuring the health of animals and the feed they consume. Animal population dynamics, population health, pathogen reservoirs and pathways of disease transmission are some of the emerging veterinary challenges. Veterinarians of the twenty-first century are now the health stewards for companion and pet animals, domestic livestock and poultry, wildlife, exotic animals and ranched wildlife along with a growing number of aquatic species.

The animal food and feed chain present a continuous challenge of controversy, from genetic selection at the farm to consumer selection at the plate. In addition to the influence of social factors, there are laws, trade practices, and consumption patterns that affect how veterinarians manage global animal populations. Today’s veterinarians rely more heavily on research and technology to make informed decisions with greater emphasis on enhancing safety of the end product. To safety must be added the quality component further defined by origin, natural, organic, locally produced, family farm and animal friendly practices that make up the informed choice of consumers.

Animal disease in the major segments of the meat industry – beef, pork, dairy and poultry - are augmented with responsibilities of companion animals and recreation or public display animals. All animal groups including wildlife are reservoirs for the 65 percent of human diseases that are zoonotic, or transmissible from animals to man.
has positioned veterinarians as first line responders for many human health issues, and the activities of veterinarians have become critical for ensuring a safe global food supply.

Disease and welfare issues, and the trade restrictions that result when either one becomes a problem become global challenges. Added to that is the accelerated response times to incidents, especially when dealing with affected animals, and the speed of disease spread, the importance of veterinarians because quickly evident. While veterinarians may be considered the front-line defense against animal health problems, the animal disease laboratory plays a critical support role by providing diagnostic services for this front-line practitioner.

Harmonization of the laboratory systems in the North American countries is important to provide a united front against transboundary diseases. Timely response to emergency disease incidents depends on the support provided by the animal disease laboratories, and thus our ability in North America to harmonize the animal health laboratory systems in Canada, Mexico and the United States will result in safer production of food products and economic stability.

The role of the “food system” veterinarian is becoming more clearly defined. Large numbers of veterinary first responders are positioned between the gate and the plate. Pathology, food hygiene and food plant technology are skills demanded today in the inspection area at the end of the food chain; these are skills provided by food system veterinarians. In addition, public health veterinarians must coordinate education and provide outreach to human physicians about zoonoses at the interfaces of wild, domestic and human populations.

National animal health and veterinary associations in the Americas, such as the United States Animal Health Association (USAHA) and the Confederacion Nacional de Salud Animal (CONASA), along with federal, state and provincial government agencies, along with academic institutions, need to collaborate and leverage their veterinary assets to address these challenges of food and feed safety in the twenty-first century.
The Committee met on October 6, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 1:00 to 5:00 p.m. There were 23 members and 16 guests present. Introductions were made by all in attendance.

Status of 2007 Resolutions and Recommendations

RESOLUTION 35: NATIONAL JOHNE’S DISEASE DEMONSTRATION HERD PROJECT

RESOLUTION: The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) continue to prioritize
funding for the National Johne’s Disease Demonstration Herd Project.
RESPONSE: The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (VS), recognizes the United States Animal Health Association’s concerns and appreciates the opportunity to respond. VS sees the value in collecting additional years of data now that calves born under the project management plans are entering the productive phase of their lives. VS continued to support the project in fiscal year 2008. VS is also evaluating alternatives to reducing the scope of the project for fiscal year 2009 if funds are not available to support the project in full.

RESOLUTION 6: MILK ELISA TESTING FOR JOHNE’S DISEASE
RESOLUTION: The U.S. Animal Health Association (USAHA) requests the USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) incorporate the milk ELISA testing method into the VBJDCP by recognizing it as an approved screening test for Johne’s disease and require that laboratories performing the milk ELISA test must pass an annual proficiency test under the direction of the National Veterinary Services Laboratories (NVSL).
RESPONSE: The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (VS), recognizes the United States Animal Health Association’s concerns and appreciates the opportunity to respond. VS will incorporate the milk enzyme linked immunosorbent assay (ELISA) testing method into the Voluntary Bovine Johne’s Disease Control Program (VBJDCP). The National Veterinary Services Laboratories (NVSL) has developed and implemented a milk ELISA proficiency test for the 2008 testing period. Kits were distributed in early 2008, and results are being analyzed from the first round of testing. From initial evaluation of the process, NVSL has plans to continue the milk ELISA proficiency test during the 2009 testing period. The addition of milk ELISA as a screening test will be included in the Uniform Program Standards for the VBJDCP during the next revision.

RESOLUTION 7: STRATEGIC PLAN FOR JOHNE’S DISEASE
RESOLUTION: 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) provide financial and personnel support for the development of the new national Strategic Plan for Johne’s Disease.
RESPONSE: The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (VS), recognizes the United States Animal Health Association’s concerns and appreciates the opportunity to respond. VS agrees that the current Johne’s strategic plan needs revision and is providing support for this effort. Activities have been initiated to develop this revised strategic plan including a meeting on March 12-14, 2008, in Chicago, Illinois, and several conference calls.
REPORT OF THE COMMITTEE

RESOLUTION 38: MILK ELISA TESTING FOR JOHNE’S DISEASE IN THE NATIONAL PROGRAM

RESOLUTION: The United States Animal Health Association, recognizing the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) is a voluntary program, requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to allow the Quality Certification Services (QCS)-certified and Designated Johne’s Coordinator (DJC)-approved Dairy Herd Improvement Association (DHIA) field personnel to collect and submit milk samples to approved laboratories for milk enzyme linked immunosorbent assay (ELISA) testing for Johne’s disease under the direction of the herd’s Johne’s certified veterinarian.

RESPONSE: The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), recognizes the United States Animal Health Association’s concerns and appreciates the opportunity to respond. Allowing official sample collection by nonaccredited veterinarians and personnel who are not veterinarians would be a significant change to VS policy. However, VS will change its policy to allow Dairy Herd Improvement Association (DHIA) field personnel, who are certified by the Quality Certification Services and approved by State Animal Health Officials, to collect and submit milk samples to approved laboratories for milk ELISA testing as part of the official Voluntary Bovine Johne’s Disease Control Program (VBJDCP) for herd classification. Additionally, APHIS will put a program requirement into the Uniform Program Standards for the VBJDCP for DHIA field technicians to complete the same training required of accredited veterinarians to gain Johne’s disease certification. This training would give them the basic information regarding the organism, clinical signs, disease epidemiology, and national and State program information they would need to accurately collect the samples.

National Johne’s Education Initiative was presented by Teres Lambert, National Institute for Animal Agriculture (NIAA).

The NIAA and USDA-APHIS-VS have a cooperative agreement to help educate the industry about Johne’s disease. The ultimate goal of all communication pieces is to educate so the incidence of Johne’s disease is reduced on U.S. farms.

Before developing industry education tactics for the 2008 National Johne’s Education Initiative marketing plan, NIAA surveyed the designated Johne’s disease coordinators (DJC). DJCs’ comments include:

- make the www.johnesdisease.org more user friendly, include more information and keep the web site current;
- when appropriate, target dairy-only audiences and beef-only audiences;
- with budgets dwindling, they would like more assistance with educational material.
What has NIAA accomplished to date? The Johne’s education initiative website was redesigned and significantly more information was added. Results showed 0 hits per day. Eight news releases were written and disseminated to print media and radio stations. Scattering news release throughout the year for a constant presence in the media:

- alerted dairy producers to the National Dairy Producer survey and encouraged their participation. Released March 28;
- shared information about the updated johnesdisease.org website. Released in May;
- announced the availability of the dairy prevention/control/risk assessment collateral piece and the beef prevention/control/risk assessment collateral piece. Three separate news releases: 1.) dairy publications only; 2.) beef publications only; and 3.) general livestock/agricultural publications. Released July;
- announced the availability of the dual dairy/beef testing brochure. Three separate news releases: 1) dairy publications only; 2) beef publications only; and 3) general livestock/agricultural publications. Released September; and
- news release sent to publications also resulted in two editors writing their own Johne’s article: National Cattlemen and Bovine Veterinarian.

In addition to news articles and announcement on radio stations, we’re seeing articles online such as at AgOnline.

Two feature articles were written and disseminated to the print media under the pen name of T.S. Gatz. The information from these articles was gleaned from the Johne’s Workshop in East Lansing in April 2008.

- The first feature article had a known reach of at least 250,000 producers.
- The second feature article had a known reach of more than 350,000 readers.
- The reach of both articles was most likely significantly larger as most publications do not indicate whether they use an article or not.

Two four-color collateral pieces — one for dairy and one for beef — were written and disseminated. Both pieces address prevention and control and have lists so producers can conduct their own risk assessment.

- 27,000 dairy risk assessment brochures have been printed, with 20,274 disseminated to date.
- 16,000 beef risk assessment brochures have been printed, with 15,011 disseminated to date.

A four-color collateral piece that addresses testing and best test, and serves both the beef and dairy industries were developed, with 25,000 copies printed: 14,793 have been disseminated to date.

One-hundred of the dairy prevention/control/risk assessment brochures, 100 of the beef prevention/control brochures and 100 of
the testing brochures were furnished at no cost to DJCs. DJCs could purchase additional quantities at NIAA’s print cost of only $0.16 each plus postage, and this resulted in about 9,500 additional copies supplied to DJCs.

- Sent 100 of the dairy risk assessment collateral piece to dairy cooperatives, with additional quantities offered at the cost of printing only: $0.16 each.
- Sent an email to beef and dairy extension specialists about the Johne’s disease prevention/control/risk assessment beef-specific and dairy-specific collateral pieces and offered 100 complimentary copies of all brochures. This resulted in further outreach to producers.
- Contacted national and state beef and dairy websites that producers use and asked that the www.johnesdisease.org website link be added to their website. At this point in time, six more websites now include this Johne’s disease information website.
- Conducted three Johne’s disease radio interviews: a 4- to 5-minute interview with an Iowa radio station, a 4- to 5-minute interview with the Northern Ag Network and the third with Truffle News Media.
- Attended the American Dairy Science and Animal Science conference and disseminated the Johne’s prevention/control/risk assessment collateral pieces.
- Attended the World Dairy Expo and disseminated 50 of the dairy risk assessment and 250 of the testing brochures.
- A mass mailing to bovine practitioners was made via an insert in AABP convention’s registration packet. This insert alerted veterinarians to the availability of the three collateral pieces.
- Answered inquiries for additional information about Johne’s disease. Two inquiries stick out: 1.) Johne’s and sheep; and 2.) Johne’s and bison. These were turned over to Dr. Carter.
- Responded to requests from producers and veterinarians for one of the three brochures.

What is on tap for NIAA’s Johne’s producer education work? Two more months of work remain. What will be produced will hinge on need.

United States Johne’s Disease Program Updates FY 2008 was presented by Dr. Michael Carter, National Johne’s Program Coordinator, VS-APHIS-USDA.

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
JOHNE’S DISEASE

for the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) approved by USDA-APHIS-VS in April of 2002. The latest revision to the program standards occurred in June of 2006 with the including of pooled fecal samples for level 3 test negative testing and updating the laboratory approval section of the standards.

For FY 2008 from States that have reported by October 10, 2007, 49 States had adopted the VBJDCP or had programs that were considered in compliance with these standards. In FY 2008, reported activities include 450,805 cattle tested by ELISA and 55,859 cattle tested by fecal culture or PCR, 7,265 enrolled herds (5,511 dairy and 1,762 beef) of which 1,397 are test negative herds (772 dairy and 625 beef). Herds enrolled as test negative herds are progressing through to level 4. There are 529 Johne’s program level 1 (284 dairy and 245 beef), 473 Johne’s program level 2 (284 dairy and 209 beef), 104 Johne’s program level 3 (50 dairy and 54 beef), and 291 Johne’s program level 4 herds (174 dairy and 117 beef). This represents a decrease in all categories except for Johne’s program level 4 beef herds which is up from 92 herds.

In FY 2008 USDA-APHIS-VS receive $10.53 million. Of this $4.0 million was distributed through cooperative agreements with the States for use with the National Johne’s Demonstration Project (1.5 million – 17 States), and State Cooperative Agreements (2.5 million including an earmark for Wisconsin). This is also the fourth year for funding the Johne’s Education Initiative (JEI) coordinator through a cooperative agreement with NIAA. Accomplishments include three brochures published and distributed along with the maintenance of the JEI website with the inclusion of a section linking producers to State websites identifying VBJDCP herds.

USDA-APHIS-VS also continued support of the Vaccine Validation Project with the Johne’s Disease Integrated Program. This is a 3 year funded effort initiated at the end of FY 2007 to validate some of the numerous vaccine candidates developed by universities, preparing the way hopefully for commercial uptake. In addition, USDA-APHIS-VS-NVSL will be starting a PCR validation project for goats in preparation of the 2009 National Animal Health Monitoring Service Goat Study.

USDA-APHIS-VS has approved the use of milk ELISA for the herd classification component of the program and will be updating the program standards to reflex this and the allowance of using DHIA field technicians to collect samples which will be used to classify herds.

National Johne’s Working Group (NJWG) Report was given by Dr. Ken Olson, NJWG Treasurer, and was accepted by the Committee. A complete report of the NJWG is included at the end of this report.

Johne’s Disease Integrated Program (JDIP) Education/Outreach Project was presented by Ken Olson and Ernest Hovingh, JDIP Education. A summary of the JDIP information is included in the NJWG report at the
REPORT OF THE COMMITTEE

end of this report.

Mycobacterium avium paratuberculosis (MAP): Infrequent Human Pathogen or Public Health Threat was presented by Mike Collins, University of Wisconsin-Madison. The full report can be viewed at: http://academy.asm.org/index.php?option=com+content&task=view&id=100&Itemid=55.

The Executive Summary is provided as follows:

Crohn’s Disease (CD) is a devastating illness in search of a cause and a cure. More than 800,000 people in North America suffer from CD, a gastrointestinal disorder characterized by severe abdominal pain, diarrhea, bleeding, bowel obstruction, and a variety of systemic symptoms that can impede the ability to lead a normal life during chronic episodes that span months to years. Researchers and clinicians agree that onset of CD requires a series of events. Implicated are certain inherited genetic traits, an environmental stimulus, and an overzealous immune and inflammatory response. The combination of these factors contributes to a disease whose course is variable among patients and whose symptoms range from mild to devastating on any given day. The economic and social impact of this disease is substantial for the patient, the family, the community, and the healthcare system.

Long considered an autoimmune and chronic inflammatory disorder, current CD therapies are designed to treat symptoms of overactive inflammation in the gut. Chronic inflammation, however, does not generally induce itself. Inflammation is normally caused by a foreign body, an inanimate object (i.e., splinter) or animate objects like rogue cells (i.e., cancer) or microorganisms (i.e., bacterium, virus, or fungus). Until the cause of inflammation is eliminated, the body continues to send in its clean-up crew, the white blood cells of inflammation whose job it is to expel the tissue invader. Inflammation only subsides when the causative agent is finally banished.

There is suspicion, supported by reports of genetic inability to interact appropriately with certain bacteria or bacterial products in some patients, that CD may have a currently unrecognized infectious origin, perhaps environmentally derived. That CD is a set of wide-ranging symptoms, more like a syndrome than a specific disease, suggests that if its origin is microbial, more than one etiologic agent may ultimately be identified. Bacterial suspects at the moment include a Mycobacterium and a variant of the normal bacterial flora of the gut, Escherichia coli. The possibility of more than one infectious cause that leads to a similar set of symptoms confounds the research agenda to find both a cause and a cure for CD.

One acknowledged potential microbial agent of CD is MAP, a microorganism that causes a gastrointestinal disease similar to CD in ruminants, including dairy cattle, called Johne’s disease (or paratuberculosis). People with CD have 7:1 odds of having a
documented presence of MAP in blood or gut tissues than those who do not have CD, thus the association of MAP and CD is no longer in question. The critical issue today is not whether MAP is associated with CD, but whether MAP causes CD or is only incidentally present, not an inciter or participant in the disease process.

If MAP is involved in the disease process of CD or other gastrointestinal disorders, then we need to determine how people are exposed to this microorganism, how to prevent that exposure, and how to treat the infection. Despite its prevalence in the U.S. population in numbers that exceed most cancers, CD is not a focus of research attention in the same way as these other feared diseases. The American Academy of Microbiology convened a colloquium with experts in medicine, microbiology, veterinary pathology, epidemiology, infectious diseases, and food safety to describe the state of knowledge about the relationship between MAP and CD and to make recommendations for effective research that will move the field forward.

The general consensus of the assembled experts was that there are certainly reasons to suspect a role for MAP in CD:

- MAP persists in contaminated soil and water, which links the environmental factor of CD to the disease.
- MAP has a cell wall that contains muramyl dipeptide (MDP). One genetic trait that is affiliated in certain patients with CD is the NOD2 gene, which regulates ability to respond appropriately to MDP, thus the link between the genetic trait and MAP, or other bacteria.
- MAP causes Johne’s disease, an illness of cattle and other ruminants that has many similarities with CD. The similarities of MAP disease in animals, for which the etiologic agent is known, and CD, for which the etiologic agent is unknown, provide a symptomatic link between agent and disease.
- MAP can survive standard milk pasteurization processes and has been identified in off-the-shelf milk in retail grocery stores in the U.S. and the European Union (EU). There is increasing concern that MAP can also be found in cheese made from the milk of MAP-infected cattle and meat from Johne’s diseased animals. These observations could provide the exposure route of CD patients to MAP.
- Treatment of some CD patients with antibiotics that have activity on certain other Mycobacteria, although not specifically selected for their activity against MAP, provides short-term or long-term relief or remission of symptoms.

Circumstantially, these observations appear to make a compelling case for MAP as involved in CD. On the other hand, the ability to definitively identify MAP as the cause of CD, or the cause of a significant number of CD cases, has been stymied by the elusive characteristics the
organism itself, the lack of broadly available and validated clinical tools to easily and definitively identify MAP in accessible tissues, and the late symptomatic stage at which CD is finally diagnosed, where the origin of the destructive inflammation could have been years before the patient sought medical care. Most important, however, is the lack of resources, financial and scientific, to generate the tools that clinicians and patients need to determine whether MAP is involved in the disease process or not.

Several important clinical trials of antibiotics have been attempted in CD patients, with variable results. Treating CD patients with existing antibiotics with activity against other Mycobacteria (M. tuberculosis, which causes tuberculosis [TB], and M. avium complex, [MAC], which is pathogenic in immune compromised persons) have either failed to provide relief (TB drugs) or produced promising outcomes for some patients, but not all (MAC drugs). Confounding these clinical results is the lack of information about which patients in the clinical trial population were actually infected with MAP, and whether any MAP organisms in infected patients were susceptible to the antibiotics used in the trials. Without sensitive and specific diagnostics that can detect early MAP infection, knowledge of how and where to isolate MAP for antibiotic susceptibility studies, and drugs that are known to be active against MAP itself, alone or in combination, the role of MAP in CD will remain circumstantial and the controversy over CD etiology will continue.

There is little known about where exactly viable MAP can be found in human tissues or, since most pathogenic Mycobacteria are intracellular, in which cells MAP can live and grow in humans. While the site of infection and tissue pathologies of MAP in animals can be assessed at necropsy, there is enough dissimilarity between digestive processes of ruminants and humans that this information may not necessarily inform studies in humans.

Of concern from a public health perspective is the ongoing presence of MAP disease in commercial livestock that supply the U.S. with dairy and meat products. If, in fact, CD is a zoonotic infection (one that is passed from animals to humans) and MAP is the (or one) cause of CD, then early identification of MAP disease in veterinary practice and appropriate management of these animals to safeguard the food supply will be critical to guard the public health.

Even in animals, it is nearly impossible to diagnose Johne’s disease in the early stages of disease. Diagnosis is by a combination of clinical observation (wasting and reductions in milk production in dairy cattle, for instance) and microbiological, histopathological, and immunological testing of Johne’s disease suspects. Although efforts to eliminate Johne’s disease and MAP from livestock herds are ongoing, the lack of an accurate and easily-administered diagnostic for early disease onset is hampering these efforts. The results are mixed, and food products containing MAP or MAP DNA can be found on supermarket shelves.
Veterinary diagnostics that are sensitive (detect MAP at early stages of infection) and specific (identify MAP and not other microorganisms) will be necessary to eliminate Johne’s disease from the commercial food supply. Research to discover and validate these techniques may also shed light on diagnosis of human disease.

Colloquium participants agreed that research to elucidate the role of MAP in CD must address two major unknowns: 1.) whether MAP from livestock and other animals is transmissible to humans and how it is transmitted and 2.) whether humans are susceptible to infection and disease after exposure to MAP. No single study will fill all the gaps in our understanding of the possible relationship between MAP and CD. Furthermore, participants agreed that validated, reproducible biological markers confirming human MAP infection are desperately needed. If MAP can be causally associated with CD using reproducible analytical techniques, appropriate patient populations can be treated with antibiotics that are selected for their MAP activity. Then, at least MAP-infected CD patients will have both a cause and a cure.

National Veterinary Services Laboratory (NVSL) Report of Approved Laboratories was given by Beth Harris, NVSL.

Proficiency panels for Johne’s disease organism detection (culture and direct PCR) were mailed to participants in January, 2008. Due to contamination problems and inconsistent results with the negative and low positive samples, this kit was recalled by NVSL and a replacement kit made available at no cost to participants in June, 2008. Combined summary results from both panels are as follows:

A total of 71 laboratories, (64 USA laboratories, 7 international; Canada -3, United Kingdom -2, Ireland -1, Sweden -1) participated in the 2008 Johne’s disease proficiency panel.

A total of 45 laboratories participated using Direct PCR; 35 laboratories passed, 3 did not submit results, and 7 laboratories did not meet the criteria for passing.

A total of 39 laboratories participated using HEY media; 20 laboratories passed, 14 laboratories did not pass, and 5 laboratories did not submit results

Thirty-five laboratories participated using liquid media systems. Two laboratories used Bactec 460 with both laboratories passing. Twenty-four laboratories used ESP with 23 passing, and nine used MGIT 960 with 6 passing.

Forty-four laboratories participated in the pooling proficiency panel. Nineteen laboratories used direct PCR with 18 passing and one laboratory not submitting results. Seven of 7 laboratories passed using HEY solid media. Twenty laboratories used a liquid media system with 18 passing and two not meeting the criteria for passing. Of the laboratories using liquid culture for the pooling proficiency panel, 4 used the MGIT 960 with all passing, one laboratory used the BACTEC 460 and passed, and 15
laboratories used the ESP system with two not passing.

Test panels for the Johne’s ELISA serology proficiency test were distributed in June, 2008, with 86 U.S. laboratories and 9 international laboratories participating (Canada, Chile, Netherlands, and Northern Ireland). With approximately 37 percent of all results being scored by October 15, 2008 using the z-score grading scheme, 95 percent of laboratories taking the Prionics ELISA panel received passing scores and 87 percent of laboratories taking the IDEXX ELISA panel passed. Final results and re-tests are scheduled to be released by October 31, 2008.

A milk ELISA proficiency panel was offered and distributed for the first time in June 2008. A total of 6 laboratories participated in this panel, with all laboratories receiving a passing score.

Committee Business:

During Committee business session, two resolutions were taken under consideration, amended, approved and sent to the Committee on Nominations and Resolutions.
Introduction

The Johne’s Disease Strategic Planning Subcommittee met on March 13 and 14, 2008 in Chicago to update the previous strategic plan dated July 2004. The group considered how the program is doing and what should change over the next five years to most effectively address Johne’s disease. For a glimpse into the group’s thinking that led to this plan see Appendix A: Results of the Strategic Planning Subcommittee Questionnaire. A draft from that meeting was previewed at the National Johne’s Working Group meeting at the National Institute of Animal Health (NIAA) Annual Meeting, April 2008. That draft was widely distributed to industry, academia, and government for comment. The result is this Strategic Plan designed to prevent and control Johne’s disease in a world where Federal and State government agriculture budgets are shrinking and primary attention is on program animal diseases which does not include Johne’s disease.

With this plan, the program would evolve in several important ways:

1. Moving from a primarily Federal/State program to one that becomes more of a public/private partnership. As the possible connection of Johne’s disease to human health remains unresolved and federal and state funding shrinks it is important that industry becomes a stronger partner.

2. Updating the herd classification system while continuing to recognize lowest risk/prevalence herds.

3. Making formerly required program components voluntary and making them more useful and more readily available.

4. Focusing educational efforts on producers and professionals (e.g. veterinarians and herd management consultants) that can help prevent and control Johne’s disease.

5. Focusing research on control and prevention of Johne’s disease with the highest priorities given to improving diagnostic tests, control strategies and vaccines.

6. Marketing this new approach for controlling and preventing Johne’s disease.

7. Changing roles because of this new approach. See Appendix B: Redefined roles and responsibilities.

Note that Johne’s disease is a contagious, chronic, essentially untreatable bacterial infection that primarily affects the small intestine of
ruminants that can cause death due to dehydration and emaciation. Cattle affected by Johne’s disease are often culled given their poor condition. For a brief history of the national program see Appendix C.

Overall Goal and Measures
Goal:
Through a public/private partnership, increase the availability of effective tools to reduce:
- the prevalence of MAP/Johne’s in the national herd
- the impact of Johne’s disease on individual farms
- the risk of introducing Johne’s disease to uninfected herds

Valuable tools include:
- more useful risk assessments and herd management plans
- faster, more accurate diagnostic tests and procedures including those that can detect the causal agent at a younger age in cattle and expanded for use with other species.
- validated prevention and disease management/control practices
- safe and effective vaccines, including those currently available and newly developed safer vaccine delivery systems and procedures

Suggested Measures:
- survey of producers to determine adoption of recommended tools
- monitor the disease prevalence
- develop other measures based on need and practicality

Strategies
There are four strategies needed to accomplish the overall goal:
1. Focus educational efforts on demonstrating potential economic and biosecurity benefits of prevention and control of Johne’s disease.
2. Focus research efforts on control and prevention of Johne’s disease.
3. Update the classification system while continuing to recognize lowest risk/prevalence herds.
4. Make herd assessment and management tools readily available and encourage their use.
5. Develop a coordinated public-private communication plan to market and deliver the updated strategies.

Strategy Details
1. **Focus educational efforts on demonstrating potential economic and biosecurity benefits of prevention and control of Johne’s disease.**
   a. Evaluate potential improvements in content and delivery methods for veterinarians and producers. Expand efforts to make materials available for:
      i. producers
JOHNE’S DISEASE

ii. veterinarians
iii. industry consultants (e.g. nutrition and management specialists)
iv. service providers (e.g. Dairy Herd Improvement Association (DHIA) Technicians and milk procurement field staff)
v. extension agents

b. Expand awareness and use of existing online resources such as the veterinarian certification and producer education modules such as those available at the University of Wisconsin-Madison: www.vetmedce.org/index.pl?op-show:id=133363

c. Coordinate educational efforts through the National Johne’s Working Group:
i. utilize surveys of producers, veterinarians and other influencers to identify additional information needs and preferred delivery methods
ii. develop tools to educate producers on the economic costs of low and high prevalence Johne’s disease
iii. work with the Johne’s Disease Integrated Program to transfer research findings into producer friendly publications
iv. create educational articles through the Johne’s Education Initiative. Articles may be written to allow for the addition of local success stories and where to get assistance with testing and education
d. Prioritize federal, state, and private funding for development and production of educational materials

2. Focus research efforts on control and prevention of Johne’s disease. It is important for the research community and program efforts to be more coordinated. Priority research needs to be on rapid, more accurate, easier to use diagnostics; more effective and safer vaccines; documentation of the economic costs of the disease; and identification of more effective management tools.
a. Diagnostics
i. development of Johne’s disease diagnostic tests that:
   • are appropriate for small ruminants, cervids and camels in addition to cattle
   • in the longer term, are able to detect the disease in younger animals
   • provide rapid, more accurate tests that focus on:
     a. better cell-mediated immunity
REPORT OF THE COMMITTEE

(CMI) tests and improved antigens
b. fewer *M. bovis* cross reactions
c. bulk tank testing – quantitative ELISA milk test
d. environmental sampling protocols for dairy and beef

ii. development of tuberculosis (TB) diagnostic or testing procedures that do not cross-react with the Johne’s vaccine(s)

b. Vaccines
i. evaluation of the current vaccine
ii. development and validation of improved vaccines that provide:
   • less shedding
   • fewer side effects (abscesses, etc.)
   • reduced cross-reactivity with the TB test
   • improved ease of use
   • improved safety when administering the vaccine

c. Economic impact
i. quantify the costs/benefits of recommended management practices
ii. make data and cost analysis and management practice recommendation tools available to consultants who work with producers
iii. work with DHIA to include these analysis and recommendation tools into their system and utilize data from the records system to further enhance the tools

d. Management practices that help control the disease and provide economic benefit for the livestock owner
i. focus on specific critical goals of demonstration herds and complete that effort
ii. emphasize analysis of data from existing studies (demonstration herds and other field studies)

e. Other concerns:
   i. ARS basic research needs to continue.
   ii. JDIP is an important conduit for research work being funded through Cooperative State Research, Education, and Extension Services (CSREES). JDIP seems to work and needs to continue with its research and outreach efforts. Efforts also need to be made to assure that results form other publicly funded research are available to the program.

360
JOHNE’S DISEASE

iii. funding:
   • federal funding would be available for field studies to support and evaluate prevention and control programs
   • funding can be leveraged from JDIP/CSREES, ARS, diagnostic companies and other industry partners

3. Update the classification system while continuing to recognize lowest risk/prevalence herds. The classification system will be scientifically sound, address differences in herd size and will encourage all susceptible animal species to participate.
   a. Recognize lowest risk/prevalence herds using a classification that is similar in rigor to the current Level 4 of the current test negative program.
   c. Recognize progress for other herds:
      i. states can use a modification of the current herd classification system, an approach similar to the Concept Paper dated March 7, 2008 titled Herd Testing Strategies to Achieve Classification Levels or another approach
      ii. producers currently enrolled in the program would be eligible to continue in a revised system

4. Make herd assessment and management tools readily available and encourage rather than require their use.
   a. Develop additional new tools as needed and make all tools available to help producers assess herd status and progress
   b. Risk assessments (RA) and Herd Management Plans (HMP)
      i. RA and HMPs conducted by a third party would be required only for newly enrolled herds.
      ii. for renewals:
         • templates would be available to producers for free as self assessment tool
         • livestock owners may be assessed a fee if the RA or HMP are completed with the help of a third party such as veterinarians, industry groups, extension personnel or government officials
         • the renewal process, including renewal form, would be simplified
   c. Eventually phase out current Johne’s Program HMPs in favor of implementing good management practices that
REPORT OF THE COMMITTEE

are part of overall herd health, quality assurance or bio-
security programs:

i. Information about the specific good management
practices that affect the prevalence of Johne’s
disease would be readily available to:

- producers
- veterinarians
- extension specialists and agents
- industry-based advisors, consultants and
  service providers
- quality assurance programs would
  be encouraged to incorporate good
  management practices for Johne’s
disease prevention and control

d. Make diagnostic tests readily available

i. the tests would be available through approved
  State and private laboratories
ii. USDA APHIS-VS-NVS maintains responsibility
  for certifying laboratories and validating tests

e. Make vaccine and safe vaccine delivery systems readily
available

i. widespread use of vaccines requires research,
development and availability of vaccines that are
more acceptable nationally and without the cross-
reactivity with M. bovis
ii. as improved vaccine and vaccine delivery
  systems become available, there will be a need
  for APHIS to validate them and to work with
  states to make vaccination legal

f. Funding availability – funds for RA, HMP, and testing may
be available depending on federal and state funding and
priorities

5. Develop a coordinated public-private communication plan to
market and deliver the updated program and strategies.

a. Look for ways to build market incentives for achieving the
lowest levels of risk/prevalence.

b. Develop public-private communication and marketing plan

i. include clear consistent messages
ii. emphasize a unified message about the newly
  simplified program and its benefits
iii. clarify any changes that may occur in the herd
  classification system

c. Present to industry groups at the NIAA, USAHA,
American Dairy Science Association (ADSA), American
Society of Animal Science (ASAS), American Association
of Bovine Practitioners (AABP) and industry meetings.
d. Use industry publications and newsletters to get the word out about the program and why it is important to change the approach to a simplified, public/private cooperative program.

e. Have the standards committee revise the standards to align with the concepts in this plan.

f. Make sure the existing participants in the program are grandfathered into the new program.

   i. develop a funding mechanism for both the public and private components of the public-private partnership including possibilities of matching funds and leveraging existing funding
Introduction

At the 2007 USAHA Annual Meeting, a resolution was passed to establish a Subcommittee of the Committee on Johne’s Disease to revise and update the National Johne’s Disease Control Program strategic plan for the next five years. As a way to begin working on the revised strategic plan, each member of the subcommittee was sent a questionnaire that contained the questions listed below. The Subcommittee members’ answers were compiled as shown below. This document was used as a way to focus the discussion as the subcommittee began its work.

What have been the 3 most successful aspects of the National Johne’s Disease Control Program since 2004?

- increased education and resulting awareness and knowledge about the disease and steps to take to control it (14/14)
- improving infrastructure (14/14)
- improved results (4/14)
- improved diagnostics (3/14)

What have been the 3 least successful aspects of the National Johne’s Disease Control Program since 2004?

- funding: decreases, non-sustainable, inequity (9/14)
- education and marketing (6/14)
- cumbersome program (6/14)
- diagnostics: Still need fast accurate test (4/14)
- poor participation (4/14)
- industry support (4/14)
- lack of consistency (2/14)
- miscellaneous (6/14): cattle only, not responsive, demo herds, government run, little effect

Should the next 5 year goal of the National Johne’s Disease Control Program to decrease prevalence or elimination?

- reduction in prevalence (11/14)
- elimination (0/14)
- both reduction of prevalence generally and elimination of infection when achievable (3/14)

How can the National Johne’s Disease Control Program operate successfully with declining funding from USDA?

- use funds more efficiently by making changes to the program:
  - cull heavy shedders ASAP
JOHNE’S DISEASE

- pool fecal cultures
- encourage more use of the Johne’s Vaccine
- list status herds on web site so they become known as low risk heifers
- use our current funding more efficiently
- provide standardized fee
- shorten/simplify the RA-HMP for renewals
- provide a lower fee
- only those who implement management changes allowed subsidized testing
- require Monensin feeding
- develop a support organization to help inform congress about the importance of Johne’s disease to the cattle industry today
- test only those herds that are closed
- change roles of APHIS and States and producer organizations
- develop improved information
- use of milk ELISA for testing through DHIA milk testing laboratories
- use of environmental fecal testing for herd detection of infected dairy herds
- research funding should focus on research to develop an accurate young animal test
- raise awareness/educate producers (6/1)
- industry helps with funding (5/1)
- combine with other biosecurity/quality assurance programs (3/1)
- create program that is more market driven (2/1)
- show link to Crohns disease (2/1)
- miscellaneous comments (3/1): Lobby states and federal legislatures for funding, matching state funds to gain federal funds, federal funding going down

What should be the role of each group in the National Johne’s Disease Control Program?

Industry
- promotion (7/1)
- design and set direction (5/1)
- help create market incentives/disincentives (5/1)
- funding (4/1)
- partnering (3/1)
- education (2/1)
- lobbying (1/1)

States
- implementation, administration and oversight (11/14)
- support (4/14)
REPORT OF THE COMMITTEE

- education (3/14)
- questions about whether States can or should be involved (3/14)
- cost sharing (1/14)

Federal
- funding (9/14)
- national coordination for program consistency (7/14)
- general administration, structure and guidance (5/14)
- support lab work (2/14)
- support training programs for vets and producers (1/14)
- facilitate a market driven program that offers incentives for Johne’s free milk and beef (1/14)

Research
- generally work to improve program (8/14)
- improve diagnostic tests (6/14)
- focus on management, control and elimination protocols (5/14)
- improve vaccines (3/14)
- economics (2/14)

Extension
- education (14/14)
- intertwine Johne’s with other management programs (1/14)

DHIA technicians (added group)
- encourage participation/inform about detriments of Johne’s disease (1/14)

What should be the research priorities?
- more accurate, more sensitive and less costly diagnostics, especially for young animals (12/14)
- improved vaccine, especially one that does not interfere with TB tests (9/14)
- show and document the economic impact of Johne’s on producers (including beef); give them tools to define costs for their operations (7/14)
- learn more about the disease, transmission and control (including management practices) (4/14)
- set up demo herds, analyze data from them and wrap them up with usable data on effectiveness of current strategies (3/14)
- miscellaneous comments (6/14): risk/reward analysis, food safety and public health implications; cattle and wildlife vectors and transmission; genetic susceptibility and resistance; Identification of super-shedders; identify genetically low risk cattle for Johne’s disease (1 each)
JOHNE’S DISEASE

What should be the Johne’s disease producer education and outreach priorities?
- get the word out about the disease and control strategies (8/14)
- provide more data about the economics of the disease (7/14)
- promote the program with a steady, consistent flow of information especially success stories (5/14)
- encourage use of/explain best ways to use diagnostics (2/14)
- get information about the demo herds out (2/14)
- make program part of other risk assessment/quality assurance or biosecurity programs (2/14)
- miscellaneous comments (3/14): opportunities for producer to question “experts;” producer input into research priorities; bring tools to determine cost of disease and benefit of management to the industry

How can current program participants be encouraged to remain active in the program?
- create incentives (9/14)
- modify the program to simplify and add flexibility (8/14)
- educate producers about the impacts of the disease (7/14)
- continue funding/increase subsidies (2/14)
- add a select number of actual working participants (producers) to the Johne’s Working Group – there the people on the front lines feeling the actual economic impacts of the disease

How can producer participation be enhanced?
- education and promotion (6/14)
- simplify program and add flexibility (5/14)
- create incentives (5/14)
- move Johne’s to broader herd plans and quality assurance (3/14)
- involve industry organizations more (2/14)
- maybe use program funds to pay for testing breeding animals, if the sale managers agree to advertise all animals are tested (1/14)
- add other species to program (1/14)

How should program activities and results be monitored to assess program success including accounting for producers participating in other Johne’s disease control efforts?
- some form of testing (5/14)
- use surveys (5/14)
- don’t use national databases (2/14)
- monitoring will be difficult because of funding and the fact that this is a voluntary program (2/14)
- miscellaneous ideas—number of samples, counting presentations and articles, auditing herds, use conference calls (4/14)
1. Industry
   a. Develop and implement a plan for future administration and funding of the program. The herd classification program would have different aspects based on different interests.
      i. DHIA: Johne’s laboratory services with appropriate disease data collected, stored, analyzed and managed as part of their herd management services. Work with researchers to include Johne’s evaluation and management tools in their program offerings.
      ii. Breed associations: program adoption of recommended management practices, program participation and assist by encouraging marketing breed stock.
      iii. Dairy coops: educate producers, market and encourage members to participate in the program.
      iv. Producers: change management approaches using tools to prevent and control Johne’s disease and provide feedback on the practices and the program.
   b. For the leadership to be effective there needs to be an identified champion from each industry (animal species) who ideally has access to marketing and publication tools.
   c. Specific groups within the industries are in the position to make research findings and other educational information available to producers. These include dairy cooperatives and allied industries such as veterinarians, producer consultants and service providers such as DHIA.
   d. Work with Federal/State government to develop a coordinated communication and marketing plan to explain the value of the program and the plans for transition from a Federal/State program to a public/private program.
   e. Allied industries such as veterinarians, cooperative field staff, and other respected producer consultants would be in a key position to help distribute information about the disease, diagnostics, prevention and management/control (including vaccination) to the producer in the form of help with assessing herd risks and planning for maximum herd health and performance (includes current or improved risk assessments (RA) and herd management plans.
JOHNE’S DISEASE

(HMP)). Veterinarians will help with vaccination where it is determined to be an appropriate tool.

f. Milk cooperatives will help with education and marketing of the program.

g. Producers will use the tools available to reduce the effects of Johne’s disease, providing feedback on the use and implementation of these tools. They may pay herd classification participation, testing, vaccines and other services and products as needed. Program funds may be available based on Federal and State funding and priorities.

h. Industry consultants and service providers (e.g. DHIA) would incorporate Johne’s test data into herd management analysis and recommendations. This is a particularly powerful lever for change when the producer trusts and uses the data, analysis and recommendations provided. Develop measures to assess program value and effectiveness.

2. State

a. Assist with transition of the program to industry with their continued participation based on the level of their individual State funding and priorities.

b. Assist in rewriting the Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) and any needed modifications to state regulations.

c. Field personnel, including current Designated Johne’s Coordinators (DJC) and others, would be available to help with risk assessments and herd management plans as well as low risk herd classification for a fee if requested.

d. Diagnostic laboratories will maintain their Johne’s test certification from NVSL and be available for the testing needed for low risk herd certification. Producers may pay market costs, though subsidies may be available at some level as long as the APHIS-VS appropriation stays above the base.

3. Universities

a. Assist with research that may be funded through USDA and coordinated by the Johne’s Disease Integrated Program.

b. Assist in outreach education particularly through Cooperative Extension.

c. Serve as NVSL-accredited laboratories for diagnostic testing.

4. Federal

a. Basic APHIS-VS role:
REPORT OF THE COMMITTEE

i. NVSL: laboratory certification, proficiency testing etc.

ii. Centers for Veterinary Biologics (CVB): licensure of biologic including diagnostics and vaccines.

iii. National Animal Health Monitoring System (NAHMS) would continue to include assessment of Johne’s in future national studies.

iv. fund the national demonstration herd project to completion focusing on analysis of data and application of the findings.

v. collect and analyze data about the national program to assess progress.

vi. make continuing education available to veterinarians.

vii. help rewrite the program standards especially for the classification program.

viii. prioritize funding for:

- creation and production of educational materials.
- field studies. field veterinarians may be available to help with low risk herd classification for a fee if requested.
- subsidize testing as long as the funding continues above the base amount.
- APHIS field personnel to deliver the Johne’s program.

b. CSREES would fund research and extension functions. They would make educational materials available to extension agents.

c. A portion of the Johne’s funding base could be used to help fund the measurement of the program as described above:

i. survey producers to determine extent of use of tools and identify additional information needs.

ii. sample those using tools to monitor changes in herd prevalence.

iii. NAHMS studies can be one way to achieve the surveys described above.
In the fall of 1995, the United States Animal Health Association (USAHA) appointed the National Johne’s Working Group (NJWG) to assist the Committee on Johne’s Disease in developing a national, coordinated Johne’s disease effort in conjunction with the States and cattle industries. The NJWG developed a strategic plan designed to reduce the prevalence of Johne’s disease in U.S. cattle. That earlier version included a national educational campaign, the Voluntary Johne’s Disease Herd Status Program for Cattle, and guidelines for States to assist infected herds. This national program was designed from the start to be producer driven and voluntary.

In 1996, a national study of U.S. dairies, Dairy NAHMS 96, found that approximately 22 percent of U.S. dairy farms sampled had at least 10 percent of the herd infected with Johne’s disease. The study determined that infected herds experienced an annual financial loss. Small herds (<50 cows) lost an average of $178 per cow, while large herds (>500 cows) lost $181 per cow. This loss was due to reduced milk production, early culling, and poor conditioning at culling. The costs of Johne’s disease in beef herds still need to be determined.

In 1998, the USAHA approved the Voluntary Johne’s Disease Herd Status Program for Cattle (VJDHSP). The VJDHSP provides testing guidelines for States to use to identify cattle herds as low risk for Johne’s disease infection. With numerous tests over several years, herds progress to higher status levels. The higher the status level, the more likely a herd is not infected with Johne’s disease.

In April of 2000, USDA-Animal and Plant Health Inspection Services-APHIS Veterinary Service (VS) incorporated portions of this program into its national program standards: Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program (VBJDCP). VBJDCP test negative herds (often referred to as status herds) serve as a source of low Johne’s disease risk replacement animals.

In June of 2004, the Committee on Johne’s Disease formed a Strategic Planning Subcommittee. The group met June 15 through June 17, 2004 in Riverdale Maryland. The five objectives that were developed included as part of that revision were the following:

1. increase producer participation;
2. improve educational efforts;
3. close gaps in knowledge about Johne’s disease;
4. improve reporting;
5. develop an eradication plan.

In March 2008, the Committee formed an ad-hoc Strategic Planning subgroup. The group met to discuss changes that are needed to the program over the next five years.
REPORT OF THE COMMITTEE

REPORT OF THE NATIONAL JOHNE’S WORKING GROUP (NJWG)

Ken Olson

The NJWG met on Thursday afternoon October 23 and all day Friday October 24, 2008 during the USAHA Annual Meeting, Greensboro, North Carolina. The meeting was called to order at 1:00 pm. The meeting was Chaired by Scott Wells and Jamie Jonker. Approximately 75 members and guests attended the sessions.

Andy Schwartz provided an update on the APHIS-VS responses to the 2007 Resolutions.

- **Resolution 35** recommended that funding for the National Johne’s Demonstration Herd Project be a priority. USDA APHIS VS responded that support was continued in FY 08 and that alternatives were being considered for FY 09 if full funding is not available.

- **Resolution 36** requested recognition of the milk ELISA test as an approved screening test for the program and that laboratories performing it pass an annual proficiency test. USDA-APHIS-VS responded that they would incorporate the milk ELISA into the Voluntary Bovine Johne’s Disease Control Program (VBJDCP), that the National Veterinary Services Laboratory (NVSL) had developed and implemented a milk ELISA proficiency test that would be continued. The milk ELISA is to be added to the Uniform Program Standards in the next revision.

- **Resolution 37** requested that USDA-APHIS-VS provide financial and personnel support for development of a new Johne’s Strategic Plan. USDA-APHIS-VS responded positively and provided support for conference calls, a planning meeting and personnel to assist in the process.

- **Resolution 38** requested that Quality Certification Services (QCS) and Designated Johne’s Coordinator (DJC) approve Dairy Herd Improvement Association (DHIA) field personnel to collect and submit milk samples to approved laboratories for milk ELISA testing under the direction of the herd’s Johne’s certified veterinarian. USDA-APHIS-VS indicated that they will change current policy to allow QCS certified DHIA field personnel, who are approved by State Animal Health Officials to submit milk samples to approved laboratories for milk ELISA testing as part of the VBJDCP for herd classification.

NJWG treasurer, Ken Olson reported that the NJWG had an initial balance of 30,663.55, with no added income and expenses of $693.00 for past meetings leaving a balance of $29,970.55 as of August 29, 2008. The Johne’s CD project included income of $93,078.28 and expenses of
$71,140.28. The income from three major sources: $30,318.28 was the initial balance, Sponsors of the CD project, $27,000 and sales of Johne’s CD ROMs for $37,909.00.

National Johne’s Coordinator’s Annual Report, Mike Carter reported a total of 8,818 herds in the VBJDCP at the end of 2007. It appears that the number of herds will decline in 2008, as will the number of tests run of all types but the milk ELISA where an increase is occurring. Program funding is under pressure. The Department is currently operating under a continuing resolution that maintains funding at last year’s level; however, the proposed budget from the Administration is $3.3 million and the Senate version is $6.8 million that includes a $1 million earmark for Wisconsin, so it is uncertain where it will end up. APHIS-VS has funded several research projects including:

- National Johne’s Demonstration Herd Project
- Small ruminant PCR validation project with NVSL
  - primarily preparing for National Animal Health Monitoring System (NAHMS) 2009 Goat study and to lay ground work for a national small ruminant classification program
- vaccine validation project
  - $500,000 3 year grant to JDIP
  - established to develop a coordinated validation protocol for the large number of mutant and attenuated vaccine candidates developed by U.S. researchers.

Anticipated future directions for the program included:

- change herd classification to eliminate references to disease freedom
  - will focus on probability that disease is less than a certain prevalence
  - more scientifically valid
- inclusion of milk ELISA as a screening test for the Test Negative Herd Classification component.
  - decision memo has been signed to allow DHIA field technicians to collect milk ELISA samples for herd classification
  - requires approval of State Animal Health Official

Johne’s Disease (JD) Strategic Plan update and review, Jamie Jonker presented the proposed strategic plan that had been developed in response to action taken at the last meeting. He thanked the group that worked on the plan, reviewed the process used in development of the proposed plan and key points included in the draft. He indicated that the primary focus for the meeting would be to finalize the proposal for presentation to the Committee.

Proposed JD Herd Classification, Scott Wells presented an overview of the Concept paper: Herd Testing Strategies to Achieve Classification Levels for the U.S. Voluntary Bovine Johne’s Disease Control Program.
The Voluntary Bovine Johne’s Disease Control Program (VBJDCP) is central to USDA-APHIS-VS Johne’s disease control efforts and has three main components: education, management, and herd classification. The goal of herd classification is to classify cattle herd risk for JD according to the risk of potential JD transmission. In 2006, the Committee recommended that USDA-APHIS-VS identify the most cost-efficient testing alternatives for detection of Mycobacterium avium paratuberculosis (MAP) in dairy and beef cattle herds at different levels of the program.

It had become apparent that in order to suggest cost-effective testing alternatives for the different levels of the program, defined targets for each level were needed. In reality the current program levels are defined by testing strategies, not by a risk characterization for the herds at each level.

In response to this identified need, this concept paper is an outline of recommendations for test strategies for classifying U.S. cattle herds by risk level for the national VBJDCP. The recommendations are based on review of scientific literature, data analysis, and discussions by a team of experts in the fields of epidemiology, diagnostics, and cattle management systems (SJ Wells, University of Minnesota; IA Gardner, University of California-Davis; CP Fossler, USDA-APHIS-VS CEAH; AJ Roussel, Texas A&M University; S Tavornpanich, Thailand International Animal Health Affairs).

The concept applied in development of JD Herd Test Strategies is to classify herds by maximum true within-herd prevalence of JD. The proposed categories are based on statistical probabilities, to assure that the upper 95 percent confidence limit for true within-herd prevalence is below the specified values for the respective level. The NJWG recommended that the Program Standards Committee develop a plan for implementation incorporating the principles of this concept paper for consideration by the group at their fall 2009 meeting.

Open discussion. Ideas/thoughts on JD Strategic Plan, Ken Waters facilitated discussion related to the proposed Johne’s Strategic Plan and the Herd Classification concept paper. After initial instructions those present divided into groups of approximately 4 to 6 for in depth discussion. Each group provided a brief oral report and a written summary of their responses to questions on each item. These were collected, summarized by Ken Waters and returned to the group for their use in the Friday discussion.

The meeting was adjourned for the evening, and continued on Friday, October 24, 2008.

JDIP Update - Vaccine, Diagnostics, Ken Olson opened by sharing brief comments on the report from the American Academy of Microbiologist (AAM) as an indication of the reason that we need to continue to push forward to address JD at the farm even if there are
funding and other challenges. He reported that the JDIP/APHIS Vaccine Project is underway with vaccine candidates being solicited. Two laboratories will screen candidates through an in vitro process. The best candidates from this evaluation will move forward for testing through a mouse model. The best candidates identified here will be evaluated through a goat model. It is expected that one or more candidates will be identified for commercial development. The total time line is three years. A project to develop guidelines for evaluation of diagnostic tests is in its preliminary stages. National Research Initiative (NRI) funding will be sought. It is anticipated that the process will provide a way to compare tests across populations. JDIP is also working with USDA-APHIS-VS in an effort to document impacts of the Johne’s program that are not captured in current reporting. DJC’s, extension and industry are being surveyed to obtain information that will be summarized for program use. It was also noted that the International Colloquium that will be held August 9-14, 2009 at the University of Minnesota will include a one-day workshop targeted at veterinarians and producers that highlights field application of Johne’s research. The JDIP Year 5 Request for Applicants (RFA) is available on www.jdip.org.

JD Vaccination Clinical Trial Update, Beth Patton reported on the Wisconsin project that involves three of their demonstration herds. It includes a total 148 vaccinated animals and 120 controls. Comparisons are being done on a within herd basis. Preliminary results show:
- overall decrease in whole herd prevalence
- 46 percent lower infection prevalence in vaccinates; (p= 0.03 pooled data)
- lower levels of shedding in vaccinates (p=0.02)
- significantly fewer clinical cases in vaccinates (p=0.01)

Observations included:
- strong evidence current vaccines will aid in control
- new vaccine candidates include DNA, subunit and mutant vaccines
- goals for new vaccine candidates include that they will:
  o maintain efficacy
  o reduce side effects

NVSL Update - Need for ELISA moderate positive control, Beth Harris reported on work at NVSL to provide low to moderate shedder positive control samples. This is in response to recommendations of the Scientific Advisory Subcommittee and the Committee. Moderate shedding cows have been identified and the processes to be used defined. Laboratories may sign up to participate through March 2009. Results will be provided to laboratories and the SAC by October 2009 for further consideration.

Nevena Djuranovic reported on a new IDEXX Pourquier M.pt. Ab ELISA kit that will replace the IDEXX HerdChek* M.pt. Ab ELISA test kit.
It is currently in the USDA licensing process for use on bovine serum, milk and plasma samples. It is approved for use in several other countries.

Ernest Hovingh reported preliminary results from the VS Dairy Producer Survey. Surveys were sent to approximately 15 percent of the dairy producers in each state. Response to the survey was good with over a 25 percent response rate. Demographics of the respondents are very similar to the national population. Interestingly the open on-line survey received minimal responses and most of those who received the survey chose to respond with the paper rather than the electronic version. Results showed generally good knowledge of the disease, but surprisingly 30 percent of the respondents did not know if their state had a program. Financial incentives were a positive, but concern over disease in their herd now and in the future was also a driving force for participation. Respondents indicated a willingness to pay more for low risk animals and to keep their herd free of Johne’s. They did feel that the value of both replacements and culls were reduced in Johne’s positive herds. Additional results will be available in the near future.

Chuck Fossler reported on the National JD Demonstration Herd Project. A total of 61 dairy and 21 beef herds are in the project. At the end of 2008, there will be five years of prevalence data on most herds. This will begin to allow evaluation of the incidence in cattle born in the first and second years of participation. It was noted that for incidence analysis, many of the principal investigators recommend following herds for at least 7-8 years. There is still a need to examine the association between management practices and MAP. Preliminary results suggest that prevalence has decreased in participating herds since start of project and that producer efforts have been effective in reducing incidence of Johne’s disease in younger cattle. Further work is needed to identify factors that have the greatest effect on incidence and prevalence. It is still early in analysis. Incidence results so far represent only half of participating dairy herds because 4 years of data were necessary. This means that current results are limited to cattle born during first year of participation—cattle born in subsequent years could not yet be included.

Jason Lombard presented results from the NAHMS Dairy 2007. States included in the study include approximately 80 percent of the dairy cows and herds in the country. The study did find that 68.1 percent of the herds sampled were positive. Other conclusion reported included:

- JD educational programs are working. This is demonstrated by
  - producer familiarity with the disease
  - implementation of control practices
- Herd-level prevalence is higher than commonly reported
  - this impacts the testing strategy and method that may be suggested
JOHNE’S DISEASE

- high Cow-level specificity (Sp) and moderate Cow-level sensitivity (Se) impact results
- it is difficult to make comparisons because different analysis have been used, so can’t ascertain national trends
  - Bulk milk testing looks promising as herd screening tool

Roxanne Pillars reported on results obtained from the Michigan Johne’s Demonstration herds on Economics of JD Control. Their objective was to determine if implementing a JD control program is economically feasible. Costs were obtained from an economic questionnaire administered annually starting in 2004. They sought to assess costs directly attributable to Johne’s Control Program. They fell into four categories: supplies; management; labor and capital investment. Benefits came from milk production, future production (or retention pay off (RPO)) and cull income. Four different NPV Scenarios were calculated that represent
  1. losses decline linearly with JD eradication after 20 years
  2. losses and prevalence remain constant after last year of study while still investing in control program
  3. no control – losses increase at rate equal to that in one
  4. no control – losses remain constant at baseline level

They found annual economic losses due to JD had a mean: of $79/cow; median of $66/cow and ranged from $16 to $243/cow. Annual cost of JD control program (without actual laboratory costs) had a mean of $30/cow, a median of $24/cow and ranged from $6 to $81/cow. They reported that all producers were satisfied with JD control program and plan to continue to invest in it after end of study. On average, the cost of JD control program was less than economic losses caused by the disease and JD control programs can be cost effective. Doing something to control JD was always a better economic decision than doing nothing.

Ken Waters led the remainder of the session in a review of the comments generated the previous day and in further discussion of the strategic plan.

Actions taken by the NJWG include:
- Accept the Strategic Plan and submit it to the Committee, which passed unanimously
- The Committee should submit a Resolution encouraging USDA to continue funding support for the Johne’s Disease Demonstration Herds through year 8 (up to three additional years) – passed unanimously
- Submit the concept paper, Herd Testing Strategies to Achieve Classification Levels for the U.S. Voluntary Bovine Johne’s Disease Control Program, to the Program Standards
Subcommittee to develop a plan for implementation - passed 14 to 8

- Recommended a task force to review programs that may work for producers who do not want to participate in state/federal program – 7 to 7 with 4 abstentions – result was no action.
The Committee met on October 28, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 8:00 a.m. to 3:30 p.m. There were 147 members and guests present. Chairman Hillman welcomed Committee members and guests to the meeting and provided opening remarks concerning Committee operation and conduction of Committee business.

Dr. John Clifford, Deputy Administrator, Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS), United States Department of Agriculture, and Neil Hammerschmidt, National Animal Identification System (NAIS) Coordinator, VS-APHIS-USDA, jointly presented the following report on the National Animal Identification System (NAIS) which was entitled Update on the National Animal Identification System: Budget and Business Plan Implementation.
REPORT OF THE COMMITTEE

The focus and objective of the NAIS remains the advancement of traceability for animal diseases. In keeping with this focus, USDA has published the final version of the Business Plan to Advance Animal Disease Traceability, which incorporated the feedback we received from stakeholders on the December 2007 draft. The strategies are designed to increase participation in the NAIS to achieve a critical mass of participation, which is the immediate focus. Also, we see the book end approach providing the most immediate and economical solution to move tracing capability forward. Identifying animals at their premises of origin is of significant merit. The business plan’s current emphasis is on cattle, since this sector has the most immediate need for advances in traceability. The cattle breeding populations are designated as the highest priority, due to their longer lifespan and subsequent likelihood to occupy multiple premises throughout their lifetimes. The long-term focus is full traceability and 48-hour traceback capability.

Standardization of data elements for disease programs

USDA is cooperating with States, Tribes, and industry groups to integrate NAIS data standards into existing disease programs and establish interoperability between technology systems. Establishing the NAIS’ seven-digit format for premises identification as the standard location identifier in all VS disease programs has been one of the most important actions taken over the past 12 months. A Premises Identification Number (PIN) Working Group made up of several State and Federal animal health officials developed a guidance document, and VS has established policy accordingly: USDA will be using NAIS’ seven-digit PIN format for locations participating in official disease control programs and emergency response activities.

PIN use in disease programs

A PIN will be used for: (1) the administration of disease programs that are regulated through the Code of Federal Regulations (CFR), for an emerging or re-emerging disease, or for a foreign animal disease; (2) VS activities that necessitate the assignment of a location identifier on a record to be submitted to and stored in a VS-maintained information system; and (3) when Federal funds are used to support the administration of the animal disease program.

To the extent possible, premises registrations are to be processed through the system used by the State, either the Standardized Premises Registration System or Compliant Premises Registration System. When necessary, if a PIN is needed immediately in the field, VS systems such as the Emergency Management Response System may generate the PIN. In such cases, the premises data will be communicated electronically with the State system to ensure that those systems have all premises records.

USDA has prepared a communication plan for stakeholders to
LIVESTOCK IDENTIFICATION

effect transparency prior to implementation. Recognizing that some sectors will require specific clarification of the policy, no revision to current practices at markets and slaughter plants will take place at this time.

Integration of automated data capture technology into disease programs

USDA has taken steps to integrate electronic data capture and reporting technologies into existing disease programs, including investing funds to obtain 1.5 million animal identification numbers (AIN) radio frequency ear tags and the development of Mobile Information Management (MIM) Systems that incorporate NAIS data standards. By integrating handheld computers/readers to replace paper-based forms, animal health officials are able to electronically record and submit essential data to the Animal Health and Surveillance Management System and other appropriate animal health databases. The electronic collection of data increases volume and quality, minimizes data errors, and speeds data entry into a searchable database.

Several States have been successfully using tuberculosis MIM in TB investigations and disease program work. A brucellosis MIM module has also been developed to accommodate brucellosis testing and vaccination activities. First tested in Wyoming in July of this year, more recently, USDA and State partners also completed a successful test of the brucellosis MIM module in the Greater Yellowstone Area (GYA) in areas of Idaho, Montana, and Wyoming.

Harmonization of animal identification programs

Numerous government and industry programs use animal identification. Animal identification can be used for management purposes, marketing opportunities, and disease control. With the NAIS, USDA is committed to the development of a flexible identification system that meets the primary needs of animal disease traceability but can also be used by the industry for other valuable opportunities. USDA will work with other federal, state, industry, and international partners to ensure the availability of improved identification methods and compatible processes and data standards that can be used for multiple purposes. Breed registry and performance recording programs present a significant opportunity to advance traceability if current identification approaches adopt the 840 AIN, which requires premises to have the standardized PIN. Radio frequency identification (RFID) technology has been utilized in marketing alliances and production management system for several years. The incorporation of the AIN 840 visual and RFID ear tags into these programs and management systems will increase tracing capabilities with minimal, if any, additional effort or requirements of the industry. Animal identification in marketing alliances helps document the information necessary for age, source, and process-verified animals.
Agricultural Marketing Service (AMS)

Many USDA-AMS verification programs require animal identification. In early April, AMS released a draft business plan describing how producers can use the NAIS to fulfill AMS marketing programs. Among the strategies, AMS is strongly encouraging NAIS participation to identify animals involved in USDA Process Verified Programs and Quality Systems Assessment Programs, allowing producers to use one animal numbering system and identification method for multiple uses, simplifying recordkeeping and reducing costs. The AMS Program Compliant eartag is a one-time use, tamper-evident tag, which contains a non-repeatable, unique number, and the NAIS-compliant 840 AIN eartags can be used for this purpose.

Producers will also be able to use NAIS-compliant 840 AIN eartags as unique identification to help meet Country-of-Origin Labeling (COOL) requirements. On September 18, USDA published an interim rule to limit the use of AINs with the 840 prefix to U.S.-born animals only. Public comments on the interim rule will be accepted until November 17. The rule also stipulates that imported animals that lose their country of origin identification cannot be retagged with 840 AIN devices, but all other official identification can be used instead.

AIN radio frequency (RF) eartags for use in brucellosis calfhood vaccinates

Official identification, including 840 AIN eartags, other than the Official Calfhood Vaccination (OCV) eartag may be used to meet the requirement for official identification for brucellosis vaccinates. States and industry have requested an orange AIN RF eartag for use in brucellosis calfhood vaccinates. As a result, USDA is establishing an option for an orange eartag, known as the AIN RF-V eartag that will have “OCV” imprinted on the male portion of the tag. States will have the option to have the state abbreviation imprinted on the eartag as well. VS will maintain a list of manufacturers producing these eartags, and States will order directly from those manufacturers.

Expanded use of official metal eartags

To accommodate requests from State animal health officials for official metal eartags being available for use outside specific regulatory programs, USDA plans to revise its policy to allow application of silver/bright eartags, which use the National Uniform Ear tagging System numbering format, by producers. Distribution of this official identification will continue to be limited to animal health officials, who will report distribution to the AIN Management System. State veterinarians will determine the availability of this option in their respective states.
LIVESTOCK IDENTIFICATION

Collaboration with industry
Active involvement and support from producer organizations and other key figures in the animal agriculture community are essential to establish a successful NAIS and advance national animal disease traceability. These groups provide a direct link to producers, offering an invaluable resource to communicate clearly about the NAIS. USDA continues to pursue a variety of avenues to strengthen partnerships with industry and solicit direct feedback from producers and other key industry stakeholders as the NAIS is developed.

Brand State Working Group
The brand infrastructure provides valuable traceability information, particularly intrastate. Fifteen brand states inspect nearly 30 million livestock annually. USDA continues to work with the brand States to explore opportunities to benefit both the NAIS and the brand infrastructure. In April 2008, a third party interoperability assessment identified potential issues: 1) uniformity of procedures among all 15 States; 2) timeliness of data retrieval from date of inspection; and 3) few electronic systems exist. Brand and animal health officials continue to develop interoperability/tracing capabilities.

Markets, packers and renderers
Some markets and auction barns are exploring options to become tagging sites to support producers’ needs and increase participation in animal identification. Packers and renderers, integral to the bookend system, have cooperated with USDA in an NAIS pilot project.

Animal Identification
Eight approved manufacturers are producing 23 AIN devices for use in the NAIS and animal disease programs (14 RFID eartags, seven visual-only eartags, and two injectable transponders). In addition, two premises identification eartags are available for use in slaughter swine.

Removal of official identification
The CFR includes regulations prohibiting the removal of official identification, however, certain situations warrant the authorized removal of US official identification: 1) malfunction, deterioration, near breakage; 2) infected ear; or 3) inoperable with a management system. The device should only be replaced with official identification and the following information must be reported: 1) date and PIN; 2) type of identification being removed; 3) reason for removal; and 4) official identification number being applied. The information should be submitted to the State Office or the Area Veterinarian in Charge or recorded in the AIN Management System. This policy does not apply to official identification for imported animals.
REPORT OF THE COMMITTEE

NAIS budget
Following the Commodity Credit Corporation (CCC) funding in early 2004, the NAIS received $33 million in appropriations annually from fiscal year (FY) 2005-2007. For FY 2008, the NAIS received appropriations in the amount of $9.7 million and also had $15 million in carryover funds, which allowed the NAIS to work from a $24 million budget this past year. In FY 2009, the President’s Budget contained a $24 million request, however, at this time, we are operating through a continuing resolution, therefore we are at the FY 2008 level of $9.6 million.

NAIS is estimated to have $3.2 million in carryover funds. Under the budget plan of $24 million, USDA had anticipated allocating $3.5 million for information technology (IT), $13.5 million for field implementation, and $7.1 million for program administration.

At the conclusion of the presentation by Dr. Clifford and Mr. Hammerschmidt, Committee members raised questions relative to USDA authority in either rules or law to require assignment of a PIN to a premises involved in an animal health program, as is called for in the Business Plan. After discussion of the issue, it was evident that clarification of the issue was needed. Chairman Hillman formed a Subcommittee, Chaired by Dr. Taylor Woods and including Dr. Becky Brewer, Mr. George Teagarden and Dr. Sam Holland to develop a proposed resolution to seek clarification of this issue.

Mr. John Picanso, Chief Information Officer, VS-APHIS provided a report entitled Veterinary Services Software Development – Results and Direction.

The office of the VS Chief Information Officer which Mr. Picanso directs is responsible for developing, deploying, and supporting automated information systems that support the data management requirements of VS’ national animal health program activities. Mr. Picanso presented an overview of information technology development projects currently underway.

Mr. Picanso also provided a summary of a report, entitled The VS Information Technology Roadmap which will be completed by December 2008, and provided to VS stakeholders and partners, State Animal Health Officials, and a variety of many other partners and commercial providers. The report highlighted the executive summary, which outlined:

- provide a technical framework of a future architecture.
- define processes and methods that describe how a variety of organizations and information technology resources can either obtain or deliver mission critical electronic data or information to Veterinary Services information systems (both current and planned).
- describe technology alternatives in moving information and technical systems from a current state to a planned future state.
Mr. Picanso indicated that the completed VS IT Roadmap Report should be completed in final form by the end of 2008. Contractor support for this report ends November 17, 2008, and VS will continue towards the finalization and clearance of the report.

One of the sections which Mr. Picanso discussed was the description of suggested initiatives which will be designed to provide VS the ability to support critical IT investments which continue to safeguard animal health and provide stakeholders details of software development highlighting software components under development and their estimated delivery dates.

One highlight of the report will focus on data acquisition, management, storage, exchange and delivery. Data standards and standard terminology will be provided to aid in data exchange with animal health officials, VS stakeholders, and industry information systems. Security with data collection and housing was also discussed.

Software results included the discussion of the Emergency Management Response System (EMRS), the Veterinary Services Process Streamlining (VSPS) system, the Generic Database (GDB) and the Animal Health and Surveillance Management (AHSM) system, and Mobile Information Management (MIM) applications.

Mr. William Sessions, Associate Deputy Administrator, Agriculture Marketing Service-USDA discussed COOL and Animal Identification Related Issues. He noted that there were two authorizing pieces of legislation – the 2002 Farm Bill which enacted mandatory COOL and the 2008 Farm Bill, which amended the COOL law and provided a September 2008 implementation date. He reported that the COOL regulations are contained in 7 CFR Parts 60 and 65. Mr. Sessions reported that covered commodities include products from beef, lamb, chicken, goat and pork. He noted that covered commodities may bear a US origin declaration only if it meets the definition of US country of origin which means that the commodity is from animals born, raised and slaughtered in the US, from animals born and raised in Alaska or Hawaii, transported through Canada, and slaughtered in the US, or is from animals present in the US on or before July 15, 2008. Mr. Sessions further noted that packers which slaughter animals that are part of a NAIS or other officially recognized system may also rely on the presence of an official ear tag or the presence of any accompanying animal markings, as applicable, to base origin claims. This also includes group/lot identification.

Dr. Hugh Millar, Chief Veterinary Officer, Australia, provided a report on Australia’s Livestock Identification and Tracking System.

The National Livestock Identification System (NLIS) is Australia’s system for identifying and tracking beef and dairy cattle for food safety,
disease control and market access purposes.

All properties are registered with a Property Identification Code (PIC) – an 8 character code that identifies the state, shire (country) and district in which the property is located. Cattle are individually identified with electronic radio frequency identification (RFID) ear tags. Information on their movement from their properties of birth until they are slaughtered is captured throughout the supply chain and recorded in on a national, producer-managed database.

The system is mandatory and is now fully in place across Australia – with over 55,000 transactions/movements recorded daily. Over 99 percent of transactions are processed in the database within 30 minutes, making the data real time and of enormous value for tracing purposes.

Many producers are using NLIS identification for their on-farm management systems.

The presentation demonstrates the NLIS from the point of view of the livestock producer, market operator and abattoir. Also presented are examples of how the NLIS database can be analyzed to provide tracing information, find links between cattle and farms related to cattle movements, and display whole-life histories for individual animals, all at the click of a mouse.

The NLIS protects the reputation of Australia’s cattle industry as a supplier of safe and wholesome beef and dairy products.

Dr. Valerie Ragan, AgWorks Solutions, presented a report and provided an update on GlobalVetLink’s (GVL) GoPass Equine Passport System.

Based in Ames, Iowa at Iowa State University Research Park, the company started operations in 1999 on a pilot project with the Florida Department of Agriculture. Today, electronic certificates are accepted in all 50 states and 3 US territories. More than 115 million animals have been moved on GVL Certificates.

Why use GVL? Provides access to real-time movement data, national standardization, reduction in paperwork, provides digital clarity – and digital photos. Also provides access to laboratory test results, and includes enhanced security via eSignatures, which has been approved by USDA. GVL sends data and certificates securely to state animal health authorities after laboratories post equine infectious anemia (EIA) test results.

Under current paper-based systems…..In most cases, official certificates of veterinary inspection for the movement of horses are valid for 30 days. There is a need to check with each state to confirm requirements for entry. Certificates for movement are paper, copies need to be sent in several directions.

The following is an example of one state’s requirements for Certificate of Veterinary Inspection (CVI) document distribution.
Distribution of written CVIs by the accredited veterinarian.

- the original shall be submitted to the office of state veterinarian (OSV) within seven (7) days of the date it is written.
- the second copy shall accompany the animal being moved.
- the third copy shall be sent to the state of destination within seven (7) days of the date it is written.
- the fourth copy is retained by the issuing veterinarian

During the 2007 USAHA Annual Meeting and the 2008 USAHA District meetings the need for an online, standardized equine event movement permit system was identified. There are several paper-based equine passport systems being utilized in the US. In 2003 the Southern Animal Health Association established for its member states a model through a memorandum of understanding (MOU). A slightly different agreement is in place with the South-Central States and Western States. These paper-based systems have not worked very well and they lack standardization. GVL has developed a system which meets the requirements of the three different groups of states. This system is GoPass:

A new on-line equine passport system, it was developed in response to an expressed interest in simplifying the process and getting it moving.

Phases of GoPass include:

- Phase I: Western and South Central States Passport
  - Launched June-July 2008
- Phase II: Southern States Passport
  - August 2008
- Phase III: Owner Login
  - Estimated completion: November 2008

The GoPass Process is as follows:

- the system validates that requirements are met before the passport can be completed;
- EIA test dates fit within guidelines;
- Official CVI is less than 30 days old; and
- meets any other required state criteria.

The Southern Animal Health Association (SAHA) GoPass version allows the veterinarian to electronically sign and submit application to the state veterinarian's office for approval. If approved by state official, it is electronically signed and immediately available to the submitting veterinarian and owner.

The GoPass Advantages include:

- web based equine passport;
- electronic; no more paper copy distribution needed (unless required by state law);
- provides easy access to state import requirements;
REPORT OF THE COMMITTEE

- valid for six months;
- more secure, eliminates fraud;
- reminders are sent 14 and 7 days before expiration; and
- standardizes the process of animal inspection, movement approval and data access.

Mr. Bruce Knight, Undersecretary, Marketing and Regulatory Programs, USDA, discussed NAIS Strategies and Directions for Achievement of the Long Term Goals for Animal Disease Traceability.

Mr. Knight reported that he left the USAHA meeting to participate in an RFD-TV call in program on Monday evening with members of the cattle industry. He reported that he is incredibly pleased with the progress of the national animal identification system. Mr. Knight noted that he had recently attended a meeting of the National Association of State Departments of Agriculture (NASDA) where he invited state agriculture commissioners to tape public service announcements (PSAs) in support of premises registration and animal identification. He noted that so far 14 or 15 Commissioners had taped PSAs but only 6 State Veterinarians had taped PSAs. He challenges the State Veterinarians to outperform the commissioners.

Mr. Knight said that there is a synergy between COOL and animal identification and noted that at the outset of the program, we must use affidavits for animal movements but believes that the safe harbour provided by 840 tags will increase their use in COOL.

Mr. Knight noted that we are one-third of the way there (39 percent) in registration of premises with over 450,000 premises registered – over 50,000 registered this year. He explained that the Business Plan lays out the work ahead for APHIS and state animal health agencies as well as producers in order to achieve full implementation of the plan. He noted that 13 states have registered over 50 percent of their premises, and that we have a larger base than Canada or Australia and will be the envy of the world in a few years.

He said that in the Business Plan we made the decision to bring the components together and connect directly to disease programs and laid out the process in the September VS Memo.

Mr. Knight reiterated that we now have several hundred thousand cattle identified with RFID tags and that we are using the components of the animal identification system in the tuberculosis testing of many of these animals. All of this is being accomplished with an error rate significantly lower that the 10 percent error rate found with paper based systems, and noted that by the end of 2008, 6-10 million animals will be identified utilizing 840 numbers.

He said that currently there are 24 tags approved for NAIS, with 15 being RFID tags.

Mr. Knight provided a word of caution and an exhortation. He noted that the anticipated budget shortfall is the biggest challenge, as we are
operating under a continuing resolution, until March 6, at which time Congress is expected to act on a new budget. He said the agency has $4.2 million to take us thru March 6. We are working with cooperative agreements and carry-over funds to make it work.

He urged individuals to work with congressional members and educate them on how important animal identification and traceability is to disease control, eradication programs, and to response to foreign animal diseases.

Mr. Knight believes that, as a nation we are capable of 48 hr. traceability on poultry and are nearing this goal with swine and sheep. He said the remaining challenge is dairy and beef cattle, noting that we need to meet the 70 percent registration goal for cattle by end of next year. It will take work from vendors and states to sign up remaining premises. Direct mail to over 250,000 producers helps educate producers, and identify those willing to participate.

He said “I have worked with two Secretaries, now many of you and have a world of respect for your efforts. There will be a new person in the Secretary’s position and in my job and I ask you to hold them accountable. Make ID come alive for them as it is not an academic exercise, rather it is about the core functions of your careers, to maintaining the viability of our livestock producers’ livelihood.”

Mr. Knight concluded by noting that we have a state of the art system that is ready, and a robust database with one third of the premises already registered. We have a state of the art system of on ear tags and RFID that is operable. Many states are moving ahead and we know it will be a national system. These challenges are formable but not impossible. As we go thru tight budgetary concerns, don’t loose your commitment and ambition.

Dr. Robert Fourdraine, Wisconsin Livestock Identification Consortium, discussed the Benefits of Integrating AIN RFID into Existing Industry Programs.

Many industry programs requiring some form of individual animal ID, which may include:

- on-farm management programs;
- breed registries;
- milk recording systems;
- AI companies; and
- marketing programs.

Existing ID Devices include:

- RFID
  - manufacturer coded RFID
  - transponders
- Visible ID
  - American ID
  - uniform series ear tag number
  - management number
Key Drivers for RFID are:
- RFID Transponders;
- cost savings of $40 -> $2;
- ease of application; and
- wider acceptance.

Visible ID and RFID advantages include:
- automate data collection;
- unique identifier beyond the farm;
- cost/labor savings; and
- data accuracy.

The ID must show benefit to producers. What do we need to address? We must show practical application and not a research project. Additionally, herd size issues must be addressed. One size does not fit all. Herds must be able to integrate with existing programs, and the industry must educate youth and those doing the work of how the technology performs.

The biggest opportunities and benefit areas are outlined as follows:

**Dairy Industry**
- over 50 percent uniquely identified
- animals are managed every day
- good record keeping a must
- many programs can link to a unique ID

**Local shows**
- meat animals need an ID for the show
- good record keeping a must
- work with volunteers, and educate youth

**Dairy producer benefits:**
- On-Farm Integration
  - herd health checks
  - milking parlor
  - sort gates
- Use in animal health programs
  - disease testing
  - calfhood vaccination
- Allied industry integration
  - breed registries
  - DHIA milk recording
  - AI genetic programs
- Apply an AIN (a.k.a “840”) ID Device and meet Country of Origin Labeling requirements?

**Livestock show benefits:**
- Provide a unique ID
  - tamper evident
  - works with existing procedures
- Applied at weigh in
- Read at the show
LIVESTOCK IDENTIFICATION

- reduce risk of injuries
  - Data collection automation
    - handheld vss keying in data afterwards
    - reduce time and effort
    - integrate with scale
  - Educational opportunity
    - explain animal health
    - technology
    - good record keeping
- Apply an AIN (a.k.a "840") ID device and meet country of origin labeling requirements.

Dr. Kent Fowler, Chief, Animal Health Branch, California Department of Food and Agriculture (CDFA) provided a report entitled The Implementation of Electronic ID-A Field Report -California Tuberculosis (TB) Task Force Report on the field integration of electronic identification, handheld device data capture and data utilization in the tuberculosis testing efforts conducted by the Tuberculosis task force.

History
The California TB Taskforce started in December 2007 and is ongoing. As of October 22, 2008, the taskforce has tested 250,000 cattle from 190 herds. There are 3 affected dairies in the Fresno County area. Two of the herds are depopulated.

Objectives of the Taskforce
The California TB Taskforce will supply cattle herds involved with the TB testing with USDA approved RFID ear tag technology (840 tags) for herd testing. Using this approach, USDA and CDFA plan to enhance TB testing activities, advance the National Animal ID System (NAIS), accelerate the use of RFID technology for regulatory testing of livestock, provide producers with long term management and marketing opportunities, and facilitate future animal health testing.

Identification Coordination Team
The TB taskforce established an ID Coordination Team to facilitate the inventory, distribution, and application of RFID tags in test eligible herds, as well as distribute outreach about NAIS. The team has 6 members and it is part of the Fresno Incident Command Post.

Communications and Producer Interaction
A high level of communication with the dairy industry is needed to facilitate the use of RFID technology and the application of the tags by dairy producers prior to the TB test. The assigned herd testing veterinarian is the initial point of communication with the herd for identification (ID) technology. In collaboration with the Herd Test Coordinator
and the Operations Section, the ID team schedules tag application and herd inventories.

The ID team supplies each dairy herd with basic instructional materials for proper placement of the RFID tag, tag application, and the NAIS. Some dairy producers already apply RFID technology for herd management. In certain situations, the producer’s data can be imported for the purposes of the test. These opportunities are evaluated on a case by case basis.

Distribution and Application Options

The California TB Taskforce staff and ID team strongly encourage livestock producers to apply the RFID tags prior to the test because of limited taskforce personnel resources. The dairy receives RFID tags for all test eligible animals several weeks in advance of the TB test. The taskforce supplies approved 840 official RFID tags for the primary benefit of the TB test. Many producers also recognize the secondary management and marketing benefits. There are three options for application of the tags for the TB test including: 1.) producer applies all the tags prior to the test and ID team inventories the herd, 2.) the ID team tags and inventories the herd prior to test day and 3.) tag application and all testing activities are completed during the injection phase of the TB test.

The current tag distribution data reports a total of 349,900 tags supplied to 201 dairies. The ratio of dairy farms requesting full-duplex tags (FDX) to half-duplex (HDX) tags is 3:1. This distribution of either FDX or HDX technology is dependent on the producer’s goals for application of the technology and available supplies.

Producers plan to use the RFID tags for different reasons. Some producers will only use it for the TB test and nothing else. There are other producers with existing RFID systems or aspirations to use the electronic ID technology to improve their daily management. A portion of producers with no plans to use the technology are motivated to apply it after receiving tags for the TB test. Two producers refused the RFID technology.

Application of RFID ear tags

The proper placement of the RFID ear tags is in the left ear between the two ribs of cartilage near the center portion of the ear approximately 1/4th of the way from the base of the ear. It is also important that the tags be disinfected with an approved disinfectant (e.g., Nolvasan, Chlorhexidine) to minimize infection and insure tag retention. The actual application can be done by one person, but a team of two people is ideal in larger operations (i.e., 2,000 head or greater). The team has one person applying tags while the
other person loads tag applicators and applies disinfectant to the tag.

Challenges and Successes

The effective implementation of RFID technology for an event like the TB taskforce requires some key elements including: good communication and coordination with distribution of supplies and the testing schedule, excellent communication with the producer, staffs that are comfortable talking about the RFID technology and its benefits for both the testing and management applications, and monitoring of accurate tag distribution to producer participants.

The overall TB test presents some interesting challenges with reading official ID and the opportunity to leverage RFID technology. Many forms of official visual ID can be hard to read due to tags with mud and dirt on them, worn off numbers or letters on metal tags, and lost ear tags. Some facilities can present safety issues for both the animals and people. If bulls or a high proportion of loose cows are an issue, the test time is often extended and more personnel are needed to complete the test. The printing of the 840 number on both sides of the tag creates several challenges including accuracy issues with matching tag parts and time delays with removal of tags from packaging.

Data Recording

The California TB Task Force uses RFID technology in combination with a handheld computers (PDAs) and the USDA Mobile Information Management (MIM) (TB testing module) software to inventory the herd, to document all forms of ID (RFID, brucellosis, silverbrite, herd tag, etc.) on the animal, and to record required herd test information.

Data recording teams consist of two people with one person using the handheld computer while the other reads the tag with the RFID reader. It is important to have enough data recording teams relative to the number of injectors to maintain a steady work flow. In some barn situations, additional personnel are critical to sorting and restraining animals for the test. Producers are consistently concerned about impact of restraint times on the well being of the cows and milk production.

The features of the handheld PDAs are also an important consideration for implementation of RFID technology and electronic data capture. The PDAs ideally should be semi-ruggedized, fully ruggedized equipment, or fitted with features that protect the hardware from the environmental elements. The ergonomics of the device (weight, balance, etc.) are an important feature because of long term use each day with little down time. Other considerations include screen illumination for outside use, battery life span, and
keyboard size. User preferences are variable and it is difficult to completely satisfy specific preferences of all users; however, a highly reliable and robust hardware system is critical.

The taskforce uses multiple brands of PDA technology and RFID reader technology. The preference for type or brand varies across users. The taskforce continues to evaluate the different technology platforms and the needs for future testing applications.

Database Systems

The early stages of the TB taskforce revealed some difficulties with data management. The taskforce staff entered data into multiple unconnected databases with different software platforms. The processes were paper intensive with duplicate data entry. Management staff worked with technical staff members to centralize data management. The current taskforce maintains all data, documents, and daily information in the Emergency Management Response System (EMRS). The individual animal test data are electronically entered into the California Tuberculosis Database (TBDB). At the early stages of the taskforce, it is important to establish a vision for robust data management and document tracking systems.

Conclusions

The experiences of TB Taskforce emphasizes the following points: 1.) good technical support is critical, 2.) the USDA MIMS team is very supportive of TB testing efforts, but the team is understaffed, 3.) communication and coordination are critical for all segments of incident command system (ICS) with respect to testing and application of RFID, 4.) opportunities exist to effectively advance the application of the NAIS for disease surveillance and testing programs, 5.) the California dairy industry is receptive of RFID technology and 6.) the current TB event provides an opportunity to collect surveillance data on slaughter cattle.

Dr. Steve Eicker, Valley Ag Software, discussed his company’s experiences with voluntary utilization of RFID on US dairy farms in a presentation entitled Field Experience with RFIDs on US Dairy Farms.

Introduction

Large scale adoption of RFID technology has occurred in the last five years on large US dairy farms. The technologies that accelerated this were:

- battery-powered, blue-tooth readers
- sufficiently powerful hand-held PCs.
- availability of software platforms.
According to recent USDA estimates, Dairy Comp 305 (Valley Ag Software) has over 60 percent market share of the cows on farms using computerized management systems, and likely a far greater proportion in larger herds and large heifer ranches. Large herd sizes dilute the cost of both hardware and software. In addition, these herds are more likely to have lockups and hired labor.

On-farm Use

The case for adoption of this technology is compelling. There are a number of chores that are greatly facilitated by this, such as reproductive injections, exams, and inseminations; inventory management; bovine somatotropin (bST) and vaccine injections, lameness rechecks, dry cow separation, etc. Nearly any task that involves finding a subset of cows in a group is substantially faster. In some dairies, we have measured over a 50 percent decrease in the time to do certain chores.

In addition, there is accountability. There is a timed-stamped record that the employee actually was near the cow, and the time interval is an indication that the task was completed. The indirect benefits maybe even greater: Cows are locked-up less time, so there is more time to lie down; the compliance means the correct injections are administered to the correct cows.

Most dairy tasks occur at the rear of the cow: inseminations, palpations, milking, Dairy Herd Improvement Association (DHIA) testing, udder treatments, TB tests, etc. Even if the ear tags read correctly, it takes an extra person, and the opportunity for mismatches in a parlor is unacceptable. The recent availability of rear-legs bands may resolve most of these issues.

Large heifer ranches have also adopted these tags. Often, a heifer raiser has calves from a number of sources, and the traditional ear tags numbers are duplicated. A unique electronic identifier resolves much of this. Cattle move is greatly facilitated, as is weighing, inventory, treatments and pregnancy examinations.

Animal Movement Tracking

As farms increase in efficiency, they can afford specialization for certain tasks. There has been a dramatic increase in very large heifer ranches, commonly in a different state. With electronic record transfer, data entry for new arrivals is minimized. Calves are scanned as they leave the source farm, and scanned as they arrive on the calf ranch. As activities occur, the data at the source farms are updated.

Although these electronic data move easily between dairy farms and heifer ranches, the health papers still tend to be on paper. There would appear to be great value if governments would accept electronic animal movement and health data.
Laboratory Data Submission

Collecting identified samples from cows has been a monthly task for DHIA organizations for years. We have expanded this concept to health samples, such as mastitis cultures or blood samples. Accurately identifying the cow, and the sample, and have electronic sample accession is crucial with DHIA, but seems nearly prohibited by many animal health laboratories. The technicians in the laboratory should not be wasting time guessing at the ID on a sample, or on a smudged paper, as they are far from the source of verification. There would appear to be great value if diagnostic laboratories would accept electronic sample submission data.

Data Distribution

The wide availability of the web has been ideal for the rapid dissemination of data so the dairy farmers can make better decisions. We have access to such data as Dairy Herd Improvement (DHI) milk and components, milk cultures, soil samples, DNA analysis, sire mating suggestions, farmer reported diseases, etc. All these data arrive electronically, automatically, without the need to logon or query a web site. There would appear to be great value if diagnostic laboratories could make other health data available for automated transfer.

Animal Identification Accuracy

In our in-house tests and field experience, the read range of HDX has been superior to several brands of FDX tags with hand scanners. This has a direct effect on the speed that a group of cows can be searched. It has an even greater impact on the ability of stationary scanners. Unfortunately, the recent TB project released a number of HDX tags that will compromise the function of a dairy farm.

At one time, there was discussion about having minimum standards for identifying animals. But this fell victim to some unknown political issue, and all standards were eliminated. The USDA even allows visual tags, which have no read accuracy worth discussing. There would appear to be value if it was prohibited to have a 15-digit number printed anywhere.

Adoption of 840 Series Tags

At one time, we were encouraging our clients to use 840 sequence numbers instead of manufacturers’ codes. This was in part due to significant subsidies from certain states and other organizations. And at one time there was the fear that USDA would not recognize the non-840 tags. However, there are some compelling reasons against a farm using
these tags. They cost more; there are additional tracking requirements; it was recently announced it was illegal to remove a tag, and finally, it is now illegal to tag a cow that is later determined to originate from Canada.

What should a dairy do that purchased a group of cows only later to find that someone had inserted inferior, low quality tags? These tags need to be replaced, or the cows need to be sold. A similar issue occurs if a cow is imported from Canada with the tag in the wrong ear. Another example is a farmer that installed inferior tags in their heifers, only to discover two years later that all the tags need to be replaced. In each case, the value of an animal tagged with a traceable tag will decrease as these animals are marketed.

Recently, the USDA has taken steps to allow replacement of 840 tags for management purposes. This is a welcome step, but it would appear we need to continue to seek incentives for farmers to use 840 tags, as the current scale is still tipped against them.

Summary
The dairy industry has made huge strides in adopting this technology for market reasons, with little financial assistance from regulatory bodies. The herds that are using these represent a significant proportion of dairy animals that are moved between herds and across state lines.

Recommendations recap:
1. Encourage the use of rear-leg dairy cattle identification.
2. Governmental agencies should accept electronic health and movement data.
3. Diagnostic laboratories should accept electronic data submission.
4. Diagnostic laboratories should provide electronic distribution of health data.
5. Government agencies should distribute only HDX 840 tags to the dairy industry.
6. Printing a 15-digit number on a tag or paper should be prohibited.
7. A clear statement should be made that allows replacement of 840 tags for management needs.
8. Additional incentives are needed to encourage the use of 840 tags if that is still a goal.

At the conclusion of this presentation a number of questions and comments challenged the assertions related to utilization of HDX versus FDX tags. The presenter noted that the apparent superior read rates may have been related to readers specifically tuned to the tag frequency and that many FDX tags would function very well. A commenter noted that currently available FDX tags were very comparable to HDX and some may have equivalent or better readability.
Committee Business:

Old Business:

Committee Purpose and Goal: Chairman Hillman led a review of the Committee purpose and goal. After the review the Committee determined that the current purpose and goal continue to be appropriate for the Committee.

Review of 2007 Resolutions: Chairman Hillman reviewed the five Committee Resolutions from 2007. Agency responses to the resolutions indicated that actions were being taken to implement recommendations from all of the resolutions. While actions were not complete on some of them, there was sufficient work to consider the purposes for the resolutions fulfilled.

New Business:

The PIN Subcommittee Chair, Dr. Taylor Woods presented the proposed Resolution developed by the Subcommittee to seek clarification of USDA authority to require a PIN for animal health programs. After discussion and clarification the proposed Resolution entitled Clarification of Authority for NAIS PIN use in Program Diseases and Emergency Programs was unanimously approved.

Chairman Hillman recognized Vice Chairman Maher to address Committee members and commend them for their participation and support for Committee efforts over the past five years.

Chairman Hillman thanked the members of the Committee for their efforts and support in furthering animal identification efforts during his tenure as Committee Chair and informed members that his five years as Chair would conclude with adjournment of the meeting.
REPORT OF THE USAHA/AAVLD COMMITTEE ON THE NATIONAL
ANIMAL HEALTH LABORATORY NETWORK

Co-Chairs: Barbara E. Powers, Fort Collins, CO
Richard E. Breitmeyer, Sacramento, CA

Co-Vice Chairs: Terry F. McElwain, Pullman, WA
David T. Marshall, Raleigh, 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;
George A. Teagarden, KS.

The Committee met on October 6, 2008 at the Sheraton Greensboro
Hotel, Greensboro, North Carolina, from 1:50 to 5:00 p.m. There were
15 members and 25 guests present. The meeting was called to order
by Co-Chairs Barb Powers and Richard Breitmeyer. Meeting attendees
introduced themselves.

Barb Powers reviewed the current National Animal Health Laboratory
Network (NAHLN) mission statement and current NAHLN Strategic
Plan that was approved in April 2005. Program accomplishments are
54 laboratories in the NAHLN, over 200 trained and proficiency tested
personnel, approved validated assays for four of the priority agents
in addition to transmissible spongiform encephalopathies (TSEs), 13
functional Biosafety Level 3 (BSL3) laboratories in operation and modeling
for gap analysis begun. Considering that many goals have been reached,
the strategic plan needs to be revised or updated.

The results of the NAHLN survey were reviewed and will be posted
on the American Association of Veterinary Laboratory Diagnosticians
(AAVLD) and United States Animal Health Association (USAHA)
websites. The 11 page document has valuable information on a wide
variety of issues. The consensus is that the information gathering for the
NAHLN review is complete and progress on implementation of gathered
information needs to begin.

Beth Lautner, National Veterinary Services Laboratory (NVSL),
Veterinary Services (VS), Animal and Plant Health Inspection Service
(APHIS), and Muquarrab Qureshi, Cooperative State Research,
Education, and Extension Service (CSREES), presented the USDA
perspective on the strategic vision of the NAHLN, the strategic plans of
APHIS and CSREES that includes the NAHLN, the proposal for formation
of the NAHLN Coordinating Council, and roles and responsibilities of APHIS and the CSREES. Discussion followed with emphasis on ensuring AAVLD and USAHA have input into NAHLN planning and progress (via the Committee and Coordinating Council), including modification of the vision statement and structure of the Coordinating Council.

A draft proposal of the new special NAHLN Committee was distributed for comment. Monthly conference calls will be planned and a web-based forum for communication will be established.

Discussion on budget /funding issues and the structure of the laboratory network ensued. Funding limits expansion of the network and the majority of the 54 member laboratories do not receive sufficient infrastructure support to meet the needs of the NAHLN.

The survey indicated that a regional concept of laboratory support was best, based on regional and animal census data. Further modeling is needed to determine gaps and to prioritize areas for additional funding. State data may be useful for individuals to use to meet state needs and/or appeal for state support/funding. How the NAHLN may interact with non-NAHLN laboratories were discussed. The reassessing of the structure of the network is a high priority item for further work, as is obtaining funding for infrastructure support of more laboratories.

A motion to approve the AAVLD position on Blanket Purchase Agreements for fee-for-service testing was introduced and passed. It is included at the end of this report.

A discussion on laboratory Quality Assurance/Accreditation included the roles of AAVLD accreditation and USDA approval and coordination with the AAVLD Accreditation Committee. AAVLD accreditation is based on World Organization for Animal Health (OIE) standards and USDA will require and accept AAVLD accreditation or ISO17025 for entry in the NAHLN unless federal law requires additional auditing (i.e. bovine spongiform encephalopathies). There needs to be more widespread information shared on the rigors of AAVLD accreditation so that stakeholders can be assured of quality results from NAHLN laboratories.

Further topics for work include input on formats for annual reports and distribution of these reports, discussion with other agencies on priority agents and new programs, information technology development updates, and updates from the Methods Technical Workgroup. The Toxicology Workgroup emphasized the strong nationwide need for toxicology laboratory support and programs as many laboratories are downsizing toxicology sections. An effort including AAVLD, USDA, and the Food and Drug Administration (FDA) is needed as this is a large gap in the system.
The American Association of Veterinary Laboratory Diagnosticians (AAVLD) greatly appreciates its partnership with United States Department of Agriculture (USDA) in the National Animal Health Laboratory Network (NAHLN). We recognize the rapid advances and progress the NAHLN has made over the last six years with limited financial resources.

In the spirit of cooperation and continual improvement of the NAHLN and the partnership between AAVLD and USDA, we make the following statements and recommendations:

1. The Blanket Purchase Agreement (BPA) is the favored financial tool compared to Cooperative Agreements or other financial arrangements for laboratory reimbursement of fee-for-service work performed as a component of formal disease surveillance activities. We greatly appreciate the progress made toward implementing use of the BPA. When possible, a single BPA for multiple surveillance programs would be preferred.

2. The prices issued in the BPA must be set by USDA. This has been done in the past for wild bird avian influenza (AI) real time polymerase chain reaction (rtPCR) testing and bovine spongiform encephalopathy (BSE) testing; this is the preferred mechanism for continued efficiency and fairness for NAHLN laboratories working as partners with National Veterinary Services Laboratories (NVSL) and each other. Forcing AAVLD laboratories to competitively bid against each other can become divisive and is contrary to the spirit of the NAHLN.

For the sake of maintaining the partnership with AAVLD, we recommend that USDA gather pricing information from NAHLN laboratories and then determine a fair price. The AAVLD laboratories can then decide whether participation in the program makes good business sense or not for their individual laboratory.

3. The BPA must be issued in a timely manner in order for AAVLD laboratories to process these according to the individual requirements of their university/ agency systems. AAVLD recommends a conference call be held one month before the solicitation announcement of the BPA. At this time, the program goals can be discussed, input provided as to suggested prices, and any other program questions (such as test volume, test type, etc.) can be addressed. Once the BPA solicitation is announced, AAVLD laboratories require at least one month to decide on program participation, and to route the paperwork through the budgeting and/or legal departments of their systems.
REPORT OF THE COMMITTEE ON NOMINATIONS AND RESOLUTIONS

Chair: Bret D. Marsh, Indianapolis, IN

2008 OFFICER NOMINATIONS

PRESIDENT: ........................................ Donald Hoenig, Belfast, ME
PRESIDENT-ELECT: ......................... Richard Breitmeyer, Sacramento, CA
FIRST VICE PRESIDENT: ................... Steven Halstead, Lansing, MI
SECOND VICE PRESIDENT: ............... David Marshall, Raleigh, NC
THIRD VICE PRESIDENT: ................... David Meeker, Alexandria, VA
TREASURER: ........................................ William Hartmann, St. Paul, MN

2008 DISTRICT DELEGATES

NORTHEAST: ........................................ John Enck, Jr, Pennsylvania
........................................................ Ernie Zirkle, New Jersey
NORTH CENTRAL: .............................. Velmar Green, Michigan
...................................................... Jay Hawley, Indiana
SOUTH: .............................................. Laurent O’Gene Lollis, Florida
...................................................... A. Gregario Rosales, Alabama
WEST: .............................................. Bill Sauble, New Mexico
...................................................... H.M. Richards, III, Hawaii

2008 RESOLUTIONS

RESOLUTION NUMBER: 1  APPROVED
SOURCE: COMMITTEE ON SALMONELLA
SUBJECT MATTER: PROMOTING THE USE OF STANDARDIZED BACTERIAL FINGERPRINTING STRATEGIES

BACKGROUND INFORMATION:

The United States needs to continuously generate baseline studies that discover bacterial fingerprints (bacterial genotypes) in order to discern the emergence of new Salmonella strains that if introduced into our human and animal populations may spread throughout the food chain. We need to coordinate the currently used pulsed field gel electrophoresis (PFGE) data with other microbial typing methods as they are discovered in addition to improving the cost effectiveness of genotyping.

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), Food and Drug Administration (FDA), and Centers for Disease Control and Prevention (CDC) to increase support for effective Salmonella
surveillance to protect public health, food safety, and international trade by the use of standardized bacterial fingerprinting strategies and the centralized storage, management and interpretation of collected data.

**RESOLUTION NUMBER:** 2 and 35 Combined  **APPROVED**

**SOURCE:** USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT COMMITTEE ON FOREIGN AND EMERGING DISEASES

**SUBJECT MATTER:** REGIONAL AND OPERATIONAL ANIMAL HEALTH EMERGENCY MANAGEMENT

**BACKGROUND INFORMATION:**

There is a significant need to expand federal funding for state animal health agencies to proactively work with state emergency management agencies and other existing regional agriculture emergency management groups. This much needed funding will be utilized to regionalize animal health emergency management preparedness and response capabilities and to demonstrate effectiveness of regional operation plans that will coordinate and integrate both the public and private sectors to prevent, respond and recover from any major foreign animal disease(s) which may threaten the public health and/or the health and safety of the United States livestock population. This important undertaking will be done in concert with recommendations contained in Homeland Security Presidential Directives 5, 7, 8 and most importantly 9.

Much has been accomplished since September 11, 2001 to focus attention at the local, state and national levels to better prepare the nation to address potential acts of terrorism. However, the food and agricultural community (both public and private sectors) remain unprepared to effectively prevent, respond and recover from major animal health emergencies that could result from the introduction of one or more foreign animal diseases at different locations throughout the nation. To be better prepared to address such worse-case scenarios, there is a critical need to operationalize emergency preparedness and response capabilities at the regional level so that both the public and private sectors are coordinated and fully integrated into such planning as called for in Homeland Security Presidential Directive 9. This represents a critical national security need to protect the food chain, public health and the environment in the event of a major animal health related emergency. Through regionalization or compartmentalization of the nation, a more rigorous and effective animal health emergency management system can be developed and quickly implemented to prevent the spread of disease agents and better manage foreign animal disease related threats which will know no state boundaries. Such regional animal health emergency management planning will provide greater assurance for critical coordination between both the public and private sectors as well as better coordination within the public
sector between federal agencies, state animal health agencies, state emergency management agencies, state and federally funded diagnostic laboratories and state and local extension agents.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Homeland Security (USDHS) and the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to each request $5 million within the President’s 2011 budget to adequately fund an initiative to engage state animal health agencies to work cooperatively at the regional level to establish or expand existing regional animal health emergency management planning groups. The goal of this initiative is to form food and agriculture Regional Emergency Management Alliances (REMAS) for the purpose of developing Regional Emergency Management Operations Plans (REOPs) to implement the provisions in Homeland Security Presidential Directive 9 (HSPD9). Such funding should encourage regional demonstration projects to develop REMA’s and implement REOPs which meet the specific need to operationalize the provisions outlined in HSPD9 and provide the capability to quickly regionalize or compartmentalize the nation against a potential introduction of a highly transmissible and contagious foreign animal disease.

USDHS and USDA-APHIS-VS also are urged to assist state animal health agencies and state emergency management agencies in actively supporting REMAs and REOPs to operationalize effective animal health emergency management planning at the regional level in both the public and private sectors, so as to better protect the nation’s food supply and public health. Such planning should develop coordinated policy and implementation of:

- Vaccination procedures;
- Euthanasia and carcass disposal procedures;
- Milk and disinfection waste disposal protocols;
- Risk assessments of public health, industry and regulatory perspectives;
- Prevention education efforts and risk communications;
- Command, control and emergency management operations;
- Recovery management;
- Continuity of business planning;
- Community-based emergency planning—local, state and regional partnerships and participation encouraged; and
- Credentialing of veterinarians between states within each region.
RESOLUTION NUMBER: 3 and 41 Combined APPROVED
SOURCE: USAHA /AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: CONSISTENCY IN GUIDELINES AND APPLICATIONS OF METHODOLOGY FOR LARGE-SCALE EUTHANASIA OR DEPOPULATION OF ANIMALS TO ENSURE TIMELY AND EFFECTIVE RESPONSE TO AN ANIMAL HEALTH EMERGENCY

BACKGROUND INFORMATION:

Since large-scale euthanasia or depopulation of animals may be necessary to control or eradicate emergency and program animal diseases or to remove animals from a compromised biosecurity situation (e.g., poultry flocks after tornado damage to houses), or to depopulate and dispose of animals with minimal handling to decrease the risk of a zoonotic disease to humans, it is important to have guidelines and approved large-scale euthanasia methodologies for each livestock species and poultry. This would ensure that animal health authorities responsible for activating and implementing animal emergency response plans are provided clear and un-reproachable direction to facilitate large-scale euthanasia or depopulation.

The American Veterinary Medical Association's (AVMA) Guidelines on Euthanasia (2007) primarily addresses euthanasia methods for individual animals. Introductory statements in that document include "there should be an attempt to balance the ideal of minimal pain and distress with the reality of the many environments in which euthanasia is performed". The Guidelines on Euthanasia also state that "selection of the most appropriate method of euthanasia in any given situation depends on [several things, such as] the number of animals and other considerations."

A paragraph in the Special Considerations section of the Guidelines on Euthanasia states "euthanasia options may be limited in unusual conditions, such as disease eradication…and the most appropriate technique that minimizes human and animal health concerns must be used." Options listed for mass euthanasia are “CO2, and physical methods such as gunshot, penetrating captive bolt, and cervical dislocation.”

Currently, inconsistencies exist between available euthanasia guidelines used by AVMA, livestock species groups and the United States Department of Agriculture (USDA) that describe approved methodologies for large-scale euthanasia or depopulation of animals. Additionally, state and local animal health authorities may not be aware of existing guidelines, approved methodologies and the resources necessary to accomplish large-scale euthanasia or depopulation of animals. These factors contribute to misinterpretation, confusion, and
REPORT OF THE COMMITTEE

delays in operations at the state and local levels.

RESOLUTION:

The United States Animal Health Association (USAHA) requests the following actions regarding the large-scale euthanasia or depopulation of animals:

· The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Center for Animal Health Emergency Management (NCAHEM) work with the American Veterinary Medical Association (AVMA) and livestock species groups to revise euthanasia guidelines and methodologies specifically for large-scale euthanasia or depopulation of animals and identify those practices which pose the least risk to animals and humans. Further, this information shall then be incorporated into the National Animal Health Emergency Management System Operational Guidelines for Euthanasia as well as into the AVMA Guidelines on Euthanasia (formerly the Report of the AVMA Panel on Euthanasia).

· USDA-APHIS-VS-NCAHEM increase awareness of accepted guidelines, methodologies and resources within USDA-APHIS-VS to ensure consistency between program areas.

· USDA-APHIS-VS-NCAHEM increase awareness through outreach and education of state and local animal health authorities of accepted guidelines, methodologies and available resources to ensure consistency between states and enable a safe, timely and effective eradication or control process in case of an animal health emergency.

RESOLUTION NUMBER: 4 APPROVED
SOURCE: COMMITTEE ON JOHNE’S DISEASE
SUBJECT MATTER: NATIONAL JOHNE’S DISEASE DEMONSTRATION HERD PROJECT

BACKGROUND INFORMATION:

The National Johne’s Disease Demonstration Herd Project was initiated in 2003 as a long-term project (at least 5 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.

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) continue to prioritize funding for the National Johne’s Disease Demonstration Herd
Project to complete the collection of 8 years of data from cooperating herds.

RESOLUTION NUMBER: 5 APPROVED
SOURCE: COMMITTEE ON JOHNE’S DISEASE
SUBJECT MATTER: STRATEGIC PLAN FOR JOHNE’S DISEASE

BACKGROUND INFORMATION:
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 5 year plan is needed to incorporate significant changes that have occurred in our understanding of 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.

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) accept the updated Strategic plan as approved by the USAHA Committee on Johne’s Disease on October 6, 2008.

RESOLUTION NUMBER: 6, 36, 39 and 46 Combined APPROVED
SOURCE: COMMITTEE ON BLUETONGUE AND RELATED ORBIVIRUSES
COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS
COMMITTEE ON FOREIGN AND EMERGING DISEASES
COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: SURVEILLANCE FOR BLUETONGUE AND EPIZOOTIC HEMORRHAGIC DISEASE IN THE UNITED STATES AND THE CARIBBEAN REGION

BACKGROUND INFORMATION:
Since 1999, the discovery of nine new serotypes of bluetongue and epizootic hemorrhagic disease viruses in the United States (U.S.) indicate that previously exotic viruses now are entering the U.S.
The emergence of seven serotypes of bluetongue virus into Europe since 1998 has been associated with extensive clinical disease in sheep and cattle, and serotype 8, in particular, is associated with a high
REPORT OF THE COMMITTEE

incidence of vertical transmission.

Climate change in the Mediterranean is generally accepted to have played a role in the spread of bluetongue viruses into Europe by creating suitable environments for colonization by competent vectors.

A similar climate change has occurred in the Caribbean region and might possibly have contributed to the introduction of new serotypes of bluetongue viruses into the U.S.

There is no coordinated surveillance for bluetongue virus or epizootic hemorrhagic disease virus in the U.S. to detect potential introductions of new serotypes.

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), working with universities and other agencies, establish a bluetongue and epizootic hemorrhagic disease surveillance program throughout the United States (U.S.) and the Caribbean region to:

a) establish the current regional distribution and activity of the established and newly recognized viruses in the U.S.,

b) detect the presence of introduced viruses in the U.S. and the Caribbean Region,

c) identify all species of insect vectors associated with the transmission of bluetongue and epizootic hemorrhagic viruses.

RESOLUTION NUMBER: 7 APPROVED

SOURCE: USAHA/AAVLD JOINT COMMITTEE ON AQUACULTURE

SUBJECT MATTER: NATIONAL AQUATIC ANIMAL HEALTH PLAN

BACKGROUND INFORMATION:

A National Aquatic Animal Health Task Force, composed of representatives from the United States Department of Agriculture (USDA), the United States Department of Commerce (USDOC), National Oceanic and Atmospheric Administration (NOAA)-Fisheries and the United States Department of Interior (USDOI), Fish and Wildlife Service (FWS) has been engaged in developing a National Aquatic Animal Health Plan (NAAHP) for the United States (U.S.). During multiple stakeholder meetings throughout the country with various aquatic industry and natural resource agency groups as well as state, federal and university personnel, the National Aquatic Animal Health Task Force has been soliciting input and drafting chapters for the NAAHP. Key elements of the plan include identification of diseases of regulatory concern, measures to protect U.S. aquatic species from the introduction of exotic diseases, plans for control should an introduction occur,
importation standards for aquatic species and wild species/cultured
species interface issues. Implementation of the NAAHP will require
significant resources.

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), the United
States Department of Interior (USDOI), Fish and Wildlife Service (FWS)
and the United States Department of Commerce (USDOC), National
Oceanic and Atmospheric Administration (NOAA)-Fisheries to provide
line item funding in future budgets to implement and maintain their
respective portions of the National Aquatic Animal Health Plan (NAAHP).

RESOLUTION NUMBER: 8 APPROVED AS AMENDED
SOURCE: USAHA/AAVLD JOINT COMMITTEE ON
AQUACULTURE
SUBJECT MATTER: FEDERAL FUNDING FOR AN AQUATIC
ANIMAL LABORATORY NETWORK

BACKGROUND INFORMATION:
In 2006, aquaculture within the United States produced an estimated
360,305 metric tons of product generating approximately $1.2 billion
with over half of the production being utilized for human consumption
(Current Fisheries Statistics No. 2007, NOAA-Fisheries statistics division;
U.S. Department of Commerce). Thus, disruption in aquaculture
production, either via natural or intentional disease outbreaks, could
impact a portion of the food supply as well as lead to a direct economic
impact on the United States. A recent example of this is the outbreak
of infectious salmon anemia virus (ISAV) in Maine. Similar situations
could occur in any region within the United States from catfish and
shrimp production in the southeast to trout, salmon and oyster production
in the northwest. Due to this concern, representatives from federal,
state, university and private aquatic diagnostic laboratories have been
in discussions regarding the need for the development of an Aquatic
Animal Laboratory Network which could be utilized for the detection of
aquaculture disease outbreaks as well as disease surveillance. Such
a network would be expected to limit disease outbreaks and economic
impact associated with the outbreaks as well as to provide confidence
in the quality of United States aquaculture products on the world market
and thus enhance foreign trade. In addition, such a network would be
highly compatible with the 2007 National Oceanic and Atmospheric
Administration (NOAA)-Fisheries 10-year Plan for Marine Aquaculture
in regards to expansion of aquaculture in the United States Exclusive
Economic Zone (EEZ).
REPORT OF THE COMMITTEE

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 request initial funding of $2 million for a pilot Aquatic Animal Health Laboratory Network in FY 2009 and $3 million in FY 2010 and in FY 2011.

RESOLUTION NUMBER: 9  APPROVED
SOURCE: USAHA/AAVLD JOINT COMMITTEE ON AQUACULTURE
SUBJECT MATTER: USE AND INTERPRETATION OF POLYMERASE CHAIN REACTION (PCR) RESULTS FOR VIRAL HEMORRHAGIC SEPTICEMIA VIRUS (VHSV)

BACKGROUND INFORMATION:
Viral hemorrhagic septicemia virus (VHSV), an emerging fish pathogen, has led to unprecedented regulatory action by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to prevent the transfer to/from aquaculture. Given the nature of the aquaculture industry, the risk of spread is great and surveillance is necessary. In response, the USDA funded a $2.5 million, multi-state VHSV surveillance program (2007-present) and has also required susceptible fish moving interstate from any Great Lakes state to be tested for the VHSV. In addition, some states have begun to require VHSV testing for intrastate movement. Current laboratory testing protocols require virus isolation as the gold-standard. Compared to available molecular methods, the drawbacks to this technique include increased cost of labor and turn around time, and lower sensitivity. Two quantitative polymerase chain reaction (PCR) assays have been developed for the detection of VHSV, including one for all known strains (Canadian VHSV assay) and one specifically for the Great Lakes strain IVb (Cornell VHSV assay). Laboratory trials have shown these assays to be 1,000-10,000 times more sensitive than virus isolation and reduces the turn-around time from 28 days to 1 day. In addition, demonstrating confidence in the Cornell VHSV assay, over 6,000 samples have been tested without a PCR false positive. The Canadian assay is currently undergoing complete World Organization for Animal Health (OIE) validation (expected completion 2009), but already is being used as the gold standard in the Canadian VHSV surveillance program.

The use of PCR for surveillance is not a novel idea and is widely accepted for other animal pathogens in the United States. Programs currently using PCR include avian influenza, classical
swine fever, bacterial meningitis, Johne’s disease, bovine spongiform encephalopathy, and others. For these surveillance programs, PCR positive results indicate a “population in need of further study.” Additional testing of the original material or population to confirm the PCR result is required to eliminate the possibility of a false positive result. Depending on the pathogen, these methods may include isolating the bacteria or virus, serological tests, or additional PCR tests. During confirmatory testing, movement of the animals is controlled based on the regulatory status of the disease and demonstration of clinical signs. For example, movement restrictions for low-path avian influenza are minimal based on an initial PCR positive in apparently healthy poultry, since this disease would be clinically apparent. This same standard can not be applied to all animals, including fish, where the VHSv has been shown to be present asymptomatically. To prevent the unknowing spread of VHSv, it would be appropriate to monitor or restrict the movement of fish undergoing additional testing. Using these PCR assays for VHSv surveillance and farm inspections would benefit all parties involved. In particular, regulatory agencies and private aquaculturists demand the most sensitive, accurate, and fastest test available to prevent the potential spread of the VHSv.

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) evaluate and validate the Canadian (all strains) and/or Cornell (strain IVb) polymerase chain reaction (PCR) assay for the detection of viral hemorrhagic septicemia virus (VHSv). The test will be used to monitor the spread of VHSv in wild fish and to satisfy VHSv interstate movement requirements for regulated species of fish as determined by USDA-APHIS-VS.

RESOLUTION NUMBER: 10
APPROVED

SOURCE: USAHA/AAVLD JOINT COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS

SUBJECT MATTER: NATIONAL LIST OF REPORTABLE ANIMAL DISEASES WORKING GROUP

BACKGROUND INFORMATION:

The Committee is tasked with evaluating animal disease information systems that provide information to stakeholders for activities and decisions related to maintaining the health of animals and people, controlling and eradicating disease, and assuring the well-being of animals and profitability of animal industries. In 2007 the United States Animal Health Association (USAHA) requested that the United States
Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), in cooperation with state animal health officials and industry, develop a United States (U.S.) National List of Reportable Animal Diseases (NLRAD). The NLRAD should include appropriate reporting criteria. The List of Diseases Notifiable to the World Organization for Animal Health (OIE) should be used as a starting point in developing a U.S. NLRAD.

A NLRAD will provide one standardized national reportable animal diseases list, demonstrate to trading partners and other countries that the U.S. has a uniform national list of reportable diseases, assist in meeting international reporting obligations and validate the U.S.’ required international reporting to the OIE as well as required export certifications, and improve zoonotic and endemic animal disease reporting in the U.S.

USDA-APHIS-VS has recognized the USAHA’s concerns. The National Surveillance Unit (NSU) is drafting a list of diseases that may be considered nationally reportable, using the list of diseases notifiable to the OIE as a starting point. The NSU has conducted background research on required disease reporting guidelines in the Code of Federal Regulations (CFR) and in other pertinent agreements and memorandums.

After consulting with USDA-APHIS’ legal counsel, the NSU determined that USDA-APHIS-VS does not have the authority to implement a mandatory list, but does have authority to develop voluntary guidelines. The NSU will continue developing the list, form a working group of stakeholders, and explore the possibility of rulemaking that would formalize the list and authority. The working group will provide periodic progress reports to the VS Management Team and the USAHA/ American Association of Veterinary Laboratory Diagnosticians (AAVLD) joint Committee on Animal Health Information Systems (AHISC).

The National Animal Health Reporting System (NAHRS) is a joint effort of the USAHA, AAVLD and USDA to establish a nationwide reporting system for the occurrence of clinical cases of certain monitored diseases in order to meet national and international needs and obligations for animal health surveillance and disease monitoring. The NAHRS subcommittee of the AHISC includes many stakeholders (state and federal regulatory agencies, veterinary diagnostic laboratories and commodity working groups) and has developed specific methods and rules, including diagnostic and reporting criteria, which may be leveraged to create the NLRAD.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that USDA-APHIS-VS task the existing National Animal Health Reporting System (NAHRS) subcommittee of the USAHA/American Association of Veterinary Laboratory Diagnosticians (AAVLD) joint Committee on Animal Health Information Systems, with support from the National
Surveillance Unit (NSU), with developing the National List of Reportable Animal Diseases (NLRAD). This list should include identification of the diseases to be included on the NLRAD as well as the case definitions and reporting criteria for each disease on the list.

RESOLUTION NUMBER: 11 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: SUPPORT FOR HIGH-CONTAINMENT BIOSAFETY LABORATORIES

BACKGROUND INFORMATION:
High containment biosafety level (BSL)-3, BSL-3 Ag, and the establishment of BSL-4 laboratory space for livestock is vital to our nation’s ability for early detection and response to any potential emerging and foreign animal disease or bioterrorist event.

Laboratories must be capable of handling disease agents in a manner that allows the safe handling of diagnostic materials and the ability to conduct research to detect and prevent emerging and exotic infectious agents.

These same laboratories assist livestock producers, regulators, veterinarians, pet owners, wildlife managers, food and feed systems specialists and public health professionals in every state on a daily basis by providing surveillance and diagnostic services for these diseases. There is collaboration between the high containment laboratories in Canada, United States and Mexico that provides international defense against animal and zoonotic diseases.

RESOLUTION:
The United States Animal Health Association (USAHA) supports continuing operation of existing, and construction of new, high-containment biosafety laboratories and maintaining the current system for regulatory oversight of these laboratories.

RESOLUTION NUMBER: 12 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: VETERINARY MEDICINE LOAN REPAYMENT PROGRAM (PL 108-161)

BACKGROUND INFORMATION:
The Veterinary Medicine Loan Repayment Program (VMLRP) was created in 2003 by the National Veterinary Medical Service Act
REPORT OF THE COMMITTEE

(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 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 of 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. Adequate funding for VMLRP is $20 million annually.

NVMSA was enacted in December 2003 and has received modest appropriations beginning with the 2006 fiscal year. Until recently the regulations governing the VMLRP remained unwritten by USDA rendering the program non-functional. Language in the 2008 Farm Bill helped to expedite that process and USDA now reports it is on schedule to have the program running by March 2009. In the past, the Bush Administration has not included funding for NVMSA in the President’s budget.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Congress fully fund the Veterinary Medicine Loan Repayment Program (VMLRP) (PL 108-161) for $5 million in the Agriculture Appropriations bill and requests that the administration budget $20 million for the National Veterinary Medical Service Act (NVMSA).

USAHA recommends that the first phase of NVMSA’s implementation should prioritize shortages of large and mixed animal practitioners in rural communities and training of veterinary diagnostic laboratory personnel because of urgent national security concerns for public health, bioterrorism preparedness, and food supply security.

RESOLUTION NUMBER:  13  APPROVED AS AMENDED
SOURCE:  COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER:  INCREASING THE VETERINARY WORKFORCE BY EXPANDING VETERINARY MEDICAL SCHOOL CAPACITY

BACKGROUND INFORMATION:
Veterinary medicine is essential to public health, food safety, and national security. There is a critical shortage of veterinarians in certain key public practice areas such as bioterrorism and emergency preparedness, environmental health, food safety and food security,
regulatory medicine, diagnostic laboratory medicine, and biomedical research. The nation's veterinary medical colleges are at capacity and can enroll only 2,600 students per year. Although these colleges provide a national resource by training veterinarians, only 26 states provide direct support to the 28 colleges. Federal support is needed to increase capacity in veterinary medical education. The United States Congress has not directly supported veterinary medical education in over 30 years. Without a sufficient supply of veterinarians with the unique training needed to respond to an emergency, the nation's public health infrastructure is at risk.

In 2007 and 2008, two new programs were signed into law to address the lack of capacity within veterinary schools; the School of Veterinary Medicine Competitive Grant Program (authorized in the United States Department of Health and Human Services) and the Agricultural Biosecurity Grant Program (authorized in the United States Department of Agriculture). While these two new programs were inspired by past efforts to pass workforce expansion bills for academic veterinary medicine, they lack authorization language providing for more comprehensive construction in lieu of “minor renovations and improvements”. It has not been determined how effective these new grants will be at alleviating the shortage of veterinarians in the workforce and the lack of capacity at veterinary schools.

RESOLUTION:

The United States Animal Health Association (USAHA) requests USDA develop regulations and implementation plans for the School of Veterinary Medicine Competitive Grant Program (SVMCGP) and the Agricultural Biosecurity Grant Program (ABGP). USAHA also requests the newly elected President of the United States include funding for SVMCGP and ABGP in the President’s Annual Budget request. USAHA requests the House of Representatives and Senate Agriculture Appropriations committees fund SVMCGP and ABGP at $15 million each per year.

RESOLUTION NUMBER: 14 APPROVED AS AMENDED
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
REPORT OF THE COMMITTEE

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 research which will not support research on agricultural animals, nor on food safety at the farm level. These 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.

Historically, the President’s budget has not requested any money for Sec.1433 Formula Funds, but Congress has provided an average of about $5 million annually. There are indications that Congress may choose to cease funding the program if enough stakeholder support for the program is not conveyed to congressional appropriators.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the newly elected President of the United States include funding for Section 1433 Formula Funds (P.L. 95-11) in the President’s Annual Budget request. USAHA also requests the House of Representatives and Senate Agriculture Appropriations committees fund Section 1433 Formula Funds (P.L. 95-11) at $10 million per year.

RESOLUTION NUMBER: 15 and 25 Combined
APPROVED AS AMENDED

SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT COMMITTEE ON PHARMACEUTICALS

SUBJECT MATTER: SUPPORT FOR FOOD ANIMAL RESIDUE AVOIDANCE DATABANK (FARAD)

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, 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 the 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.

The loss of an earmark for funding of FARAD in 2007 clearly demonstrates the dilemma that has existed throughout FARAD’s existence. FARAD shut down all public access on September 30, 2008, and with remaining funds, will maintain the existing databank for an additional month. Without permanent multi-year funding ($2.5M/yr for 3-5 years), FARAD will discontinue all activities by the start of 2009.

RESOLUTION:

The United States Animal Health Association (USAHA) requests the newly elected President of the United States include funding for the Food Animal Residue Avoidance Databank (FARAD) in the President’s Annual Budget.

USAHA requests the House of Representatives and Senate Agriculture Appropriations committees fund FARAD at $2.5 million per year.

RESOLUTION NUMBER: 16 APPROVED AS AMENDED

SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: SUPPORT FOR REGIONAL CENTERS OF EXCELLENCE IN FOOD SYSTEMS VETERINARY MEDICINE

BACKGROUND INFORMATION:

The 2008 Farm Bill included the establishment of new regional centers of excellence in food systems veterinary medicine. A regional center of excellence shall be composed of one or more colleges and universities (including land-grant institutions, schools of forestry, schools of veterinary medicine) to focus on species specific diseases.

The criteria for consideration to be a regional center of excellence shall include efforts to ensure coordination and cost-effectiveness, leverage available resources, implement teaching initiatives, increase the economic returns to rural communities, and improve teaching capacity and infrastructure at colleges and universities. USDA has not reported how they intend to implement this new program, either as a new stand-alone grant or part of the larger reorganization of USDA’s extramural research programs.
REPORT OF THE COMMITTEE

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA) develop regulations and implementation plans for the Regional Centers of Excellence (Centers) and the newly elected President of the United States include funding for the Centers in the President’s Annual Budget request.

USAHA requests that the House of Representatives and Senate Agriculture Appropriations committees fund the Centers at $15 million per year.

RESOLUTION NUMBER: 17 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: INCREASED FUNDING FOR EXPANDED RESEARCH FOR THE DEPARTMENT OF HOMELAND SECURITY NATIONAL CENTER FOR FOREIGN ANIMAL AND ZOONOTIC DISEASE DEFENSE (FAZD CENTER)

BACKGROUND INFORMATION:
The National Center for Foreign Animal and Zoonotic Disease Defense (FAZD Center) is a coalition of seven academic institutions cooperating 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 four years of its existence, the FAZD Center has brought together an integrated team of scientists and educators that uses an 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 FY 2009. The indicative budget for the FAZD Center from FY 2010 through FY 2013 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 the 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 FY 2010 – FY 2014. USAHA requests the United States Department of Homeland Security (USDHS) to 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.

RESOLUTION NUMBER: 18 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: FUNDING FOR THE UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, WILDLIFE SERVICES, NATIONAL WILDLIFE RESEARCH CENTER’S NEW BIOSAFETY LEVEL-3 AGRICULTURE (BSL-3Ag) WILDLIFE DISEASE RESEARCH LABORATORY

BACKGROUND INFORMATION:

Because of the important impact wildlife diseases have on human and domestic animal health, it is critical to ensure there is adequate laboratory space to address national wildlife disease problems. The construction and operation of a Biosafety Level-3 Agriculture (BSL-3Ag) laboratory at the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) National Wildlife Research Center (NWRC), Fort Collins, Colorado will enhance the nation’s ability to address significant wildlife disease issues. In support of the construction of the NWRC BSL-3Ag facility, the United States Animal Health Association (USAHA) passed Resolution 8 at its 2005 Annual Meeting, and in support of the operation and maintenance of the facility the USAHA passed Resolution 32 at its 2007 Annual Meeting. A delay for construction of the facility occurred in the spring of 2008 due to an inability to come to terms with the developer and negotiations were cancelled. Currently, a renewed effort to secure
REPORT OF THE COMMITTEE

A developer is under negotiation. The 30% design phase of the NWRC Wildlife Disease Research Building (WDRB) is complete and “Solicitation for Offerers” for development and construction is underway. Functional operation of the facility is scheduled for fall 2011. This resolution reaffirms USAHA support for the staffing and operation of a 70,000 square foot BSL-3Ag laboratory at the NWRC, Fort Collins, Colorado.

The NWRC has unique capabilities to address research, surveillance, diagnostics and disease control efforts in wildlife. These programs are the first line of defense against catastrophic and newly emerging animal diseases, some of which are transmissible to humans. An essential component of an increased capacity for addressing these disease programs is the construction of a BSL-3Ag research laboratory and wildlife disease diagnostic and research facility at the NWRC. This facility will support expanding research, methods development, and operational efforts to better understand and combat emerging and invasive wildlife diseases.

During the past 24 months USDA-APHIS-WS has played a critical role in efforts for first detection for Asian subtypes of highly pathogenic avian influenza (HPAI). Through the WS operational program over 150,000 wild bird samples and 75,000 environmental samples were collected in collaboration with 50 state agencies. The wild bird samples were analyzed under stringent requirements laid out in the Interagency Strategic Plan by multiple laboratories in the National Animal Laboratory Health Network (NAHLN) in multiple states. The environmental samples were analyzed at the NWRC. While the HPAI screening was conducted under BSL-2 conditions, the effort and capacity of the NWRC for surge wildlife disease diagnostics were demonstrated.

Construction and operation of the WDRB will enhance USDA’s ability to meet the challenges imposed by newly and re-emerging wildlife disease and to comply with Homeland Security Presidential Directive 9 (HSPD9), the USDA Strategic Plan and the APHIS Strategic Plan by providing APHIS with BSL-3 laboratory and BSL-3Ag wildlife holding/testing facilities in support of: (1) Enhancement of operational capacity of federal BSL-3 laboratory diagnostic surge capacity; (2) Development of laboratory diagnostic methods for wildlife pathogens and diseases impacting domestic animal and human health; (3) Development of field sampling and diagnostic methods to support surveillance and monitoring activities for wildlife pathogens and diseases within and across United States borders; (4) Development and efficacy evaluation of methods to prevent/control/contain (e.g. vaccines) wildlife diseases; (5) Determination of wildlife host range and reservoir potential for pathogens of program importance toward development of wildlife disease risk assessment models relating to animal and human health and farm biosecurity; (6) Development of methods for the protection of animal and public health and protection of the food supply; (7) Directed efforts toward methods development for foreign animal diseases.
The NWRC laboratory will be utilized to conduct research on zoonotic wildlife diseases that affect wild and domestic animals, and that may impact human health. The facility will be instrumental in development of methods to identify, monitor, control, eradicate, and prevent the introduction of wildlife diseases into the United States and the North American continent. The BSL-3 laboratory environments will provide for support and surge capacity for other APHIS surveillance activities for domestic and foreign animal diseases during times of emergency.

A fully staffed facility will be able to respond to outbreaks of wildlife diseases and catastrophic emergencies. In addition, the facility could provide emergency surge capacity to the NAHLN.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), the United States Secretary of Agriculture and the House and Senate Agriculture Appropriation committees to secure funding for the staffing and operation of a 70,000 square foot Biosafety Level 3-Agriculture (BSL-3Ag) laboratory at the National Wildlife Research Center (NWRC), Fort Collins, Colorado at an estimated annual cost of $3.5 million so that research and methods development on wildlife diseases that are transmissible to humans and domestic animals can be conducted.

RESOLUTION NUMBER: 19  APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: VETERINARY DIAGNOSTIC LABORATORY READINESS FOR ARTHROPOD-BORNE DISEASES

BACKGROUND INFORMATION:
The inability of the United States (U.S.) to detect the introduction of West Nile virus and control the spread of the disease across the nation has highlighted the lack of U.S. veterinary workforce readiness for arthropod-borne diseases. The recent outbreaks of bluetongue virus in Europe and Rift Valley fever virus in Africa further support the need for veterinary capacity in the diagnosis, control and epidemiology of arthropod-borne diseases. Development of diagnostic and control strategies, and regulatory statutes to reduce the economic impact on U.S. livestock requires an interdisciplinary approach including entomology, microbiology, immunology, veterinary medicine and epidemiology.
REPORT OF THE COMMITTEE

RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA) develop an interagency strategy and coordination for development of diagnostic and control strategies for arthropod-borne animal diseases, support either development or maintenance of the necessary high bio-containment laboratories and large animal isolation facilities and provide opportunities for training of National Animal Health Laboratory Network (NAHLN) laboratories and veterinarians as to the clinical presentations and detection of high threat arthropod-borne diseases.

RESOLUTION NUMBER: 20 APPROVED
SOURCE: COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: REVIEW OF COMPENSATION FOR RESEARCH AND DIAGNOSTIC VETERINARIANS

BACKGROUND INFORMATION:
Veterinarians with advanced scientific training, including advanced degrees and board certification credentials, are critically needed for the prevention 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) recommends that in order to appropriately compensate and retain veterinary scientists with advanced degrees or board certification in high priority research and diagnostic fields that state and federal agencies review veterinarian salaries for parity with other health professional salaries, especially those established by Title 42 for the National Institute of Health (NIH), to retain scientific staff.
In addition, Title 42 pay adjustments should be available for use by all state and federal agencies employing these critical veterinary scientists.

RESOLUTION NUMBER: 21 APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: REVIEW OF SELECT AGENT STATUS FOR BRUECELLA abortus
BACKGROUND INFORMATION:
  In 2005, the United States Animal Health Association (USAHA) Laramie Agenda identified the need for improved brucellosis vaccines, vaccine delivery systems, and diagnostics for wild bison and elk in order to advance the elimination of brucellosis from wildlife in the Greater Yellowstone Area (GYA). Brucella abortus (B. abortus) has been designated as a select agent by the United States Department of Agriculture (USDA) and the United States Department of Health and Human Services (USDHHS). The select agent rule makes it significantly more difficult to expand this body of knowledge by imposing restrictions that prevent further research on B. abortus because of increased expense and limitations on approved laboratory space needed for live animal trials and vaccine studies.

  The Federal Select Agent Program is planning to publish an Advanced Notice of Proposed Rulemaking (ANPR) within the next year to allow the public to comment on the entire list of select agents, and based on public comments, decisions can be made to add or remove select agents.

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 review the criteria used to designate Brucella abortus (B. abortus) as a select agent. USDA-APHIS-VS should participate in and support the publication of the Advanced Notice of Proposed Rulemaking (ANPR), and include in the ANPR the rationale for removing B. abortus from the select agent list.

RESOLUTION NUMBER: 22 APPROVED
SOURCE: COMMITTEE ON BRUCELLOSIS
SUBJECT MATTER: REVISE THE CODE OF FEDERAL REGULATIONS FOR BRUCELLOSIS AND PROVIDE FUNDING TO ADDRESS THE RISK OF TRANSMISSION FROM WILDLIFE IN THE GREATER YELLOWSTONE AREA

BACKGROUND INFORMATION:
  Wild elk and bison in the Greater Yellowstone Area (GYA) are infected with Brucella abortus (B. abortus) and represent the last focus of infection of B. abortus in the United States. There is an increased risk of wild elk and bison transmitting brucellosis to livestock when they occupy the same habitat geographically and temporally. However, areas of the GYA states with no brucellosis infected wildlife are not at increased risk
REPORT OF THE COMMITTEE

of transmission of brucellosis from wildlife.

The Code of Federal Regulations (CFR) for brucellosis does not adequately address the risk of transmission of B. abortus from infected wildlife to livestock and the subsequent variable risk of transmission within state boundaries. Further, the Brucellosis Class Free designation as directed by the CFR, does not adequately address the ongoing risk of transmission in GYA states where brucellosis infected wildlife and livestock share habitat.

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 revise the Code of Federal Regulations (CFR) to further the goal of eliminating brucellosis from the Greater Yellowstone Area (GYA), and address the ongoing risk of brucellosis transmission from infected bison and elk.

The key concepts of an amended CFR for brucellosis should:

- Recognize that the risk of brucellosis transmission from wild elk and bison to livestock in the GYA is geographically and temporally variable within a state based on proximity to infected wildlife; and
- Implement enhanced traceability, more rigorous testing, and standardization of movement controls for livestock as determined by risk within a regionalized area that satisfies the criteria of the World Organization for Animal Health (OIE); and
- Allow for additional cases of brucellosis in livestock, within a regionalized area, that satisfies the criteria of the OIE, without a downgrade to a state’s brucellosis status; and
- Advance the elimination of Brucella abortus from the GYA through coordinated multi-state and multi-jurisdictional strategies for brucellosis in wildlife.

The USAHA further urges that the USDA-APHIS-VS fund ongoing and enhanced efforts for surveillance in the GYA, with the goal of elimination of Brucella abortus from the region.

RESOLUTION NUMBER: 23 APPROVED
SOURCE: COMMITTEE ON PHARMACEUTICALS
SUBJECT MATTER: CONTINUED SUPPORT FOR THE NEGOTIATIONS TO HARMONIZE INTERNATIONAL RULES AND REGULATIONS GOVERNING METHODS OF DETECTING RESIDUES OF VETERINARY DRUGS IN FOOD TO REDUCE TECHNICAL BARRIERS TO TRADE

BACKGROUND INFORMATION:
Global trade of meat and poultry products is essential to financial
health of the livestock and poultry producers in the United States. Use of veterinary drugs when necessary is essential to treat and control disease. In order to maintain the safety of the food supply when these drugs are used, a pre-slaughter withdrawal period is established by the Food and Drug Administration (FDA) to allow drugs to clear from the edible tissues to a level not exceeding the tolerance level. The FDA established withdrawal periods, based on sound science, sometimes differ substantially from those necessary to meet global (or specific country) maximum residue limits. These differences are based on different interpretations of residue risk with no real difference in food safety. This can result in an American farmer using an FDA approved veterinary drug according to label sending livestock to market with potentially detectable residues that would be violative in certain markets. A violation or repeated violations may lead to disruption of trade with that market. FDA and the United States Department of Agriculture (USDA) along with representatives of the Animal Health Institute are in on-going negotiations with the applicable non-government organizations (NGOs) (International Cooperation on Harmonization of Technical Requirements for Registration of Veterinary Medicinal Products (VICH), Joint Expert Committee on Food Additives (JECFA), and the Codex Committee on Residues of Veterinary Drugs in Food (CCRVDF)) to harmonize the processes and reduce this technical barrier to trade.

RESOLUTION:
The United States Animal Health Association (USAHA) supports the continued funding of activities of the Food and Drug Administration (FDA) and the United States Department of Agriculture (USDA) related to negotiations to harmonize the requirements surrounding residues of veterinary drugs in food based on sound science and risk analysis.

RESOLUTION NUMBER: 24 APPROVED
SOURCE: COMMITTEE ON PHARMACEUTICALS
SUBJECT MATTER: INTERIM FUNDING FOR FOOD ANIMAL RESIDUE AVOIDANCE DATABANK (FARAD)

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, 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 the 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,
REPORT OF THE COMMITTEE

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.

The loss of an earmark for funding of FARAD in 2007 clearly demonstrates the dilemma that has existed throughout FARAD’s existence. FARAD shut down all public access on September 30, 2008, and with remaining funds, will maintain the existing databank for an additional month. Without permanent multi-year funding ($2.5M/yr for 3-5 years), FARAD will discontinue all activities by the start of 2009. Once FARAD activities are discontinued, FARAD will be unable to reactivate FARAD activities and the databank will be permanently disabled. In the absence of the valuable scientific information provided by FARAD, food safety and international trade will be compromised.

RESOLUTION:

The United States Animal Health Association (USAHA) urgently requests that the United States Department of Agriculture (USDA), Cooperative State Research, Education and Extension Service (CREES) and the United States Department of Health and Human Services (USDHHS), Food and Drug Administration (FDA) provide immediate interim funding to sustain the Food Animal Residue Avoidance Databank (FARAD) until the $2.5 million multi-year funding authorized by the 2008 Farm Bill is appropriated by Congress.

RESOLUTION NUMBER: 25 Combined with 15
SOURCE: COMMITTEE ON PHARMACEUTICALS
SUBJECT MATTER: SUPPORT FOR FOOD ANIMAL RESIDUE AVOIDANCE DATABANK (FARAD)

RESOLUTION NUMBER: 26 APPROVED AS AMENDED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: ENHANCED EQUINE INFECTIOUS ANEMIA PROGRAM FUNDING

BACKGROUND INFORMATION:

Equine Infectious Anemia (EIA) has been controlled in the United States because individual states with support of their equine industries have instituted regulations which require testing for entry, movement
and/or congregation, as well as quarantine of test-positive equids. Testing for EIA has been widely accepted, and today includes both the agar gel immunodiffusion (AGID or Coggins) and enzyme linked immunosorbent assay (ELISA) test formats. Each year, approximately 2 million equid samples are tested for EIA, and over the last 3 years, 0.01% of the samples were reported as positive. The true prevalence of the infection is not known. In recent years, many of the reported cases have been from states with historically low numbers of cases, and a substantial proportion of those positives were in equids not previously tested for EIA. It is assumed that a population of untested equids exists in the United States. The rate of EIA infection is expected to be higher for that population in those states with historically higher reported numbers of positive tests, such as Arkansas, Louisiana, Oklahoma, Texas and Mississippi.

In the considered opinion of experts and regulators, active surveillance should not be reduced but should be improved. The changes are needed because the traditional methods have reached their plateau, and testing in the mobile tested population greatly exceeds the actual risk. The changes deemed most appropriate are those directed toward: 1) identifying the true prevalence of the infection, 2) reducing the interval of testing where appropriate, 3) devising methods to address the untested population, with a focus on states with historically higher rates of test-positive equids, and 4) implementing a three tiered testing system utilizing sensitivity and specificity of tests in appropriate sequence for maximum efficiency.

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), 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,
2. Requests funding for an enhanced EIA control program leading to eradication with new money,
   · “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),

- “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
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:
   - Identification of industry stakeholders,
   - Accurate equine census,
   - Accurate prevalence data,
   - Consistent case definition – herd vs. head
   - 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), and
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.

RESOLUTION NUMBER: 27 APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: RADIO FREQUENCY IDENTIFICATION (RFID) MICROCHIP IDENTIFICATION OF IMPORTED EQUIDS

BACKGROUND INFORMATION:
With increased global livestock movement the disease risk is greater to the United States (U.S.) horse population. Horse diseases considered high risk include, but are not exclusive to, equine piroplasmosis, contagious equine metritis, dourine, glanders, equine infectious anemia, African horse sickness, equine viral arteritis and Venezuelan equine encephalomyelitis.

Eradication efforts in the early 1900’s eliminated the presence of
diseases such as dourine and glanders in the U.S. To protect the U.S. horse population, required importation testing and quarantine were implemented to minimize potential disease introduction into the U.S. Through national disease control programs, testing of both domestic and imported animals has limited the spread of diseases such as equine infectious anemia. Horses being imported to the U.S. represent a risk of importation of various diseases. Therefore, traceability of these animals is a critical element in the protection of the U.S. horse population.

A lack of a reliable and traceable permanent identification system for horses imported into the United States makes it difficult to conduct trace back of animals that are potentially positive or exposed to an infectious disease. There is an immediate need to establish a standard method of permanent identification and traceability for all horses imported into the United States.

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 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) 11784 and 11785 standards (1. 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 NUMBER: 28 APPROVED AS AMENDED

SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES

SUBJECT MATTER: EQUINE PIROPLASMOsis RESEARCH FUNDING

BACKGROUND INFORMATION:

Equine piroplasmosis (EP) is classified as a foreign animal disease to the United States (U.S.). However, there is an unknown prevalence of EP in the resident horse population. Prior to February 1, 2004, the official test for importation was the complement fixation (CF) test that occasionally yielded false negative results. The problem was compounded because known seropositive horses could purposely be treated with immunosuppressive medications to produce an upcoming transient negative import test. An upgraded competitive enzyme linked immunosorbent assay (C ELISA) test was specified as the official test on
REPORT OF THE COMMITTEE

August 22, 2005, and is highly unlikely to yield false negative results on adult horses.

Therefore, seropositive horses exist in the resident U.S. horse population at an unknown level and have the potential to infect multiple competent resident tick vectors and possibly establish the disease as endemic. There is no conclusive evidence that treatment of a bona fide carrier of either of the two strains of EP (Babesia caballi and Babesia equi) is a fail-proof viable option.

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 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.

RESOLUTION NUMBER: 29 APPROVED
SOURCE: COMMITTEE ON PARASITIC DISEASES
SUBJECT MATTER: TROPICAL BONT TICK

BACKGROUND INFORMATION:

The tropical bont tick (TBT) Amblyomma variegatum and Cowdria ruminantium, the causative agent of heartwater disease, were introduced into the Western Hemisphere on cattle imported from Senegal in western Africa to Guadeloupe, French West Indies in the late 1700’s to early 1800’s. The tick remained on three islands, Guadeloupe, Antigua, and Marie Galante from the mid-1800’s to 1949, but since 1949 has been found on numerous islands from Puerto Rico in the north to St. Vincent in the south. Heartwater occurs in Guadeloupe, Antigua and Marie Galante, and acute bovine dermatophilosis, another disease associated with the TBT, is found on all of the islands where the TBT now occurs.

The TBT, heartwater and acute bovine dermatophilosis limit the potential for livestock production in the affected countries. Furthermore, the presence of the tick and its associated diseases in the Caribbean region presents a risk for introduction of the TBT and these diseases into the Americas. The introduction of heartwater into the United States could result in a cycle of transmission involving the TBT and native ticks, domestic livestock, and exotic and native wildlife. Spread of the TBT and its associated diseases could result in annual losses estimated at $655,000 to $ billion annually.

Until 2007, efforts to control and/or eradicate the TBT were underway through the Caribbean Amblyomma Program (CAP) in the eastern Caribbean nations, the POSEIDON Program in the French West Indies, and through the Government of the Virgin Islands of the
United States and the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), in St. Croix, United States Virgin Islands. The CAP ended in 2008 and has been followed by projects of the national epidemiologists of eastern Caribbean nations under the strategy of the Caribbean Animal Health Network (CaribVET).

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), International Services (IS) and/or Veterinary Services (VS) establish a working group to review successes and failures of the previous tropical bont tick (TBT) control/eradication programs, to review the current status of the TBT in the region, and to develop a strategic plan to address support for and participation in programs for control and/or eradication of the TBT in St. Croix and the Caribbean region over the next 5-10 years.

RESOLUTION NUMBER: 30 APPROVED
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: CLARIFICATION OF AUTHORITY FOR USE OF THE NATIONAL ANIMAL IDENTIFICATION SYSTEM PREMISES IDENTIFICATION NUMBERS IN PROGRAM DISEASES AND EMERGENCY PROGRAMS

BACKGROUND INFORMATION:

Recognizing premises identification numbers (PINs) as a primary component of disease eradication efforts, and realizing that many states have statutory language that requires the National Animal Identification System (NAIS) to be a voluntary program, many states must have a clear mandate from the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) that this component of NAIS must be mandatory in order for some states to move forward.

Stakeholders of NAIS through the United States Animal Health Association (USAHA) have long encouraged USDA-APHIS-VS to prioritize NAIS efforts on animal health. Previous resolutions from the USAHA Committee on Livestock Identification indeed requested USDA-APHIS-VS implement mandatory use of NAIS components in animal health programs. The final Business Plan of NAIS is consistent with these principles. USDA-APHIS-VS is commended for the basic NAIS Business Plan and for VS Memorandum 575.19, which specifies assignment of PINs for animal health program activities.
REPORT OF THE COMMITTEE

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) provide a letter clarifying the legality of VS Memorandum 575.19, and comparing the legal authority of a VS Memorandum to Code of Federal Regulation (CFR) requirements for assignment of premises identification numbers (PIN). Additionally, this letter must address whether USDA-APHIS-VS will respond and defend challenges to the assignment of a PIN and to the confidentiality of such.

USAHA also requests that USDA-APHIS-VS respond in a timely fashion to this request and issue a letter of findings directly to all state animal health officials.

RESOLUTION NUMBER: 31 APPROVED
SOURCE: COMMITTEE ON SCRAPIE
SUBJECT MATTER: SCRAPIE ERADICATION PROGRAM FUNDING

BACKGROUND INFORMATION:

To continue progress toward scrapie eradication, enhanced surveillance and enforcement of regulations is paramount. The Accelerated Scrapie Eradication Program began in 2001 and has made excellent progress as demonstrated by an 80 percent reduction of scrapie in black-faced sheep diagnosed positive at slaughter. At this time the best available epidemiological analysis suggests that, with adequate funding, eradication is possible by 2017. However, as described in the National Scrapie Surveillance Plan, funding is currently inadequate to meet surveillance goals. Specifically, funding is needed to insure that sampling goals are met for both sheep and goats and that the information system is designed to maximize the value of the data collected. Also, the number of positive animals that can be traced from slaughter is only 80 percent. Surveillance, identification compliance, and producer education must be significantly increased in order to find the diminishing number of scrapie-infected flocks/herds. Funding requests are currently inadequate to effectively eradicate scrapie in a reasonable amount of time.

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 request adequate funding for the National Scrapie Eradication Program’s budget to achieve eradication and conduct subsequent surveillance. This amount is equal to $10 million beyond the Fiscal Year 2007 appropriation.
or a total budget of $28.6 million annually adjusted for inflation.

RESOLUTION NUMBER: 32 APPROVED  
SOURCE: COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY  
SUBJECT MATTER: FUNDING FOR NEW FACILITY OPERATIONS AT THE NATIONAL CENTERS FOR ANIMAL HEALTH  

BACKGROUND INFORMATION:  
Currently, there is inadequate funding to provide for operational expenses for the new facilities at National Centers for Animal Health (NCAH), Ames, Iowa. The United States Department of Agriculture (USDA) has spent over $430 million in construction of facilities but will be forced to use mandated program budget money to pay for facility operations. This transfer of money jeopardizes and negatively impacts critical programs needed to regulate the veterinary biologics industry and to safeguard animal health in the United States.

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) request sufficient money for facility operations, outside of program funding, at the new National Centers for Animal Health (NCAH).

RESOLUTION NUMBER: 33 APPROVED  
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES  
SUBJECT MATTER: ADDITIONAL RESOURCES FOR VALIDATION OF GENOMICS-BASED PATHOGEN DETECTION TECHNOLOGIES  

BACKGROUND INFORMATION:  
Validation of the tests used to detect dangerous pathogens in animals or animal products requires significant resources that have not been available to regulatory agencies of the United States Department of Agriculture (USDA). As a consequence, vast improvements in pathogen detection technologies have had limited application to the biosecurity of United States agriculture and the food supply. New tests can quickly provide information on multiple pathogen strains and subtypes in a single sample with virtually no risk of error. A new annual appropriation of $10 million will allow the receiving agencies to conduct preliminary comparisons of new multiplex sequencing technologies and select the most worthy methods for official validation and permitting.
REPORT OF THE COMMITTEE

The new challenges posed by the threat of biological attacks on agriculture and the food supply require that the United States Department of Homeland Security (USDHS) must also have access to validated, multiplexed detection technologies to defend against unprecedented combinations of livestock, wildlife, and even zoonotic diseases that could be used against the agricultural economy or the American people.

In order to achieve these advances, which are based upon existing but not yet adopted detection methods, a new approach to validation that will result in expedited evaluation of deoxyribonucleic acid (DNA)/ribonucleic acid (RNA) sequencing-based identification of complex mixtures of pathogens simultaneously in a variety of sample types is necessary.

RESOLUTION:

The United States Animal Health Association (USAHA) urges Congress to appropriate financial resources to the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and Agricultural Research Service (ARS), working in close cooperation with the United States Department of Homeland Security (USDHS), Directorate for Science and Technology (DS&T), specifically for validation of rapid, reliable tests that will detect pathogens in complex mixtures of species, strains and sub-types. This program will initially require an annual appropriation of $10 million. This effort should focus on the objective of moving from the discovery of a potential “index case” to the issuance of an official conclusion and an appropriate response within days rather than weeks.

RESOLUTION NUMBER: 34 APPROVED AS AMENDED

SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES

SUBJECT MATTER: FUNDING FOR FOOT AND MOUTH VIRUS DISEASE RESEARCH

BACKGROUND INFORMATION:

The United States Animal Health Association (USAHA) was pleased to see the progress being made in the development of new generation adenovirus vector foot and mouth virus disease (FMDv) vaccines presented by Drs. Tam Garland and Luis Rodriguez in the plenary session. These vaccines can be safely produced in the United States (U.S.). This committee was also pleased to see the high quality scientific data presented during the afternoon symposium hosted by the United States Department of Agriculture (USDA), Agricultural Research Service (ARS). However, it was clear that major research gaps remain in FMDv detection, surveillance, epidemiology, immunology, and the development of vaccines and biotherapeutics specifically designed for
the progressive control of FMDv, all of which are priorities for the U.S. National Veterinary Stockpile (NVS).

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) request an increase in the actual net level of bench research funding for foot and mouth disease virus (FMDv) research in the amount of at least $1 million to the USDA-ARS, Foreign Animal Disease Research unit at the Plum Island Animal Disease Center (PIADC) to specifically address the research gaps to fulfill the needs of the United States National Veterinary Stockpile (NVS).

RESOLUTION NUMBER: 35 Combined with 2
SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER: REGIONAL AND OPERATIONAL ANIMAL HEALTH EMERGENCY MANAGEMENT

RESOLUTION NUMBER: 36 Combined with 6
SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER: SURVEILLANCE FOR BLUETONGUE AND EPIZOOTIC HEMORRHAGIC DISEASE IN THE UNITED STATES AND THE CARIBBEAN REGION

RESOLUTION NUMBER: 37 TABLED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: NATIONAL WILDLIFE RESEARCH CENTER GONACON™ GONADOTROPIN RELEASING HORMONE (GnRH) IMMUNOCONTRACEPTION VACCINE.

BACKGROUND INFORMATION:
Population management of wildlife and feral species is a valuable tool to address disease management and eradication. Currently available population management methodologies are often prohibitively expensive, sometimes unacceptable to the public and difficult to effectively apply to wildlife and feral species.

Effective immunocontraception would provide an additional tool for wildlife and feral species population management where lethal control is either difficult or prohibited.

Additionally, success in management and elimination of terrestrial
rabies is dependent upon reducing the susceptible populations. The use
of immunocontraception in rabies management would also be a valuable
tool in reducing the risk of rabies in humans, especially in those countries
where veterinary service is limited for feral and companion animals.

The preliminary positive results of the United States Department of
Agriculture (USDA), Animal Plant Health Inspection Service (APHIS),
Wildlife Services (WS) GonaCon™ gonadotropin releasing hormone
(GnRH) vaccine in both wildlife and feral species and the critical role this
vaccine could play in wildlife and feral species management and rabies
management, warrants making GonaCon™ research a priority of the
USDA-APHIS-WS and the National Wildlife Research Center (NWRC).

RESOLUTION:

The United States Animal Health Association (USAHA) requests
that the United States Department of Agriculture (USDA), Animal Plant
Health Inspection Service (APHIS), make it a high priority to expedite
research, investigations, and field trials toward licensing of USDA-
APHIS-Wildlife Services (WS), National Wildlife Research Center’s
(NWRC) immunocontraception vaccine GonaCon™ for use in wildlife
and feral species for population management in the control of rabies and
other diseases.

RESOLUTION NUMBER: 38 APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: THE NORTH AMERICAN RABIES
MANAGEMENT PLAN

BACKGROUND INFORMATION:

At the recent 19th Annual Rabies in the Americas Conference held
at the Centers for Disease Control and Prevention (CDC) the North
American Rabies Management Plan was officially signed by agencies
of the United States (U.S.), Canada, and Mexico and Navajo (Tribal)
Nation. This historic event will enhance coordination and support
the control of terrestrial rabies in North America which has led to the
successful eradication of canine variant in the U.S. as proclaimed by
CDC at the World Rabies Day in 2007. It also continues to support the
control of canine rabies variant in coyotes in Mexico as well as gray fox
rabies variants in Texas along the U.S.-Mexico border as well as the
eastern seaboard raccoon rabies vaccine program in the U.S.-Canadian
border utilizing RABORAL VRG® (Merial) and other approved vaccines.
The Ontario Ministry of Natural Resources also continues control
programs with the ultimate goal of elimination of arctic fox rabies in
western Ontario utilizing a new human adenovirus recombinant DNA oral
rabies vaccine, ONRAB® (Artemis).
RESOLUTION:
The United States Animal Health Association (USAHA) supports the United States Department of Health and Human Services (USDHHS), Centers for Disease Control and Prevention (CDC) continued surveillance and control of the canine variant of rabies to prevent the reintroduction of this strain into the United States. USAHA also encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) and the CDC to allocate appropriated funding and resources to cooperate and collaborate with state and local agencies in maintaining this canine-free rabies status and expand the coordinated regional wildlife rabies control and vaccination programs for raccoon rabies on the U.S. eastern seaboard and gray fox rabies in Texas, and expand the preliminary research into the control of skunk variant rabies and control programs targeting skunks and feral dogs in the U.S., utilizing oral vaccination. USAHA encourages WS and CDC to fully implement and support the recently signed North American Rabies Management Plan, which will provide a dynamic framework for enhancement of rabies control in North America with the ultimate goal of eliminating terrestrial strains of rabies regionally, nationally and throughout the North American continent.

RESOLUTION NUMBER: 39 Combined with 6, 36 and 46
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS
SUBJECT MATTER: SURVEILLANCE FOR BLUETONGUE AND EPIZOOTIC HEMORRHAGIC DISEASE IN THE UNITED STATES AND THE CARIBBEAN REGION

RESOLUTION NUMBER: 40 APPROVED
SOURCE: COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: SORING OF TENNESSEE WALKING AND OTHER SHOW HORSES

BACKGROUND INFORMATION:
Soring of horses is the practice of purposely and deliberately causing pain to a horse’s front legs and hoofs that result in the exaggeration of the horses natural gait in show competition.
Soring is prohibited by the Horse Protection Act of 1970.
During the 2008 Tennessee Walking Horse Celebration, the United States Department of Agriculture (USDA) issued 187 violations of the Horse Protection Act.
Calling this practice “one of the most significant welfare issues affecting any breed or discipline”, the American Association of Equine Practitioners (AAEP) issued a White Paper recommending the
elimination of the abusive practice of soring.

RESOLUTION:

The United States Animal Health Association (USAHA) supports the American Association of Equine Practitioners (AAEP) call for the elimination of the abusive practice of soring and requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Animal Care (AC), in cooperation with industry, continue their vigilant monitoring of the Horse Protection Act of 1970.

RESOLUTION NUMBER: 41 Combined with 3
SOURCE: COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: CONSISTENCY IN GUIDELINES AND APPLICATIONS OF METHODOLOGY FOR LARGE-SCALE EUTHANASIA OR DEPOPULATION OF ANIMALS TO ENSURE TIMELY AND EFFECTIVE RESPONSE TO ANIMAL HEALTH EMERGENCY

RESOLUTION NUMBER: 42 NOT APPROVED
SOURCE: COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: BAN ON DOUBLE-DECK TRAILERS OF EQUINES

BACKGROUND INFORMATION:

Studies published in peer-reviewed scientific journals clearly document that the number of horses injured in double-deck trucks (29%) is three times greater than those travelling in straight-deck (8%) trailers. These data contributed to the Federal Regulation 9 Code of Federal Regulations (CFR) Part 88 in 2002 to provide humane and safe conditions to horses transported to slaughter facilities, and included the prohibition of double-deck trailers for transportation. However six years later (2008), there are numerous reports that horses are being transported in double-deck trailers to feedlots, assembly points, stockyards, or other destinations. Thus, there is a need on a federal basis to promulgate regulations to prohibit using double-deck trailers for the transport of horses in the United States.

RESOLUTION:

The United States Animal Health Association (USAHA) opposes transport of horses in double-deck trailers and supports legislation or regulatory actions to prohibit this practice.
NOMINATIONS AND RESOLUTIONS

RESOLUTION NUMBER: 43 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: ENZYME LINKED IMMUNOSORBENT ASSAY (ELISA) TESTING OF GOAT MILK FOR BRUCELLA MELITENSISS

BACKGROUND INFORMATION:

Brucella melitensis infection in goats causes severe systemic disease in humans, who are often infected by consumption of raw goat milk products. It is responsible for more clinical cases of brucellosis and more human suffering worldwide than all other brucellae. A bulk milk test for goat brucellosis is needed in the diagnostic battery of brucellosis tests in small ruminants. The Pasteurized Milk Ordinance (PMO) requires annual testing of dairy goat herds, however, no herd level test is available for screening and goats have to be tested individually by serology. This is time consuming, costly, and stressful for the animals.

The National Veterinary Services Laboratory (NVSL) and other research partners developed an indirect enzyme linked immunosorbent assay (ELISA) (using Brucella melitensis strain 16M antigen) to detect brucella antibodies in goat milk. Initial research on this test using individual milk samples from experimentally-infected goats and laboratory simulated mock-bulk milk suggest this test may be a good bulk milk test for goats, especially in herds segmented in groups of 50 animals or less.

RESOLUTION:

The United States Animal Health Assocation (USAHA) requests the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), National Veterinary Services Laboratory (NVSL) develop and validate the Brucella melitensis indirect enzyme linked immunosorbent assay (ELISA) for bulk tank sampling of goat milk through the production and standardization of a Brucella melitensis ELISA antigen as soon as practical.

RESOLUTION NUMBER: 44 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: APPROVAL OF CIDRs©

BACKGROUND INFORMATION:

Reproductive manipulations of sheep and goats such as artificial insemination, embryo transfer and timed matings require drugs, hormones and delivery devices not currently approved or available in the United States (U.S.). Legal and ethical availability of these types of drugs and hormones would facilitate productivity and genetic progress.
REPORT OF THE COMMITTEE

of U.S. flocks and herds and enhance planned reproduction systems for veterinarians and producers, while providing proper and transparent knowledge of the products in use in food producing breeding animals.

CIDRs® (a progesterone-impregnated plastic device for intra-vaginal delivery to synchronize estrus) are labeled and available in many sheep and goat producing countries outside the U.S. Availability here would level the playing field for U.S. producers.

CIDRs® have been “fast tracked” through the Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM) Minor Use and Minor Species (MUMS) approval process since the summer of 2006, but they are still not available for use for the fall 2008 breeding season.

RESOLUTION:

The United States Animal Health Association (USAHA) respectfully requests that the Food and Drug Administration (FDA) complete the label approval process of CIDRs® so that they may be marketed in the U.S.

RESOLUTION NUMBER: 45 APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: BAN ON EXTRA-LABEL USE OF CEPHALOSPORIN ANTIMICROBIAL DRUGS IN FOOD PRODUCING ANIMALS

BACKGROUND INFORMATION:

On July 3, 2008 the Food and Drug Administration (FDA) issued an order prohibiting the extra-label use of cephalosporin drugs in food producing animals (Fed. Reg. Vol. 73, No. 129). The comment period (Docket Number FDA-2008-N-0326, New Animal Drugs; Cephalosporin Drugs; Extra-label Animal Drug Use; Order of Prohibition) was extended to November 1, 2008. The effective date of the final rule was extended to November 30, 2008.

The extra-label use of cephalosporin drugs for use in sheep and goats is critical to the appropriate treatment of disease and relief of suffering in sheep and goats. Ceftiofur is one of the few antimicrobials approved for respiratory disease sheep and the only antimicrobial approved for such use in goats. Extra-label use of this drug for other indications (e.g. retained placenta, metritis, septicemia, soft tissue infections), at a higher dose or for duration of treatment exceeding the 3-day labeled course of therapy may be medically necessary to prevent animal suffering and appropriately treat disease. Further, there are no antimicrobials currently labeled intramammary for use in sheep and goats. Extralabel use of intramammary cephalosporins labeled use in cattle are medically necessary for the intramammary treatment of mastitis in small ruminant species; no other classes of intramammary preparations have label claims against gram negative mastitis.
organisms.

The Order of Prohibition is based on “evidence 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 human health.” No evidence is provided to demonstrate that the use of cephalosporin drugs in small ruminants has contributed to the emergence of cephalosporin-resistant food-borne pathogens, the concern stated in the supporting documents for the Order of Prohibition.

The United States Animal Health Association (USAHA) opposes the FDA Order of Prohibition on extra-label use of cephalosporin antimicrobial drugs in food-producing animals as it applies to small ruminant species. No evidence has been presented that the extra-label use of these drugs in small ruminants presents a risk to public health. The Order of Prohibition will prevent veterinarians from using medically necessary treatments for disease to relieve animal suffering in small ruminant species.

RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Department of Health and Human Services (USDHHS), Food and Drug Administration (FDA) to indefinitely delay the effective date of the Order of Prohibition on the Extralabel Use of Cephalosporin Drugs in Food-Producing Animals. USAHA requests that any such ban should be considered on a species-by-species basis and based on evidence generated for each species.

Further, the USAHA requests FDA to conduct slaughter surveillance and collect and share data on the antimicrobial resistance of pathogens of sheep and goats before applying any such prohibition to these species in the future.

RESOLUTION NUMBER: 46 Combined with 6, 36 and 39
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: SURVEILLANCE FOR BLUETONGUE AND EPIZOOTIC HEMORRHAGIC DISEASE IN THE UNITED STATES AND THE CARIBBEAN REGION

RESOLUTION NUMBER: 47 APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: 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 BOVINE TUBERCULOSIS ERADICATION PROGRAM
REPORT OF THE COMMITTEE

BACKGROUND INFORMATION:

The need for gathering quality samples for new Tuberculosis (TB) test validation work has been supported by multiple recent United States Animal Health Association (USAHA) resolutions. This has lead to the National Veterinary Services Laboratories (NVSL) working hard to implement a sera bank during the last two years. The initial work focused on cervid sample collection, which has been followed by cattle sample collection. The estimated number of total samples at the NVSL from these efforts is 2,500 cervid samples and 380 cattle samples. Only 5 cervid and fewer than 10 cattle samples are well-characterized positives which are the samples needed for sensitivity validation of any new test. This resolution seeks to overcome the significant limitation of the current sera bank and ask for the United States Department of Agriculture (USDA) to support the work of collecting up to 1,000 new well-characterized positive cattle and Cervid samples, along with added negative cattle samples from TB Accredited Free States. From the draft report of a recent USAHA TB Committee Sub-committee updating the criteria for evaluating TB test performance for “official test” status, the number of positive samples needed per species is estimated to be 500 or more. This is far above the fewer than 10 and 5 positive samples that are available respectively for cattle and cervid test validation in the NVSL sera bank today. Without these samples being collected, no new test will be validated.

At the 2006 USAHA Annual Meeting the following resolution was approved as Resolution 21: “The United States Animal Health Association (USAHA) recommends that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) validate a serological tuberculosis test for captive cervids. USAHA urges USDA-APHIS-VS to take the lead in organizing a pilot project with industry so that prior to each single cervical test injection in captive cervids a blood sample is collected and serum submitted to the National Veterinary Services Laboratory (NVSL) for evaluation of the VetTB Stat-PakTM rapid test for one year. Serum should be banked for evaluation of a future serology test. Results of this evaluation should be submitted for review by the Scientific Advisory Subcommittee on Tuberculosis”.

This Resolution had the following response: “The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) maintains interest in enhancing and approving new, reliable tests for tuberculosis. We specifically look forward to testing methods that will exceed the accuracy of our current tests and reduce the impact of testing on producers and their livestock. For these reasons, VS fully supports this recommendation. Implementation of this project will be heavily dependent on the industry for providing samples, providing assistance with the purchase of suspects and reactors for confirmatory testing,
assistance during testing, and with the promotion of this effort within the industry. Implementation of this project is also dependent on the availability of time, personnel, and financial resources. VS fully intends to pursue.

At the 2007 USAHA Annual Meeting the following resolution was approved as Resolution 26: “The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to expedite the validation process for tuberculosis (TB) serological tests for cervids to enhance surveillance for TB.”

This Resolution had the following response: “The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services recognizes the United States Animal Health Association’s concerns and appreciates the opportunity to respond. The Serology Section of the Diagnostic Bacteriology Laboratory of the National Veterinary Services Laboratories (NVSL) is currently working with various cervid producer associations to obtain serum samples from a variety of cervid species. A cervid serum bank has been established; the number of species and the number of samples for each species are increasing. As of January 1, 2008, there were 1,273 serum samples in the bank. The NVSL continues to create panels of blind samples to assist in the evaluation of cervid TB serological tests being developed.”

There are promising tests awaiting these additional samples to complete their validation work. At the 2007 USAHA Annual Meeting the following resolution was approved as Resolution 27: “The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to designate the PriTest SeraLyte-Mbv™, Chembio BovidTB STAT-PAK™, and Chembio Mapia™ tests as provisional tests for Mycobacteria bovis diagnosis in cattle.” These tests are being developed for cervid TB testing as well.

The Resolution had the following response: “The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (VS) recognizes the United States Animal Health Association’s concerns and appreciates the opportunity to respond. Official use of specific test kits is determined by VS National Animal Health Program and Policy staff, with input from the TB Scientific Advisory Committee. Due to confidential business information constraints, the Center for Veterinary Biologics (CVB) cannot comment on the licensure status of these three kits, but it is the CVB’s opinion that these products should follow the standard process for licensure.”

RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to request funding and establish
REPORT OF THE COMMITTEE

specific goals and timelines to gather the required numbers of well-characterized samples that will allow new and promising tests for tuberculosis (TB) to be scientifically validated.

RESOLUTION NUMBER:  48  APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: CHANGE IN HOW TEST AND REMOVAL HERDS AFFECTS THE CALCULATION OF THE NUMBER OF TUBERCULOSIS AFFECTED HERDS WITH RESPECT TO DETERMINING STATE/ZONE STATUS

BACKGROUND INFORMATION:

A study of the bovine tuberculosis (bTB) infected United States (U.S.) dairy herds that have undergone test and remove (T&R) protocols since 1985 provides evidence that T&R is a cost effective and efficacious method to eliminate bTB while minimizing risk to other herds, wildlife and humans. In low prevalence herds, current testing protocols and quarantine provide a significant margin of safety. Meanwhile, the cost to depopulate all bTB infected herds has, in some cases, increased beyond what governments can afford. The loss of herds through depopulation also has great impact on community economic conditions.

While T&R is scientifically, socially and economically a good option for low bTB prevalence herds, current United States Department of Agriculture (USDA) policy (Veterinary Services (VS) memorandum 552.38, March, 2008) on the equal count of affected herd years throughout the quarantine period make T&R unattractive as an option because of the potential downgrade of a state’s bTB status. In modified accredited advanced (MAA) states/zones with less than 30,000 herds and in modified accredited (MA) states/zones with less than 10,000 herds, an affected herd going through T&R will count fully throughout the approximately 4.5 year quarantine even as confidence in the herd’s elimination of bTB increases with each subsequent negative whole herd test over time. The requirement for an additional two to five years (dependent on the current status of the state/zone) of being bTB free after the end of the quarantine period is overly burdensome to a state to advance to the next higher status, when there have been no identified infected cattle for four years. Since 42 states currently have less than 30,000 cattle herds, the USDA policy memorandum has potentially widespread impact.

There is now enough evidence of the effectiveness of T&R in low prevalence herds to change the counting of affected herds that meet specific criteria of prevalence rate, approved herd plan development, epidemiological investigation and regular review. Meeting the criteria would define a herd as an “Approved” T&R herd and, therefore, qualify it
for the benefit of a change in affected herd year counting. The counting can be changed by a multiplication factor that decreases with increasing years and negative testing results in a T&R program.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to adopt changes to veterinary services (VS) Memorandum 552.38 in the counting of affected herd years for “Approved” T&R herds by reducing the value to 75 percent of an affected herd in year two, 50 percent in year three, and 25 percent thereafter when no additional infected animals are found.

RESOLUTION NUMBER: 49 APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: ELEPHANT TUBERCULOSIS GUIDELINES

BACKGROUND INFORMATION:

The emergence of tuberculosis (TB) in elephants in 1996 prompted the formation of an advisory panel to draft guidelines for the control of TB in elephants. Since that time various modifications of the guidelines have been drafted. The proposed 2008 guidelines incorporate several changes including the addition of serological testing using Chembio’s Elephant TB Stat-Pak® Assay and additional options for culturing positive elephants.

Proposed guidelines would require annual testing by the triple culture method (3 trunk wash samples) and a single sample of serum collected for analysis by the Elephant TB Stat-Pak® Assay. The Elephant TB Stat-Pak® Assay was approved and licensed by United States Department of Agriculture (USDA), Center for Veterinary Biologics (CVB) in 2007. The proposed guidelines require that blood from Elephant TB Stat-Pak® Assay positive elephants be submitted to Chembio for confirmatory testing with the Multi-Antigen Print ImmunoAssay (MAPIA).

Guidelines for treatment and movement restrictions would be based on culture and serological results. A Subcommittee of the United States Animal Health Association (USAHA) Committee on Tuberculosis was formed at the 2007 USAHA annual conference to review and comment on proposed guidelines.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Animal Care (AC) adopt and implement the “Guidelines for the Control of Tuberculosis in Elephants 2008” which were reviewed and approved by the USAHA Tuberculosis Subcommittee on Elephants.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER:  50  APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER:  RESTRICTING IMPORTED FEEDER CATTLE

BACKGROUND INFORMATION:

  Mexican origin steers and spayed heifers meeting United States (U.S.) import requirements are allowed to enter the U.S. without restriction and little consideration for risk to commingled or adjacent livestock that may be exposed to Mexican origin cattle that may be incubating tuberculosis (TB).

  Cases of TB continue to be found in Mexican origin steers and spayed heifers, and genetic fingerprinting suggests epidemiologic links and their involvement in transmitting tuberculosis to native U.S. cattle. This has been determined to be a major deterrent in successfully completing the national tuberculosis eradication program in the U.S.

  To adequately address this significant impediment to the successful completion of the U.S. TB Eradication Program, cattle import regulations in the Code of Federal Regulations (CFR) must be modified to require that steers and spayed heifers originating from non accredited free states or zones in Mexico or from any other zone which historically has not achieved accredited tuberculosis free status meet import testing requirements and be restricted to facilities which contain no breeding cattle.

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 modify Title 9, Code of Federal Regulations (CFR), Part 93.427 to require that steers and spayed heifers originating from states or zones which have never historically achieved Accredited-free status only be allowed importation into the United States if import requirements are met and transported directly from the port of entry or first point of assembly to feedlots, pastures or pens which do not contain breeding cattle.

RESOLUTION NUMBER:  51  APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER:  PREVENTION OF INTRODUCTION OF CLASSICAL SWINE FEVER (CSF) AND OTHER FOREIGN ANIMAL DISEASES (FADs) INTO THE UNITED STATES

BACKGROUND INFORMATION:

  Mitigations that prevent the introduction of foreign animal diseases
(FADs) into the United States (U.S.) from international travelers disembarking from countries at risk for classical swine fever (CSF) and other FADs are essential to protecting the health and viability of the U.S. pork industry.

The Passenger Pre-inspection Program (PPIP), funded by Agricultural Quarantine Inspection (AQI) user fees, the Dominican Republic provides an excellent example of a risk-based, cost-effective program that successfully reduces the risk of introduction of CSF and other FADs through the interception of prohibited meat and meat products before they enter the U.S.

The PPIP is the only pre-inspection program of its kind focusing on preventing the entry of prohibited products prior to international passengers arriving in the U.S. The emphasis of the PPIP on disease prevention meets the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services 2015 strategic vision and the success of the program suggests it should be used as a model to expand other similar initiatives in other countries.

Currently, the PPIP has the potential to be expanded to include Haiti, which would further reduce the risk of introduction of CSF and other FADs to the U.S. by international travelers provided adequate funding from AQI user fees.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection Quarantine (PPQ), with support from Veterinary Services (VS) and International Services (IS), to:

- Continue to utilize Agricultural Quarantine Inspection (AQI) user fees to adequately fund the Passenger Pre-inspection Program (PPIP) in the Dominican Republic;
- Acquire the necessary funding from AQI user fees to expand the PPIP to include Haiti; and
- Explore opportunities to use AQI user fees to develop similar, prioritized passenger inspection programs for other countries that have been determined to pose significant risks to the United States for the introduction of Classical Swine Fever (CSF) and other Foreign Animal Diseases (FADs) through international travel.

RESOLUTION NUMBER:  52   APPROVED
SOURCE:    BOARD OF DIRECTORS
SUBJECT MATTER:  URGENCY OF PROGRAM COMPLETION

BACKGROUND INFORMATION:
We are blessed with a great infrastructure for animal health and
production in our country and enjoy an abundance of quality, safe animal protein products and the livestock that produces those products. Too many times, and with increasing frequency, we find ourselves urgently going to Congress and State legislatures to seek emergency assistance for control of diseases that have been nearly eradicated from the United States through prudent cooperative federal, state and industry animal health and disease control programs. This sporadic response to animal health issues will inevitably lead to a crisis. Today, some states total animal health budgets are less in actual dollars than they were fifty years ago for specific diseases.

Of greater importance is the failure of the National system to safeguard animal health. Congress fails to recognize the importance of implementing a multi-year core funding for animal disease programs and fails to timely enact annual budgets, thus placing disease control programs in jeopardy due to the intermittency and uncertainty of even marginal funding.

If this issue is not addressed soon by responsible people in industry, federal and state governments, we will be negligent in our responsibilities to the American public in protecting this vital part of our food system infrastructure. Re-emergence and exacerbation of diseases such as tuberculosis, brucellosis, cattle tick fever and equally threatening intentional or unintentional introduction of a highly contagious foreign disease affecting both animal and public health present real and inevitable risk.

USDA, APHIS, Veterinary Services, cooperating with state animal health agencies and industry, has done, truly, a commendable job of safeguarding our livestock industry with the limited resources provided. However, success in controlling diseases has led to complacency while freedom of disease has created larger, yet more susceptible populations, and globalization of people, products and animals has created a whole new world for animal health safeguarding. Our disease control programs must be finalized.

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 continually support and advocate for the ongoing support, both program wise and financially, by the Secretary of Agriculture, the United States Congress and the President of the United States. Resources must be available, in adequate amounts and in timely manners, to finish disease control programs. The USAHA urges USDA to establish priorities, within budgetary functions, to bring existing programs and goals to finalization. We also urge USDA to adequately support initiatives to safeguard our livestock industries.
REPORT OF THE COMMITTEE ON PARASITIC DISEASES

Chair: Joseph L. Corn, Athens, GA
Vice Chair: J. Mathews Pound, Kerrville, TX

Bob H. Bokma, MD; Corrie C. Brown, GA; A. A. Cuthbertson, NV; Dee B. Ellis, TX; John E. George, TX; Chester A. Gipson, MD; Larry L. Hawkins, MO; Bob R. Hillman, TX; Thomas J. Holt, FL; Lee C. Jan, TX; Ralph C. Knowles, FL; Ulysses J. Lane, NC; Linda L. Logan, TX; Terry F. McElwain, WA; Daniel G. Mead, GA; Andrea Mikolon, CA; Ernie A. Morales, TX; Don L. Notter, KY; James E. Novy, TX; Jack L. Schlater, IA; Robert C. Stout, KY; Lee Ann Thomas, MD; Paul O. Ugstad, TX; Sherrilyn H. Wainwright, CO; Kenneth Waldrup, TX; James A. Watson, MS; John B. Welch, TX; David W. Winters, TX.

The Committee met on October 28, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 8:00 a.m. to 12:00 p.m. There were 15 members and 18 guests present.

Dr. Mat Pound, Knipling-Bushland U.S. Livestock Insects Research Laboratory, Agriculture Research Service (ARS), gave an update on wild ungulates and the Cattle Fever Tick Eradication Program. There is strong evidence that white-tailed deer and other wild ungulates are compromising the Cattle Fever Tick Eradication Program. It is further compromised by the continual decrease in numbers of cattle being raised in South Texas counties which function as sentinels for the discovery of fever tick outbreaks and as easily treatable hosts to aid re-eradication of the ticks.

During the last few decades there has been an increase in the incidence of fever tick infestations being discovered on white-tailed deer. More recently, deer that have been captured and examined for ticks have shown an alarming increase in the proportion of deer that are heavily infested. This is strongly indicative of their increased role in maintaining and dispersing the ticks among premises, especially within counties such as Zapata and Starr which have relatively small pastures as compared with those in larger more northern counties. These smaller pastures permit deer to travel among several premises within their home ranges, thus dispersing ticks to cattle in multiple premises.

Several potential treatment technologies have been developed to aid the Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) in alleviating the problem; however, funds and labor currently are insufficient to make optimal use of them. Having just completed FY 2008 which had the highest number of fever tick infestations since the outbreaks of 1976, infestations that have occurred during the first four weeks of FY 2009 indicate that infestations are continuing to rise, and perhaps this year will have an even greater number, perhaps the greatest since 1960.
REPORT OF THE COMMITTEE

Dr. Dee Ellis, Texas Animal Health Commission (TAHC), and Dr. Paul Ugstad, VS-APHIS gave an update on the Cattle Fever Tick Eradication Program. *Boophilus microplus*, the southern cattle tick, and *Boophilus annulatus*, the cattle tick, were first introduced into eastern Mexico on livestock brought to the new world by the Spanish colonists. *B. annulatus* was once the most important external parasite of cattle in the Southern States. These ticks are important because they transmit the protozoa, *Babesia bovis*, and *Babesia bigemina*, the causative agents of babesiosis, also known as Cattle Fever, Splenetic Fever, Spanish Fever, Texas Cattle Fever, and Murraine Fever. The clinical disease seen in cattle is due to the destruction of red blood cells which are parasitized by the protozoa, and the buildup in the host of the products of that cellular destruction. Anemia, pyrexia, splenomegaly, hemoglobinuria, icterus, and dyspnea are among the clinical signs. Morbidity in naïve cattle may exceed 90 percent.

In 1906, the national *Boophilus* tick campaign was initiated; the area infested encompassed parts of 14 southern states and a portion of southern California. The goal was eradication of ticks. Economic losses at that time were estimated to be in excess of $100 million each year. By 1943, the eradication campaign was declared complete, although subsequent outbreaks of *Boophilus* ticks occurred in Florida and Texas. In 1961, the U.S. was again declared free of *Boophilus* ticks and no further outbreaks have occurred outside of South Texas since that time.

The USDA Tick Force patrols the Fever Tick Quarantine Zone, apprehending stray cattle, horses and wildlife crossing the Rio Grande.

The number of infested premises in FY 2008 was the highest since 1976, and the number in the permanent quarantine (systematic) zone was the highest recorded since the ticks were declared eradicated in 1961.

In 2007, three temporary preventive quarantine zones were established in response to incursions of fever ticks outside the permanent quarantine zone. Because this more than doubled the area under quarantine, a needs assessment was performed and a request for emergency funding was prepared indicating a need for $13.3 million over the next two years to eradicate these outbreaks. The program received $340,000 in contingency funds near the end of FY 2007, and an allocation of $5.2 million in Commodity Credit Corporation (CCC) funding in March of 2008.

While the additional funding enabled us to provide additional manpower in the quarantine zones and in the northern temporary zone there has not been evidence of additional spread of fever ticks beyond adjacent premises, there were several premises disclosed in Starr and Zapata counties well outside the previously established quarantine zone. In July of 2008, those zones were expanded and coalesced into one large temporary quarantine zone. We again formulated a funding request for $15.5 million to continue the efforts and to address the additional manpower, acaracide, and equipment needed to eradicate the incursions in the expanded quarantines.
If sufficient funding is made available, USDA and TAHC plan to institute scratch inspection and dipping of all livestock sold through seven South Texas markets. This will ensure buyers in Texas and surrounding States that the animals are free of fever ticks, as well as reduce the workload on the tick force because the infestations will be disclosed prior to animals moving. The tracing activities resulting from infestations found in the free area require valuable time which reduces the time spent on horseback river patrol, potentially allowing more infested Mexico-origin livestock and wildlife to continue to seed down the U.S. side.

Additionally, it is evident that the time-honored pasture vacation method of releasing quarantine is no longer effective in the current climate of increased wildlife populations capable of sustaining the fever ticks in the absence of cattle. Requiring producers to gather and treat cattle every 14 days for nine months is not a viable option economically, and on many premises is physically next to impossible.

The program desperately needs treatment options which are effective with less frequent application. TAHC and VS have engaged Natural Resources Conservation Service (NRCS) in proposing some measures which would assist producers in brush control, pasture rotation, and fencing which would help producers in eliminating the ticks.

The strategic plan which was formulated in 2005-2006 has not been funded. It is vital that the emergency funding, as well as funding for the strategic plan, be made available. Failure to provide the resources needed places the U.S. at risk for the fever tick to re-establish infestations throughout its natural range – 14 southern States and portions of Southern California.

Dr. Javier Rojas, Mexico-American Commission for the Eradication of the Screwworm gave an update on a demonstration project for screwworm control and groundwork for a future screwworm eradication program in Mercosur (Southern Common Market) countries:

According to the Global Framework for the Progressive Control of Trans Boundary Animal Diseases, a joint initiative of the United Nations Food and Agriculture Organization and the World Organization for Animal Health (OIE), livestock-farming generates nearly half of the agriculture sector’s contribution to gross domestic product worldwide. Recent zoo sanitary emergencies in various countries (Great Britain, Asian countries) have revealed the livestock sector’s vulnerability to the serious damages caused by disease epidemics and the need for effective services and practices in all areas of animal health. Based on 2000 statistics, the Food and Agriculture Organization estimates the annual economic impact of the New World screwworm fly (Cochliomyia hominivorax) on the countries covered by the proposed operation as follows: USD $210 million in Uruguay; USD $1.77 billion in Brazil; and USD $103 million in Paraguay. Losses are caused by productivity declines due to animal disease and death, destruction of hides and the labor and insecticide costs.
associated with ongoing inspections and treatment of vulnerable wounds. The primary mode of transmission of the screwworm fly from one country to another is through infected animals and the migration of fertile flies in border areas. The screwworm fly is also a serious public health problem that mainly affects the poorest, most vulnerable communities in the region. The general objective is to develop, over the next two years, a regional action plan for control and eradication of the screwworm fly and a regional screwworm control demonstration project that lays the groundwork for future eradication programs in the participating countries. The specific objectives are to:

- disseminate information on the screwworm problem to livestock farmers
- provide training in sampling techniques to technical staff at the three countries' Ministries of Agriculture
- identify myiasis-causing species
- obtain screwworm strains from the production facility run by the Mexican-American Commission for the Eradication of the Screwworm (COMEXA), in Mexico
- disseminate technology to eradicate the screwworm fly using the sterile insect technique.

Dr. Peter Merrell, VS-APHIS, provided an update on heartwater vectors and reptile imports. Large numbers of reptiles are imported into the U.S. on an annual basis and present a risk for introduction of heartwater vector ticks. USDA is beginning to hold stakeholder meetings in order to develop plans to mitigate this risk. Dr. Linda Logan, International Services (IS), APHIS provided a report on non-tsetse transmitted trypanosomiasis.

Dr. Thomas J. Holt, Florida Department of Agriculture and Consumer Services, gave a report on the outbreak of equine piroplasmosis (EP) in Florida in 2008. In August 2008, a racing quarter horse was presented to a Florida veterinary clinic with depression, fever, edema, and hematuria. Blood smears were submitted to the University of Florida, College of Veterinary Medicine, and EP, *Theileria equi*, was diagnosed and reported to State animal health officials. This diagnosis was confirmed by competitive enzyme-linked immunoabsorbent assay (cELISA), complement fixation (CF), immunofluorescence assay (IFA), and polymerase chain reaction (PCR) testing at the National Veterinary Services Laboratories (NVSL). Testing of 25 horses on the index premises revealed four additional positive horses. Quarantines were placed on adjacent and traced premises with possible exposure and testing carried out on all associated horses. Surveillance for ticks was initiated immediately on positive premises via horse inspections, ticks drags, and CO₂ traps. Most significantly, live animal trapping and tick collection carried out by Southeastern Cooperative Wildlife Disease
PARASITIC DISEASES

Study (SCWDS) personnel, who routinely carry out surveillance in Florida for exotic tick species, was initiated to target surveillance on positive premises.

Twenty-five quarantines in all were issued, with a finding of seven positive premises with 19 positive horses. Owners of six of the positive premises elected to euthanize their positive animals and have followed a protocol for quarantine release that requires a 60-day negative retest of all exposed horses and negative tick surveillance (no competent vector, negative EP testing by PCR). One hundred thirty ticks were collected with 82 ticks (Amblyomma maculatum, Ixodes) considered non-competent vectors for T. equi. Forty-eight ticks were identified as Dermacentor variabilis, a tick shown experimentally to be a possible, but not effective, vector. All D. variabilis ticks were tested by PCR and one collected from a raccoon tested positive. Additional work is being done to elucidate this finding, as there are raccoon Babesia species that may have caused this positive test result.

There is strong evidence to point to iatrogenic spread of this disease among the affected horses. All of the positive horses are quarter horses used in unsanctioned racing events. These animals are for the most part treated by owners, trainers, and unlicensed animal health providers and there is a common practice of using shared needles, dental equipment, and blood packing, a practice of administering packed red blood cells to horses just prior to racing.

Epidemiological tracing has shown positive horse movement between all seven positive premises with at least two positive horses entering Florida from Mexico in 2004-2005. Florida has not had a reported case of EP for more than 20 years and it is believed that entry of this disease occurred with limited mechanical spread among an equine population not monitored by health professionals. This outbreak has highlighted concerns that this disease is entering the United States from the illegal movement of horses and the treatment of positive horses prior to import to mask infection.

Dr. Joseph L. Corn, Southeastern Cooperative Wildlife Disease Study (SCWDS), provided an update on wildlife surveillance associated with the current cases of equine piroplasmosis in Florida. SCWDS is assisting the Florida Department of Agriculture and Consumer Services with surveillance for wildlife and ticks at premises associated with the current cases of equine piroplasmosis in Florida through a Cooperative Agreement for Arthropod Surveillance with USDA-APHIS-VS. Surveys to determine the presence of wildlife and to collect ticks from wildlife are being conducted at all sites where horses positive for equine piroplasmosis have been found and on farms adjacent to these premises. Due to the small size of most of the premises involved, and the limited wildlife habitat present at most of these premises, wildlife trapping success has not been high. Trapping has been conducted at 11 premises and a total of
71 rodents, opossums and raccoons have been captured and examined. Ticks collected thus far from wildlife have been *Dermacentor variabilis* and *Ixodes scapularis*. All ticks collected are being submitted to the National Veterinary Services Laboratories for identification and testing.

Dr. Sylvie Ahoussou, Centre International de Recherche en Agriculture pour le Développement, Guadeloupe, France, gave the update on *Amblyomma variegatum* programs in the Caribbean. A summary of this presentation is included at the end of this report.

Committee Business:

The Committee passed one resolution on Tropical Bont Tick, which was forwarded to the Committee on Nominations and Resolutions.
Initially introduced in Guadeloupe and Antigua in the 18th Century, the tropical bont tick (TBT) *Amblyomma variegatum* spread to 17 islands in the Caribbean region mostly since the 1970’s, probably in association with cattle egrets. This tick is the principal vector of heartwater and is also associated with dermatophilosis, which have resulted in major losses in animal production and mortality, mainly in cattle. The tick is endemic in this region and constitutes a threat to the American mainland. From 1995 to 2007, the Caribbean *Amblyomma* Programme (CAP) supported treatment and surveillance activities in 11 islands of the Eastern Caribbean with an initial aim at tick eradication. This objective was partially achieved: in some islands the tick was eliminated, while in others tick hotspots persisted.

Where adequate surveillance data were collected between 1995 and 2006, and entered in the regional database, TickINFO, an in-depth analysis was carried out. The surveillance level (numbers of animals examined and farms visited per quarter), and animal and farm infestation rates (by host species, year, quarter, parish) were analysed from four islands (Nevis, St Kitts, St Lucia, Barbados) with R software.

The study pointed out 1) an adequate level of surveillance (for detection of 1 percent prevalence) in Nevis, St Lucia, and Barbados. In St Kitts, inadequate surveillance in some quarters could have contributed to the late detection of the recent reinvasion and spread; 2) a decrease in tick populations following treatment programmes; 3) adult tick seasonality on livestock during the 3rd quarter of the year in Nevis and St Kitts; and 4) a higher infestation level in cattle than in small ruminants. The results assist in predicting possible consequences of the termination of the programme on the expansion of TBT populations, and can help providing recommendations for future national control and surveillance activities.

Geographical information analysis will be used to clarify risk factors related to tick ecology. Tick population modelling will be performed for the Caribbean region and validated against the results of this analysis.
The Committee met on October 28, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 8:00 a.m. to 12:00 p.m. There were 13 members and 12 guests present. Three presentations were given.

Steve Vaughn, Office of New Animal Drug Evaluation (ONADE), Center for Veterinary Medicine (CVM), Food and Drug Administration (FDA) presented on several key issues regarding animal drug availability. He reported that Animal Drug User Fee Act (ADUFA) II was passed and signed into law resulting in user fees from the research pharmaceutical manufacturers amounting to $98 million over the five year term. The fees are directed at keeping the review times to 180 days. There were several other enhancements that should allow for a more efficient work process. Under ADUFA II, annual reports shift to a calendar year basis rather than anniversary date status. This includes volume sold reporting by molecule unless there is only a single company producing a specific drug in which case volumes are reported by class. Secondly he reported that AGDUFA, user fees from generic manufacturers, passed and has targeted a reduction in review times for Abbreviated New Animal Drug Applications (ANADAs) from 700 days to 270 days. Both should result in speedier approval processes for animal drugs to producers and veterinarians.

He next reported on Minor Use/Minor Species (MUMS), the method used to make approved drugs available to minor species or production classes that result in minor use. This is designed to make these opportunities more attractive to industry. The process does not preclude safety (human or animal) filings. The specifics are available on the CVM website www.fda.gov/cvm/minortoc.htm. More than 50 drugs have been designated for this process and there has been one approval. In the realm of global harmonization, FDA continues to work with the appropriate non-government organizations (NGOs) and expert committees to assure rigorous scientific review. Both scientific and political progress is being made, but progress is slow and maximum residue levels are weapons used in global trade.

Lastly, Vaughn discussed the Proposed Final Order to ban the extra-
label use of cephalosporin antibiotics in animals destined for food. The agency issued the order to combat a potential risk to human health. The agency is receiving comments to the docket until November 1, 2008. The order is to take effect November 30, 2008, unless rescinded or modified. This was a key point of discussion in the roundtable discussion with members and guests expressing concerns about losing valuable tools in the treatment, control and prevention of animal disease. Vaughn encouraged comments to the docket.

Drs. Lisa Tell, University of California-Davis, and Ron Baynes, North Carolina State University presented a review of the history of the Food Animal Residue Avoidance Databank (FARAD). This organization, a collaboration of three universities: University of Florida, North Carolina State University, University of California-Davis, has been in existence since 1982, helping veterinarians and producers determine the necessary withhold or withdrawal period when drugs have been used in an extra-label manner. Historically, the funding was through the United States Department of Agriculture (USDA). Several times in the recent past, funding has been delayed such that the organization has been forced to close. They are currently beginning layoffs and will close their doors permanently on July 1, 2009, leaving veterinarians with no centralized independent source of information on the pharmacology and pharmacokinetics of drugs used in an extra-label manner. FARAD has averaged approximately 1300 cases per year with a targeted turnaround time of 24 hours. Dr. Tell explained that each case is handled as a new case with a complete literature search being conducted and the information entered into a patented algorithm used to estimate time to return to tolerance level (U.S.) or minimum residue level (MRL) if there is no U.S. established tolerance. While the incidence of residues creating a risk for human health is relatively low, the potential for a residue to trigger a trade action is high. With the US livestock and poultry industry heavily dependent on the global marketplace and drug residues one of the weapons in technical barriers to trade, it is important that there be a source of information when extra-label use has accidentally or intentionally occurred. Funding has been authorized in the 2008 Farm Bill, but the money has not been appropriated.

Dr. Christine Huoang, American Veterinary Medical Association (AVMA), presented the AVMA’s concerns about the proposed final order to ban the extra-label use of cephalosporins in food animals and provide an update on pending/proposed legislation that might impact the availability of drugs to veterinarians and producers. Strategies to Address Antimicrobial Resistance (STAAR) Act runs contrary to FDA’s science based approval process, but is supportive of enhancing research and surveillance through the public health action plan. The proposed Preservation of Antibiotics for Medical Treatment Act (PAMTA) is also pending in Congress and would restrict the availability of drugs used for nontherapeutic purposes in particular. She pointed out that both acts use the term nontherapeutic
which is undefined. This language is also prevalent in the report of the PEW Commission Report on Industrial Farm Animal Production and again is poorly defined. There will be a proposal in the AVMA House of Delegates to ban antimicrobial use in feed, for growth promotion and to make all veterinary products delivered by any route prescription only. The AVMA opposes this proposal because there are too few veterinarians to have valid veterinary-client-patient relationships to care for the nations animals. She discussed the Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA) which codified the right of veterinarians to use approved animal and human drugs in an extra-label manner as long as human health was not compromised. The AVMA disputes the legal authority of FDA-CVM to prohibit the extra-label use of cephalosporins in food animals and identifies several areas of policy contradiction and potential lack of sound science in their implementation of the proposed final order. The AVMA response to the docket will be posted by the deadline and available for public review.

A discussion followed that focused on the proposed ban and its unintended consequences including reduced animal welfare and potentially unsafe food. Concerns were expressed about the lack of transparency in the decision process and the use of the precautionary principle instead of a sound risk analysis. Dr. Vaughn implored the audience to respond to the docket with information that shows what the industry is doing to preserve the long-term effectiveness of the cephalosporin class of drugs. A second concern expressed by the committee members was the lack of harmonization of MRLs and the risk to the U.S. products traded globally.

Committee Business:

Three Resolutions were passed and submitted to the Committee on Nominations and Resolutions.
REPORT OF THE COMMITTEE ON PROGRAM

Chair: Dr. Donald E. Hoenig, Belfast, ME
Vice Chair: Dr. Richard E. Breitmeyer, Sacramento, CA

Bruce L. Akey, NY; J Lee Alley, AL; James R. Bradford, MI; Charles E. Brown, IL, WI; Kathleen M. Connell, WA; Joseph L. Corn, GA; Francois C. Elvinger, VA; Mark J. Engle, TN; J Amelita Facchiano, TX; John R. Fischer, GA; Bob Frost, CA; Andrew E. Goodwin, AR; Steven L. Halstead, MI; William L. Hartmann, MN; Bob R. Hillman, TX; Daniel E. LaFontaine, SC; James W. Leafstedt, SD; Howard D. Lehmkuhl, IA; Jim R. Logan, WY; Bret D. Marsh, IN; David T. Marshall, NC; Patrick L. McDonough, NY; Gavin Meerdink, IL; Michele A. Miller, FL; Lee M. Myers, GA; Bennie I. Osburn, CA; James E. Pearson, IA; Bob E. Pitts, GA; Glenn E. Plumb, WY; Keith Roehr, CO; John P. Sanders, WV; Andy L. Schwartz, TX; Marilyn M. Simunich, ID; John A. Smith, GA; Kevin R. Snekvik, WA; Peter J. Timoney, KY; Alfonso Torres, NY; Richard D. Willer, HI; Cindy B. Wolf, MN.

The Committee met on October 26, 2008 at the Sheraton Greensboro Hotel in Greensboro, North Carolina, from 6:00 p.m. to 8:00 p.m. There were 37 members and guests present. Chair Don Hoenig called the meeting to order following dinner. Attendees introduced themselves.

Hoenig reminded committee chairs about the change in quorum, which is: 10 members or 30 percent, whichever is less. He reiterated the importance of organization using Roberts Rules of Order and other voting matters.

Dr. Bret Marsh, Chair of the Committee on Nominations and Resolutions, reviewed the resolution process. He challenged the chairs to make sure the resolutions were logical, actionable and directed to someone that could accomplish the charge of the resolution. Marsh stated that the resolutions should be processed and submitted as quickly as possible. He also encouraged the committees to have an individual present during the membership meeting that could speak to any questions on the resolutions.

Ben Richey, executive director, reminded chairs about submitting committee reports and papers, as well as sign in sheets and evaluation forms. Chairs will be given a portable USB drive to transfer corresponding files to the workroom. He added that in case of security issues during the sessions, chairs should contact the staff to handle.

Hoenig announced that chairs should consider what federal representatives would be most beneficial to their committees. The
executive committee will work with federal partners to ensure that stakeholders can attend the meeting.

Discussion was had regarding conflicting committee sessions, and asked staff to work with chairs in which meetings could be in heavy conflict. Chairs also indicated that more up-to-date contact lists for their committees would be helpful. Discussion on list-serve type mechanisms was considered to further explore for the coming year.

Dr. Steve Halstead presented the Strategic Operational Plan developed during 2008. Copies were distributed via email prior to the meeting.

Members expressed their appreciation for the Daily News Alert Summaries.

Hoenig recognized the following retiring chairs:
- Dr. Jim Pearson, Committee on Bluetongue and Related Orbiviruses
- Dr. Peter Timoney, Committee on Infectious Diseases of Horses
- Dr. Bob Hillman, Committee on Livestock Identification
- Dr. Joe Corn, Committee on Parasitic Diseases
- Dr. John Sanders, Committee on Public Health and Rabies
- Dr. Jim Logan, Committee on Scrapie
- Dr. Cindy Wolf, Committee on Sheep and Goats
- Dr. Gavin Meerdink, Committee on Environment
- Dr. Corrie Brown, Committee on Foreign and Emerging Diseases
The Committee met on October 27, 2008 in Auditorium II at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 1:10 to 5:00 p.m. There were 17 members and 16 guests present.

The meeting was called to order by Chair John Sanders and he asked for presentations to be brought forward. Sign in sheets were in the back of the room and attendees were asked to check if they are members or list their desire to become members. Those wanting to be members will have their names submitted for approval. They also should indicate if they would be willing to be a Chair or Co-chair in the future as this is Sanders’ last year as Chair. Resolutions proposed last year were all approved and we received responses from requested agencies.

Dr. Richard Barnes, Food and Drug Administration (FDA), gave a presentation on the 50 state FDA meeting held in St. Louis, Missouri in August, 2008 on food protection. Long term Food Protection Plan was created to deal with food safety in the United States (U.S.) in November, 2007. Global food safety is now more important that just national food safety. Many food stuffs come from outside the U.S., especially if we want food out of season. Most people do not cook more than five days a week. We do a lot of reheating and not much cooking. Population is also becoming more high-risk in that by the year 2025, 25 percent of population will be over 60. A graph of import and export lines showed 16.3 million product import lines. FDA looks at all of them by computer-physically, the staff can only look at one percent at the point of import. All the staff of all the federal agencies could only look at three percent. Dr. Barnes highlighted the list of recent food contamination events.
REPORT OF THE COMMITTEE

Changes and challenges include bioterrorism, melamine contamination and regulation of other countries. It is impossible to test for everything. Data handling systems are outdated and it is difficult to deliver the proper information to the consumer and retail level. We need to find better ways to recall products. We need to get out of the reactive mode and move to a proactive system. In May 2007, the Secretary of Health and Human Services asked FDA to put together food safety and food defense into one program. The November report was the result of that effort. Some of the conclusions of that report include:

- focus on risks over product life cycle
- target resources to achieve maximum risk reduction
- integration of food safety and food defense
- use science and modern technology systems.

Prevention was covered, which includes promoting increased corporate responsibility, identify food vulnerabilities and assess the risk and expand understanding and use of effective mitigation measures.

Other points include preventative controls against intentional introduction, preventative controls for high-risk foods, and registration of all food facilities every two years. Increased risk-based inspections and improvement of the detection of food system signals that indicate contamination - for example, how could we know about melamine before it happened?

Intervention activities include accredit third parties to do inspections overseas, electronic import certificates for certain high risk products and refusal of admission if inspection access is denied.

Response recommendations include improve immediate response and improve risk communications to public, industry and other stakeholders. FDA cannot make recall of foods mandatory, and they need this authority.

Opening three offices in China to increase food safety oversight-working with Chinese government and will have personnel on sight next year.

Three things to start with from the 50 state meeting use of state data for FDA regulatory action, sharing the registration database with states and automation of recall forms and notifications. Confidentiality agreements with states - need to be able to keep some info confidential and work with states to adjust their records laws.

- The 50 State meeting involved 246 federal, state, local, tribal, and territorial attendees.
- Outbreak investigations - define minimal standards and best practices and give money to states for food safety.
- PET NET - tracks animals and feed and there is mandatory traceability in 10 years.

Interrelated risk intervention system should be done, that involved both federal, state and industry. International food protection training center is being planned that combines training at FDA, states, industry all do and certify people in their jobs. Partner with states by state contracts and
grants/cooperative agreements and manufactured food regulatory program standards need to be developed.

Plans now are to develop implementation programs initiating 2008-2009 deliverables but degree of response will be resource dependent. This is a long-term activity. We need to look at this project as a team event. Changes in food supply necessitate changes in how the system operates and works. There is a need to push out food protection plan to other countries, industry and all other partners.

Dr. Chuck Massengill gave a presentation on human exposure to canine brucellosis. Having an increased population of immunocompromised people makes human exposure more likely. The organism may be transmitted by fomites and people working in infected kennels-needs high level of biosecurity. There are high numbers of organisms per milliliter (10000 infective doses per ml of fluid). Mandatory quarantine has driven the disease underground. Heavy exposure to humans occurs in infected kennels. Treatment is only 80 percent successful and leaves infected dogs in the kennel. Missouri has developed a voluntary certification program for kennels and breeders and it appears to be successful. Four levels: unknown; high - all dogs every year tested; medium - all dogs tested, test only males annual; low - kennel tests and affidavit not to test to outside dogs. All dogs introduced into kennel should be tested before and 30 days later tested negative again.

Canine brucellosis is commonly found in feral dogs and street dogs in other countries. Testing causes disease in many cases. No vaccines are available and research for the vaccine companies is prime territory.

Dr. Dennis Slate gave a presentation on the rabies barrier program. The Animal Rabies Management Team meets every year to plan the barrier program along with other rabies control programs nationwide. Enhanced rabies surveillance has enhanced the efforts of public health at all levels. Decisions to put rabies barrier in place cost more money, but increased surveillance will help with less investment of money. Rapid immunohistochemical test (RIT) testing has enhanced rabies diagnostics and increased surveillance. Enhanced surveillance found 20 terrestrial rabies cases not found by public health surveillance. Use data to determine oral rabies vaccine distribution. Different samples provide different data, but odd acting animals provide the best return on investment to complement public health investment. Great strides have been made to get good samples, challenging in Texas in order to make good decisions on bait distribution. As far as baiting, the United States Department of Agriculture (USDA) made some adjustments to the program to lessen fuel costs by consolidating airports and conserving costs therefore lessening the number of days in the field.

Getting about 29 percent uptake in raccoon population and get 60-70 percent up take in foxes and coyotes. Double and high density baiting
will get over 40 percent in raccoons in Ohio. They have instituted trap-vaccinate-release (TVR) program. High raccoon density in Cleveland area makes TVR difficult and now considering contraception program with TVR program. Gray fox variant in Texas presents its own problems and additional surveillance needed in Mexico. Additional funding used to expand program.

Canine rabies variant has been eliminated in the U.S. with the efforts of public health. Mexico has barrier on border which involves vaccination of dogs in that area. Mass vaccination has been shown by U.S. to help eliminate canine rabies variant. Feral dogs keep the variant alive in Mexico. Native American reservations have challenges with rabies because of low populations of dogs vaccinated, probably 5-15 percent. This puts human population at risk also. Oral bating in dogs was tried with some success. Integrating racbies and reproduction control will be important in the future with the use of GonaCon.

Stakeholders signed the North American Rabies Management Plan at Rabies in America meeting in September 2008, which is a framework for continental collaboration and cooperation.

Species variants have spilled over into other species and vaccines and strategies must change to accommodate movement of these strains. They are working on types of baits that are best taken up by various species. Also need to adjust strategies to reach target populations. Density of population determines whether baiting is needed in certain corridors. Gates foundation will fund a dog rabies elimination demonstration in a country over seas such as Phillipines, Tanzania or other countries. Remarkable advances have been made in enhanced surveillance. Contingencies are a fact of life with limited resources and continental framework will be important in continuing rabies control.

Use of Landscape Features in Preventing the Spread of Raccoon Rabies Variant was presented by Dr. Mike Dunbar. A full summary of this presentation is included at the end of this report.

Human Rabies Vaccine Supply in the United States was presented by Dr. Heather Henderson, Centers for Disease Control and Prevention (CDC). A full summary of this presentation is included at the end of this report.

Committee Business:

Having no further presentations, the Committee moved to official business. They considered two resolutions. The first Resolution involved support for the recently signed North American Rabies Management Plan and asked for implementation. After revising language in the Resolution, it passed unanimously. The second Resolution called for support into research of the GenCon® vaccine for use in racbies and population control in feral animals. After revision, the Resolution was approved and referred to the Committee on Nominations and Resolutions.
Use of Landscape Features in Preventing the Spread of Raccoon Rabies Variant

Shylo R. Johnson, Mike R. Dunbar*, Dennis Slate, Robert Hale
National Wildlife Research Center

The spread of raccoon rabies variant was documented from Florida in the 1940s to Ohio in 1996. The oral rabies vaccine program began with initial trial in New Jersey in 1992.

Goals of the oral rabies vaccination (ORV) program were to prevent spread and keep costs down. ORV zones are connected to landscape features. Rivers reduced crossings as well as mountains are a deterrent to rapid spread of rabies. Rivers deter about 50 percent of raccoons to cross depending on size.

National Wildlife Research Center provided research involving barriers and their use in oral bait distribution. Slow distribution in Alabama and Pennsylvania were aided by natural barriers. Data collection was done to document what led to slower spread. Research was done on both natural barriers and the genetics of different populations.

Alabama showed raccoons had low density in wooded areas plus raccoons only crossed at low river sites. Genetic tests showed raccoons were genetically the same on both sides of the river. River therefore did not serve as a barrier. In Pennsylvania, they looked at valleys and ridges in the southwest part of the state. Only one raccoon went from ridge to valley, none went from valley to ridge. Genetic tests showed that ridge and valley populations are genetically the same although separated by distance. In Alabama, raccoons crossed the river and gene flow occurs across the river. Pennsylvania, the ridges shaped the direction of movement and slowed, but did not stop the spread of rabies. The Appalachian Mountains are higher in Tennessee and this leads to lower density of raccoons and discourages movement because of lower contact rates.

Increasing rabies cases is caused by low intensity residential areas and lack of rivers or lakes and major roads. Decreasing rabies cases are associated with high elevation and increasing wetlands. There is an ongoing study in the Cleveland area to study the movement of the raccoon population by barriers and genetics. In the process of trapping raccoons in downtown Cleveland and tracking those populations in an urban setting, recommendations for future baiting activity will result.
Rabies can be prevented with post exposure vaccine. Interruption of vaccine supply is not uncommon and this is in part due to complex vaccine production. Use is also determined by numbers of rabies cases and epizootics that occur in different areas. You cannot predict the need for human rabies vaccine and only two manufacturers exist in the world.

In 2007, Sanofi began renovations to its plant that will not be done till 2009. They created supply to fill the gap based on previous use of vaccine. Novartis had difficulties keeping up with needs and had to stop shipment several times. Demand outstriped the vaccine being produced by Novartis. Sanofi only shipped for postexposure prophylaxis (PEP) approved by public health veterinarians. Higher than estimated PEP requests kept the supply low.

A working group was created to evaluate the situation of limited supply and how to deal with it. Advisory Committee on Immunization Practices (ACIP) working group may drop 5th dose and intradermal use is being investigated along with other options.

Since PEP is not reportable, need to keep better track of PEP use to help minimize use in low risk situations.

Two situations that were completely preventable resulted in high use of PEP. Montana - dead bat brought to school by mother, exposed 90 children. In Malawi, 1000 people ate meat from rabid cow and 800 received PEP, but no rabies can be acquired from cooked meat.

Limited supply produced conflict with public health and medical practice. Limited supply was confused with shortage of vaccine. Messages were mixed and this added to the confusion.

Most exposures can be prevented. PEP can be delayed in many cases and animals should be observed if they are dogs or cats. PEP should be reserved for high risk groups and evaluated on a case by case basis. State and local public health must work with local animal control, medical and veterinary community to deal with exposure situations. There is a good chance that the supply will also be limited in 2009.
The Committee met on October 6, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 1:00 to 5:00 p.m. There were 15 members and 1 guest present. The meeting was called to order at 1:00 p.m. and members were encouraged to sign-in. Dr. McDonough gave a brief overview of the Committee and its mission statement, encouraged attendees to review the minutes of the 2007 Reno meeting, gave a brief look at Salmonella in the world’s scientific literature, and welcomed the speakers to the forum.

The Continuing Challenge of Salmonella in the United States – the CDC Overview of Salmonella was presented by Casey Barton Behravesh, Centers for Disease Control and Prevention (CDC).

Dr. Barton Behravesh gave an overview of Salmonella - 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 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 2006 (see the Salmonella Appendix A following this report) in which Salmonella typhimurium and Salmonella enteritidis remained the top 2 serotypes.
REPORT OF THE COMMITTEE

Annual summaries of human *Salmonella* isolations may be found at www.cdc.gov/nationalsurveillance/salmonella_surveillance.html.

She then went on to describe FoodNet, established in 1996, as the principal foodborne disease component of CDC’s Emerging Infections Program. FoodNet is a collaboration of CDC, United States Department of Agriculture (USDA), Food and Drug Administration (FDA), and 10 participating state health departments. It covers about 15 percent of the United States (US) 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. Estimates show that the rate of *Salmonella* has remained steady compared to the baseline period. In fact, no statistically significant change was seen for *Salmonella* between 2006 and baseline. For year 2007 the *Salmonella* rates showed some differences (see *Salmonella* Appendix A following this report), e.g., *S.* Typhimurium and *S.* Heidelberg declined versus the 1996-1998 baseline, and there was no change in *S.* Enteritidis while *S.* Newport increased.

Dr. Barton Behravesh then gave an overview of the National Antimicrobial Resistance Monitoring Program (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 1 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.

Next 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 U.S. It is a collaboration between CDC and State and local health departments, USDA-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 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).

Next she discussed the National Outbreak Reporting System, or (NORS), which is an electronic reporting system for foodborne and waterborne disease outbreaks, enteric person-to-person-transmitted disease outbreaks (e.g., norovirus outbreaks), and for the first time will include 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, mean 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 trainings will be available online by early 2009. Information was provided on the number of salmonellosis outbreaks and outbreak-related illnesses reported to CDC, 1998-2007. More information was given about outbreaks by food commodity category of single implicated food, 1998-2005. Salmonellosis outbreaks due to poultry were discussed, i.e., these are typically small, are home, restaurant or event-based. Cross-contamination by poultry is likely underrepresented in outbreak surveillance, e.g., these may be large: >100 cases S. Typhimurium in Arkansas associated with restaurant sushi contaminated in 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. Produce-associated outbreaks on the rise with the proportion of all foodborne outbreaks associated with produce increasing over last 30 years, i.e., from < 1 percent to 6 percent of all outbreaks, from < 1 percent to 12 percent of outbreak associated cases. Some produce items are associated with recurrent outbreaks of salmonellosis, i.e., almonds, melons, sprouts, tomatoes. Recent Salmonella outbreaks have included chicks, turtles, dog food, pot pies, and cantaloupes. Contact with live poultry (including chickens, ducks, and other birds) is a source of human Salmonella infections, and more than 20 outbreaks have been recognized since1955. All of these outbreaks have involved cases in young children and were associated with baby chicks.
REPORT OF THE COMMITTEE

purchased as pets. In addition these outbreaks have had a seasonal pattern, with most cases occurring during the spring months surrounding the Easter holiday. A recent outbreak of *Salmonella montevideo* infections linked to baby chicks was identified in 2005, with cases occurring in 2006 and 2007. Although these birds appear healthy, they are shedding *Salmonella*, i.e., hot chicks. In a number of these outbreaks, mail-order hatcheries were implicated as the source of the birds. *Salmonellae* are normal gut flora for turtles. Human infections occur through contact with turtle feces; direct contact is not necessary for infection. Turtles are considered especially high-risk for young children because they are more likely to be handled by a young child, compared with other reptiles. This is due to a turtle’s slowness, gentle nature and perceived ease of care. Small turtles can be handled differently than other reptiles, and a child may kiss a small turtle or put it in their mouth. To prevent turtle-associated *Salmonella* infections, especially in young children, in 1975 FDA 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 U.S. Two large multistate *Salmonella* outbreaks with >100 illnesses each occurred in 2007-2008: *Salmonella* Java, and in 2008: S. Typhimurium.

Index case with turtle contact had secondary exposure in daycares resulting in seven ill children (no turtle contact). By February 18, 2008, 107 infections with the outbreak strain of *Salmonella* Paratyphi B (var Java) had been identified in 34 states. Conclusions about this outbreak were that to date, it was the largest documented outbreak of *Salmonella* infections associated with turtle exposure. Most patients were children, and most infections involved turtles with shells less than four inches in length, the sale of which is illegal in the U.S. Despite this, many of these turtles were purchased from retail pet stores. These data indicate that existing enforcement efforts are not sufficient to prevent turtle-associated *Salmonella* infections, particularly in children. In addition, there is a need for greater public awareness of the link between reptiles and *Salmonella*. Next, information was provided about a dry pet food outbreak in which >76 cases of *Salmonella* Schwarzengrund with outbreak strain occurred from 2006-2008. Children < years accounted for 48 percent of the cases. Epidemiologic and laboratory evidence implicated multiple brands produced by Manufacturer X at Plant X in Pennsylvania. In August 2007 there was a recall of 2 brands of dry dog food and in September 2008 another recall of 105 types of dry dog and cat food. In October 2008 a permanent closure of the pet food plant occurred. An infant case-control study identified feeding pets in kitchen and frequent contact with pet treats by primary care giver as risk factors. Next a large pot pie related outbreak occurring in 2007 was discussed, i.e., it was caused by S. I, 4,5,12:i:- infections associated with prepared but not ready-to-eat pot pies, it was detected by PulseNet, iterative interviewing identified vehicle,
most patients cooked pot pies in microwaves, microwaving instructions were confusing, most patients did not follow instructions, and finally the source of pot pie contamination is unknown. Next a 2008 *Salmonella* Litchfield outbreak linked to cantaloupes was presented; this outbreak resulted in 53 cases of *S*. Litchfield infections in 16 states and additional cases in Canada. These cases are likely only a small proportion of the actual number of ill persons because some cases do not get reported. An analytic study indicated that the consumption of cantaloupe was associated with illness. Traceback investigations by the FDA identified a common Honduran cantaloupe grower and packer as a source of cantaloupes.

Dr. Baron Behravesh concluded by stating that *Salmonella* remains a continuing challenge for us in the U.S.

Outbreak of *Salmonella* Serotype Saintpaul Infections Associated with Multiple Raw Produce Items -- United States, 2008 was presented by Casey Barton Behravesh. The complete text of this presentation is included at the end of this report and can also be found at www.cdc.gov/mmwr/preview/mmwrhtml/mm57a1.htm.

*Salmonella* sampling strategies for dairy operations: Results from the National Animal Health Monitoring and Surveillance (NAHMS) Dairy 2007 study was given by David A. Dargatz, Centers for Epidemiology and Animal Health, Veterinary Services.

Dr. Dargatz presented the results of bovine salmonellosis from the recent NAHMS Dairy 2007 study. Foodborne infection with *Salmonella* remains a major cause of human illness. *Salmonella* is shed from diarrheic and from asymptomatic cows. Individual fecal samples are the most common method of diagnosis. However, environmental sampling has been successfully used in identifying herd infected with *Mycobacterium avium paratuberculosis* (MAP). In fact, in a recently published study over 90 percent of environmental samples (5 samples per visit/1-2 months between visits over 3 years) were positive for *Salmonella* on an infected dairy herd (Van Kessel, et al, 2008). The objective of the study was to compare individual cow fecal samples, pooled fecal samples and composite environmental fecal samples in determining herd infection status and predominant *Salmonella* serotype. Samples were collected between February and August 2007 from operations in 17 states. A total of 6,542 samples were cultured, 4,164 – individual cows, 35 cows per herd, 837 – pools created, 7 pools composed of 5 cows each, and 1,541 environmental samples, plus 6 composite samples from common cow areas. There were a total of 265 operations participating (116 operations – contributed individuals, pools, environmental; 5 operations – contributed individuals and pools, and 144 operations – contributed only environmental samples). Sample prevalence by sample type (individual) and herd size were presented. Also *Salmonella* serotypes recovered were outlined:
from the category Individual - Cerro – 167, Kentucky – 137, Montevideo – 72, Meleagridis – 58, Mbandaka – 50; Pooled - Cerro – 49, Kentucky – 46, Meleagridis – 24, Montevideo – 17, Mbandaka – 15; Environmental - Cerro – 114, Kentucky – 70, Montevideo – 43, Meleagridis – 39, Muenster – 29. Many sample comparisons were discussed. It was concluded that differences in percent positive by sample type do occur, but environmental samples are comparable to individual or pooled sampled for determining herd Salmonella status, and the most common serotypes recovered are similar across sample types.

National Antimicrobial Resistance Monitoring System (NARMS) was presented by Jonathan G. Frye, ARS, Bacterial Epidemiology and Antimicrobial Resistance Research Unit, Agriculture Research Service. Dr. Frye presented our yearly update of activities from the NARMS group. Dr. Barton Behravesh had earlier described the human part of the NARMS surveillance. Initially he provided an overview of NARMS, of multi drug resistance (MDR) Salmonella, MDR-AmpC Salmonella Newport. NARMS began in the U.S. in 1996 and is funded through and interagency grant by the FDA. Unfortunately, funding has been level for the past three years, which of course equates to a decline in money each year as salaries and operating costs increase; this fact has severely affected the scope of the NARMS project. Dr. Frye presented the evolution of antimicrobial testing in the U.S. They test isolates from on-farm and diagnostic sources when available and funding allows. However, routine testing of slaughter/processing isolates is the hallmark of NARMS; it is a passive system, relying on the receipt of Salmonella isolates from Food Safety and Inspection Service (FSIS). However, it remains the only comprehensive snapshot of resistance in animal production in the U.S. All food animal species, all sizes of plants, and all geographic areas are represented in the slaughter isolates. They also test for E.coli, Campylobacter and Enterococcus as money permits. The animal isolates from NARMS originate from a variety of sources. Diagnostic isolates: these isolates presumed to be associated with clinical illness, animals are not likely to enter slaughter facility, isolates come from sentinel sites (14 veterinary diagnostic laboratories), a random selection of isolates come from USDA-APHIS-VS, National Veterinary Services Laboratories (NVSL), from Sentinel states excluded from NVSL selection to prevent duplication. Non-diagnostic isolates: isolates presumed to come from healthy animals, On-farm (these isolates come from NAHMS during national prevalence studies on farm during a five year rotations of commodity), from slaughter (rinsates, carcass swabs, ground product) and from eggs. Testing provides a comprehensive snapshot of what is going to retail from compliance testing. How is the data reported? Each arm of NARMS posts yearly annual reports on their respective websites. Additionally, an executive report which combines data from all three arms is posted on the FDA website and can be linked from the other websites www.fda.
The future goal is to post individual reports in a more timely manner and to have the executive reports completed within 9 months of data closeout. Various tables were presented that highlighted *Salmonella* resistance patterns (see the Appendix B following this report).

With regard to MDR, many other serotypes harbor the ACSSuT phenotype other than *S. Typhimurium*; for the majority of serotypes, this phenotype has declined over time. *Salmonella* Newport has been declining both in number and in MDR phenotype. A summary of information was presented for the MDR *Salmonella* - *Salmonella* Newport was responsible for a large proportion of MDR *Salmonella*; this serotype was mostly isolated from cattle (especially from diagnostic samples), and its extended spectrum cephalosporin resistance was due to the *blaCMY-2 ampC* gene encoded on a large MDR plasmid in most animal and human isolates. The prevalence of MDR *S. Newport* has been dropping in animal and human NARMS isolates; however, preliminary data indicates the plasmid may be spreading to other serotypes and host species in animals.

Next Dr. Frye presented an overview of USDA VetNet. Food is often implicated in *Salmonella* outbreaks, but in the majority of outbreaks the etiologic agent is never identified. PFGE analysis of *Salmonella* isolates from food animals, would aid in tracking outbreaks, would provide an increased public health benefit, and an increased animal health benefit. In 2003, ARS and FSIS established USDA VetNet [PulseVet, VetNet-Animal] in collaboration with CDC. Personnel were trained and certified at CDC, but the program resides in Athens, Georgia. The objectives of USDA VetNet include to capture PFGE patterns of *Salmonella* and *Campylobacter* isolates submitted to NARMS and Collaboration in Animal Health and Food Safety Epidemiology (CAHFSE) and other sources with generic *E. coli*, *Enterococcus* and other bacterial isolates to be added over time. To compare VetNet and PulseNet PFGE patterns, this comparative data would assist in surveillance, in carriage and persistence studies, in the study of the ecology of organisms along the food chain and lastly to investigate animal illness outbreaks as well as food borne illness outbreaks. There are some limitations apparent in the USDA VetNet process, i.e., DNA is cut primarily with only one enzyme but a second enzyme may be added on request or for outbreaks, also what defines a fingerprint, what is a match (PFGE band differences may be attributed to genetic changes, plasmids, etc), and lastly prior to final interpretation, other information including but not limited to their antimicrobial resistance profile, plasmid or other gene information and supporting epidemiology is required prior to determining the final level of relatedness. A summary of VetNet patterns over the years by animal source was presented. See the *Salmonella* Appendix B following this report.

Lastly Dr. Fyre provided an overview of new tools – the interactive NARMS data website, high-throughput multiplex PCR serotyping, and an antimicrobial resistance gene microarray. www.ars.usda.gov/main/site_main.htm?modecode=66120508.
Evolutionary Trends of *Salmonella enteritidis*Linked to Subpopulation Biology and Virulence Attributes a Time Specific Paper was presented by Dr. J. Guard Bouldin, ARS-USDA. The complete text of the presentation is included in these proceedings at the end of this report.

Dr. Bouldin reported that *Salmonella enterica* serovar *enteritidis* (S. Enteritidis) is currently the world’s leading cause of food borne salmonellosis. It is the only serotype out of over 1400 within *Salmonella enterica* I that contaminates the internal contents of the egg by vertical transmission from the reproductive tract of otherwise healthy hens. Epidemiological studies have shown that this exceptionally invasive pathogen with an unusual tissue tropism has a more clonal population structure than most other broad-host range *Salmonella* serotypes. Dr. Guard Bouldin presented research findings that showed how this egg tropism is likely to have occurred.

FSIS *Salmonella* initiatives for meat, poultry, and processed egg products presentation was given by Daniel L. Engeljohn, Office of Policy, Program and Employee Development, FSIS.

Dr. Engeljohn presented FSIS’s mission, its public health performance measures, policies on pathogen control including *Salmonella*. 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 are safe, wholesome, and correctly labeled and packaged www.fsis.usda.gov/about_fsis/index.asp. In FY07, FSIS had approximately 7,800 full-time inspectors that visited around 6,200 facilities. Processing establishments receive daily inspection, slaughter establishments receive daily inspection along with every animal afforded a critical inspection before slaughter. FSIS inspected approximately 44 billion pounds of livestock, 57 billion pounds of poultry, 3.5 billion pounds of liquid egg product, 3.8 billion pounds of product reinspected at the border, and conducted about 8 million inspection procedures. A progress review was presented for the federal Healthy People 2010 program Morbidity and Mortality Weekly Report (MMWR) April 11, 2008; 57(14):366-370 www.cdc.gov/mmwr/preview/mmwrhtml/mm5714a.htm. He described preliminary surveillance data for 2007 and compared them with data for previous years. In 2007, the estimated incidence of infections caused by *Campylobacter, Listeria*, Shiga toxin-producing *Escherichia coli* O157 (STEC O157), *Salmonella, Shigella, Vibrio*, and *Yersinia* did not change significantly, and *Cryptosporidium* infections increased compared with 2004–2006. Progress toward the targets for Healthy People 2010 national health objectives and targets regarding the incidence of foodborne infections occurred before 2004; however, none of the targets were reached in 2007. *Salmonella* incidence was the furthest from its national health target, suggesting that reaching this target will require new approaches.
Dr. Engeljohn gave an overview of FSIS’s involvement in Salmonella testing:

1998-2000: phased implementation of Salmonella testing.
2002-2005: noted an adverse upward trend in percent positives seen with Salmonella verification testing.
2005: poultry pre-harvest interventions public meeting.
2006: poultry post-harvest interventions public meeting.


The 11 initiatives included:
1. report back Salmonella results immediately.
2. post quarterly Salmonella data; look for trends.
3. begin Salmonella sets for turkey carcasses (swabs).
4. identify establishments in 1 of 3 categories.
5. schedule follow-up Salmonella sets based on category.
6. schedule FSAs in poorer performing establishments.
7. issue compliance guidelines for effective process control.
8. share subtyping information; publish aggregate data.
9. pursue policies on sub-typing Salmonella.
10. conduct baseline studies on raw classes of product.
11. monitor progress towards Category 1 status.

The acceptable number of Salmonella positive samples were as follows for each category:

<table>
<thead>
<tr>
<th>Raw Class of Product</th>
<th>Sample Set Size</th>
<th>Standard</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broiler Carcasses</td>
<td>51</td>
<td>12</td>
<td>6</td>
<td>7 - 12</td>
<td>&gt;12</td>
</tr>
</tbody>
</table>

Categories found in Broiler establishments (Preliminary data current as of 26 September 2008):

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Number of Establishments</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>146</td>
<td>79% (up from 35% in 2006)</td>
</tr>
<tr>
<td>2</td>
<td>35</td>
<td>29%</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>184</td>
<td>100%</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

As the proportion of establishments in Category 1 increases, the relative risk of illness from *Salmonella* on broiler carcasses decreases. FSIS estimates the rate of human *Salmonella* illnesses from broilers fell from 0.9 cases/100,000 in FY2007 to 0.83 cases/100,000 in FY2008.

Categories found in Turkey establishments (Preliminary data current as of 26 September 2008):

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Establishments</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>35</td>
<td>92%</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>8%</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>100%</td>
</tr>
</tbody>
</table>

The next steps in 2008 include - FSIS issued a Federal Register Notice announcing additional *Salmonella* policies, including posting names of establishments demonstrating poor or inconsistent process control (i.e., Category 2 or 3) to the FSIS website: www.fsis.usda.gov/science/salmonella_verification_testing_program/index.asp.

Also in 2008 the *Salmonella* Initiative Program (SIP) was implemented. It applies to regulatory waivers (9 CFR 303.1(h) & 381.3(b)), and it responds to requests for increased line speeds for slaughter, to requests for alternative time/temperature for chilling birds after slaughter, and to increased establishment microbial testing. An update to SIP will be published soon.

Update from the National Pork Board was given by Dr. Steve Larsen, National Pork Board. An estimated 1.4 million cases of salmonellosis occur per year in the U.S. No declining trend in human cases has occurred in spite of declines seen in FSIS in-plant pork carcass testing. There are more than 2,500 serotypes of *Salmonella*; some disconnect may be seen between common serotypes found in pigs versus humans; *Salmonella* Typhimurium very common in both. Food safety and the pork industry involve a team approach; the industry objective is to lower the incidence of salmonellosis. The Farm to Fork Team Approach involves on-farm interventions, transportation, lairage, in-plant attention. On-farm interventions involving feed and water gave mixed results that were inconsistent at best. On-farm interventions are perhaps not the best location because re-infections occur at lairage. There is some hope in breeding for genetic resistance to shedding. The Pig Quality Assurance Plus (PQA) was launched in June 2007 and is a HACCP based approach looking at physical, chemical and biological hazards. Looking at transportation issues may provide some control. Cleaning and disinfection
of transports would serve to reduce/eliminate exposure; limiting transportation times would serve to limit exposure. The phenomenon of stress from transportation has given us an inconsistent message in that it may increase shedding and exposure and may not have an effect on shedding and infection. Control in the lairage (holding pens at plant) may offer additional controls and has the potential of greatest impact. It can have major impact on carcass contamination. We need to reduce/limit exposure in pens because infection can occur within 30 minutes, so that two hours is the limit for holding time. In fact, no holding actually showed reduced *Salmonella* in sows (this is not practical for market hogs). Also moisture in pens correlates to increased *Salmonella* infections. Cleaning and disinfection of pens have provided an inconsistent message in that it sometimes works and sometimes doesn’t; perhaps the fecal load is too large. At any rate we need consistently reliable interventions at lairage. In-plant the combination of scalding/de-hairing and carcass wash does a good job at reducing *Salmonella* and as a result pork carcasses are well below performance standard; thus it might be best to focus attention elsewhere.

As far as pre harvest results the 2000 National Animal Health Monitoring System (NAHMS) showed that 6.2 percent of on-farm samples were positive (5420 samples collected). The 2006 NAHMS is currently being reviewed and will be out shortly. The 2004 Collaboration in Animal Health and Food Safety Epidemiology (CAHFSE) from Iowa, Minnesota, Missouri, North Carolina, and Texas involved testing from July 2004 – June 2005 at a total of 48 sites, and 28 (58.3 percent) were positive, 690 pens and 140 (20.3 percent) were positive, and 4,306 individual samples of which 349 (8.1 percent) were positive. The 2006 CAHFSE is underway and they are seeing similar results, but lower *Salmonella* rates.

The CAHFSE top 10 serotypes for 2004 are: Derby, Typhimurium, (var. Copenhagen), Typhimurium, Heidelberg, Mbandaka, Worthington, Untypeable, Anatum, Infantis, and Meleagridis.

The next steps for FSIS will include increased testing for plants that have serotypes of human health concern, i.e., the CDC top 30 list, and FSIS is considering more aggressive steps to ensure increased control of *Salmonella* Pre-Harvest? A new baseline study will be forthcoming.

In summary, *Salmonella* reduction is a team approach from farm to fork. Pre-harvest testing shows a low *Salmonella* prevalence (CAHFSE – 8.1 percent, NAHMS – 6.2 percent). The industry average is below 4.0 percent carcass prevalence that is even lower at retail. There is some question in looking at serotypes because there is an Inconsistent match with human illness.

NVSL National *Salmonella* serotype Report – *Salmonella* Serotypes, July 2007 to June 2008 was presented by Matt Erdman, Diagnostic Bacteriology Laboratory, NVSL.

Dr. Erdman presented the USDA *Salmonella* serotype report. The
REPORT OF THE COMMITTEE

paper in its entirety is included at the end of this report. He noted that there have been some changes in nomenclature, i.e. the change in the White-Kaufman-Le Minor scheme, change in the 9th edition of the Antigenic Formulae of The Salmonella Serovars, published by the World Health Organization (WHO) in 2007.

White and Kaufmann combined their work to publish the classification of Salmonella based on serology; Kaufmann was in charge of the Salmonella international centre from 1935-1965, and 958 serotypes names were added; Le Minor was in charge from 1965-1989, and there were then a total of 2287 serotypes names. Also, Salmonella enterica subspecies I is now the only named subspecies, Arizona is now III antigenic formula, and Group E2 and E3 use the E1 name followed by var. 15+ or var. 15+, 34+.

New activities at NVSL include the investigation of new technologies for serotyping, e.g., Bioplex, and the work to summarize historical data/trends from the wealth of data accumulated at the serotyping laboratory.

National Poultry Improvement Plan 2007-2008 Update was given by C. Stephen Roney, National Poultry Improvement Plan (NPIP).

Dr. Roney provided an overview of the progress for the NPIP program after a historical look at the pullorum/typhoid over the years. The Salmonella Pullorum and Salmonella Gallinarum eradication program began in 1935. There has been no isolation of Salmonella Gallinarum in the U.S. since 1987, and no isolation of Salmonella Pullorum in 2006 and 2007 in backyard poultry in the United States; one isolate was found in 2008.

Salmonella Enteritidis cases were presented for egg-type breeding positive flocks, and the phage types were listed for 1990 to 2008. An S. Enteritidis meeting was held at the NPIP office in May 2008 to review the serotype, i.e., a literature review was presented, laboratory isolation and identification were reviewed, virulence factors outlined, increasing incidence was discussed.

Salmonella related services through the NPIP were presented. An Annual Hands-on Salmonella Isolation and Identification Workshop for authorized laboratories cosponsored by the Georgia Poultry Laboratory and NPIP have been given from 1994-2008. A series of three videos sponsored by the U.S. Poultry and Egg Association on Salmonella have been developed. Also, NVSL issues a group D Salmonella check test annually for authorized laboratories of the NPIP.

Committee Business:

During the Committee’s business session, the Chair reviewed USAHA 2008 Strategic Plan. The Committee discussed topics from the 2007 meeting relative to a real concern for veterinary clinics and hospitals with historical and ongoing multi drug resistant (MDR) Salmonella infections, for the need of a review of the Infection Control (IC) Programs that may
or may not be available for such premises, for frequent nosocomial infections and ensuing spread to the community and to non-source farms/flocks. It was thought that the Committee should initiate collaborations with such groups as the Veterinary Infection Control Society (VIC-S) vics-l@colostate.edu, with the Association for Professionals in Infection Control and Epidemiology (APIC) http://www.apic.org//AM/Template.cfm?Section=Home or the American College of Veterinary Internal Medicine (ACVIM), http://www.acvim.org/ to promote IC programs in clinics, hospitals and veterinary clinics. Perhaps the Committee should write a position paper on this very important topic, which often involves food-fiber type animals, horses and on occasion companion animal patients in private and university veterinary clinics/hospitals.

Another term from the 2007 meeting was again discussed regarding the need to promote the availability and ease of use of fingerprinting strategies such as phage typing (S. Typhimurium, S. Enteritidis) pulse-field gel electrophoresis (PFGE), Multi Locus Sequence Typing (MLST) microarray, other that would facilitate the sharing of fingerprint data between agencies (USDA, FDA, CDC, state departments of health and agriculture) microbial source tracking (MST) in order to detect the emergence and spread (in real time) of (new/emerging) Salmonella strains or perhaps clones.

As a result of their discussion, the Committee developed a Resolution regarding the fingerprinting strategies. The plan of action is to encourage interagency increased support for NARMS and the USDA VetNet. In addition to funding for Veterinary Sentinel sites for detecting trends in antimicrobial resistance, to promote creation and funding for a Veterinary Pulse Net (now termed USDA VetNet) as a counterpart to Food Net/Pulse Net.
Salmonella enterica serovar Enteritidis (S. Enteritidis) is currently the world’s leading cause of food borne salmonellosis. It is the only serotype out of over 1400 within Salmonella enterica that contaminates the internal contents of the egg by vertical transmission from the reproductive tract of otherwise healthy hens. Epidemiological studies have shown that this exceptionally invasive pathogen with an unusual tissue tropism has a more clonal population structure than most other broad-host range Salmonella serotypes. In contrast to its clonal genomic structure, cell surface analysis and hen infection studies indicate that S. Enteritidis generates more phenotype heterogeneity than does S. Typhimurium. To resolve the conundrum of how a genome can look the same but yet generate heterogeneous subpopulations that vary in their ability to interact with the avian reproductive tract, comparative genome sequencing (CGS) of 3 whole genomes of S. Enteritidis was performed in conjunction with high-throughput phenotype microarray (PM) and hen infection studies.

Application of CGS revealed a genome that harbored approximately 200 small scale evolutionary events per strain as well as evidence of homologous recombination, insertion of uropathogenic genes from E. Coli, and acquisition of single genes from S. Typhi and other serotypes. PM analysis of a PT strain that lacked SEN4316, the largest naturally occurring gene deletion found, revealed striking divergence in physiological capabilities between strains, including the ability to metabolize and grow well in the presence of a number of nitrogenous compounds at pH 4.5 and the antibiotic colistin. Results from hen infection studies that recovered bacteria from internal organs and measured egg production following infection supported the concept that some cultures could harbor three major subpopulations were sometimes present in both ST64b (PT4) and Fels2 (PT13a) bacteriophage lineage strains. These results indicate that the most virulent isolates of S. Enteritidis are at least triphasic, which means that three prevalent phenotypes are inherently expressed from a single genome in response to environmental conditions. Strains that vary in their ability to contaminate eggs and to grow to high cell density are likely to vary in their ability to express all three developmental pathways because of the accumulation of small scale evolutionary events over time.
Outbreak of Salmonella Serotype Saintpaul Infections Associated with Multiple Raw Produce Items — United States, 2008

Casey Barton Behravesh
Enteric Diseases Epidemiology Branch
Centers for Disease Control and Prevention (CDC)

On May 22, 2008, the New Mexico Department of Health (NMDOH) notified CDC about four persons infected with Salmonella Saintpaul strains that were indistinguishable from each other by pulsed-field gel electrophoresis (PFGE) and 15 other persons with Salmonella infections whose isolates had not yet been characterized. In the following weeks, cases continued to be reported, and the outbreak expanded to include 43 states, the District of Columbia (Figure 1), and Canada. This report is an interim summary of results from seven epidemiologic studies, traceback investigations, and environmental investigations related to the outbreak. Further data collection and analyses are ongoing. As of August 25, 2008, a total of 1,442 persons had been reported infected with the outbreak strain. At least 286 persons have been hospitalized, and the infection might have contributed to two deaths. The outbreak began late in April 2008, and most persons became ill in May or June. The outbreak appears to be over; however, CDC and state health departments are continuing to conduct surveillance for cases of infection with the outbreak strain. Preliminary epidemiologic and microbiologic results to date support the conclusion that jalapeño peppers were a major vehicle by which the pathogen was transmitted and serrano peppers also were a vehicle; tomatoes possibly were a vehicle, particularly early in the outbreak. Contamination of produce items might have occurred on the farm or during processing or distribution; the mechanism of contamination has not been determined. These findings indicate that additional measures are needed to enhance food safety and reduce illnesses from produce that is consumed raw.

Epidemiologic Studies

A case was defined as laboratory-confirmed infection with Salmonella Saintpaul with XbaI pattern JN6X01.0048, the outbreak strain. Of the 1,442 cases reported, public health agencies have reported illness onset information for 1,414 patients. Illnesses began during April 16--August 11; most persons became ill in May or June (Figure 2). Complete demographic information is available for 565 ill persons. Of these, 52 percent were male; 79 percent were white, 8 percent were American Indian/Alaska Native, 3 percent were black, 2 percent were Asian/Pacific Islander, and 7 percent reported other or multiple races. Hispanic ethnicity was reported for 22 percent. Patient ages ranged from <1 to 99 years (median age: 33 years), and the highest incidence was among persons aged 20--29 years. Cases were distributed among 43 states, the District
of Columbia, and Canada, with particularly high incidence rates in New Mexico and Texas (Figure 1).

Soon after the first cases were detected in mid-May 2008, additional cases were identified in Texas and the Navajo Nation through PulseNet (the national molecular subtyping network for foodborne disease surveillance). Nineteen ill persons were initially interviewed in detail to generate hypotheses about the source of their illnesses. To identify the source, NMDOH, the Texas Department of State Health Services (TXDSHS), Navajo Nation, the Indian Health Service (IHS), and CDC conducted a multistate case-control study of laboratory-confirmed infections. For this case-control study, a case was defined as diarrheal illness (three or more loose stools in a 24-hour period) that began on or after May 1 in a person infected with the outbreak strain. Controls were well persons in the community matched by age and location using reverse telephone directories and by face-to-face interviews. The matched analysis included 51 case-patients and 106 controls. Using a questionnaire based on hypotheses generated by the preliminary interviews, study participants were asked about foods consumed during the week preceding their illness. On univariate analysis, illness was significantly associated with eating raw tomatoes (matched odds ratio [mOR] = 6.7) and had a borderline association with eating tortillas (mOR = 2.8) in the week preceding illness onset (Table). Illness remained significantly associated with eating raw tomatoes (mOR = 5.6) after adjusting for consumption of tortillas (Table). Illness was not significantly associated with eating salsa (mOR = 1.7), guacamole (mOR = 1.6), or any other food item (Table).

In June, increasing numbers of cases were reported from a growing number of states. State and local health departments identified clusters of illness in restaurants by interviewing ill persons whose isolates had the outbreak PFGE pattern and asking about exposures to suspect foods and about any recent meals at restaurants. Beginning on June 20, TXDSHS and CDC investigated a cluster of 47 ill persons associated with a Mexican-style restaurant in Texas. For this case-control study, a case was defined as diarrheal illness (three or more loose stools in a 24-hour period) in a person who ate at the restaurant in the week before illness began; culture confirmation was not required. Controls were well meal companions. The analysis included 47 case-patients and 36 controls. On multiple logistic regression, illness was significantly associated only with eating salsa (adjusted odds ratio [aOR] = 62.3) (Table). The salsa ingredients included raw tomatoes and raw jalapeño peppers.

Beginning on June 24, TXDSHS and CDC investigated another cluster of 33 ill persons, this one associated with a local Mexican-style restaurant chain in Texas. For this case-control study, a case was defined as diarrheal illness (three or more loose stools in a 24-hour period) in a person who ate at either of two restaurants in the chain during the week before illness began; culture confirmation was not required. Controls were
Salmonella

Well meal companions and restaurant patrons identified by credit card receipts. The analysis included 33 case-patients and 62 controls. Illness was significantly associated only with eating salsa (aOR = 7.5) (Table). The salsa ingredients included commercially canned tomatoes and raw jalapeño peppers, but not raw tomatoes. These results indicated that jalapeño peppers were a likely source of illness.

Beginning on June 26, to further investigate possible food vehicles, CDC and state and local health departments in 29 states conducted a second multistate case-control study of laboratory-confirmed infections identified through PulseNet. A case was defined as diarrheal illness (three or more loose stools in a 24-hour period) that began on or after June 1 in a person infected with the outbreak strain. Controls were well persons in the community matched by age and location using reverse telephone directories. The matched analysis included 11 cases and 81 controls. After adjusting for sex, Hispanic ethnicity, and additional age variation, illness was significantly associated with eating at a Mexican-style restaurant in the week preceding illness onset (mOR = 1.6) (Table). Illness also was significantly associated with eating pico de gallo (mOR = 1.0), corn tortillas (mOR = 2.3), and freshly prepared salsa (mOR = 2.1) (Table). Illness was not significantly associated with any other individual food items or ingredients.

Beginning on June 30, the Minnesota Department of Health investigated a cluster of 19 persons with Salmonella Saintpaul infection associated with a natural food restaurant. For this case-control study, a case was defined as diarrheal illness (three or more loose stools in a 24-hour period) in a person infected with the outbreak strain who ate at the restaurant in the week before illness began. Controls were well meal companions and restaurant patrons identified by credit card receipts. The analysis included 19 case-patients and 73 controls. On univariate analysis, illness was significantly associated with eating any of several items including salsa, guacamole, red bell peppers, cilantro, and jalapeño peppers. Both types of peppers had been diced before they arrived at the restaurant. On multivariate analysis, illness was only significantly associated with eating raw, jalapeño peppers (OR = 6.0) (Table). This study provided more evidence that consumption of raw jalapeño peppers was a major risk factor for illness.

Beginning on July 7, the North Carolina Division of Public Health, the Mecklenburg County Health Department, and CDC investigated a cluster of 13 ill persons associated with a local Mexican-style restaurant. For the case-control study, a case was defined as diarrheal illness (three or more loose stools in a 24-hour period) in a person infected with the outbreak strain who ate at the restaurant in the week before illness began. Controls were well restaurant patrons identified by credit card receipts. The analysis included four case-patients and 113 controls. On multivariate analysis, illness was significantly associated only with eating guacamole (aOR = 8.7) (Table). The guacamole ingredients included avocado, raw
REPORT OF THE COMMITTEE

Roma tomatoes, raw red onions, raw serrano peppers, cilantro, salt, and lime juice, but not jalapeño peppers. This study demonstrated that not all of the outbreak illnesses could be linked to eating jalapeño peppers. During May 22-August 7, state and local health departments in 14 states and the District of Columbia reported a total of 33 restaurant-associated clusters of illness. The median number of laboratory-confirmed cases for all clusters was four; 26 (79 percent) of the 33 clusters had eight or fewer laboratory-confirmed cases. Raw jalapeño peppers were not served in four of the restaurants, serrano peppers were not served in 19 restaurants, and raw tomatoes of various types were served in all restaurants. Of the four restaurants without raw jalapeño peppers, two had serrano peppers.

During July 11-25, NMDOH, the Arizona Department of Health Services, Navajo Nation, IHS, and CDC conducted a household-based case-control study among non-restaurant--associated cases in New Mexico, Arizona, and the Navajo Nation. A case-household was defined as a household with a case (defined as diarrheal illness [three or more loose stools in a 24-hour period] beginning on or after June 1 in a person infected with the outbreak strain). Control-households were enrolled systematically from the same community and had no members who reported diarrheal illness on or after June 1. The matched analysis included 41 case-households and 107 control-households and compared the presence of specific foods in the household regardless of whether the respondent remembered eating them. On univariate analysis, illness in the household was significantly associated with having a raw jalapeño pepper in the household (mOR = 2.9), and illness had a borderline association with having a raw serrano pepper in the household (mOR = 3.0) during the week preceding illness onset (Table). Illness was not significantly associated with the presence of any other food item in the household. A concurrent case-control study that evaluated individual-level exposures asked the case-patient in each case-household and respondents in control-households about recent food exposures. This study did not identify an association between illness in the case-patients and eating raw jalapeño or serrano peppers. These results suggested that at the time these illnesses were occurring, jalapeño peppers and perhaps serrano peppers were likely vehicles for illness among persons not associated with a restaurant cluster, although persons might not have specifically recalled consuming the peppers.

Environmental and Traceback Investigations

The Food and Drug Administration (FDA) traced back the processing and distribution pathway for tomatoes associated with several ill persons. These tracebacks did not converge onto a single packer, distributor, or growing area of tomatoes. Tomatoes linked to ill persons and tomatoes randomly collected from the distribution chain in several states were cultured; none of these cultures yielded *Salmonella*.

FDA traced the source of the jalapeño peppers associated with illness.
in the two previously described Texas restaurant-associated clusters to distributors in Texas that received jalapeño peppers from Mexico. On July 21, FDA reported isolation of the outbreak strain from a jalapeño pepper sample obtained from one of these distributors. The pepper likely was grown on a farm in Tamaulipas, Mexico (farm A); this farm also grew serrano peppers and Roma tomatoes. FDA did not isolate the outbreak strain from environmental samples from farm A, but did isolate the outbreak strain from a sample of serrano peppers and a sample of water from a holding pond used for irrigation from another farm (farm B) in Tamaulipas. Farm B also grew jalapeño peppers, but not tomatoes. Farms A and B provided produce to a common packing facility in Mexico that exports to the United States. In addition, on July 29, the Colorado Department of Public Health and Environment (CDPHE) reported isolation of the outbreak strain from a jalapeño pepper collected from the household of a person in Colorado who had developed illness with the outbreak strain. CDPHE traced this pepper from the grocery store where it had been purchased to another distributor in Texas, which reportedly received jalapeño peppers from farms in Mexico; however, the specific farms have not been identified.

Control Measures
Since June, CDC, FDA, and public health partners have issued multiple public advisories recommending that consumers avoid eating certain produce items. A limited advisory recommending that consumers in New Mexico and Texas avoid eating certain types of tomatoes was issued on June 3, and the advisory was expanded nationwide on June 7 (Figure 2). After associations were identified between illness and eating jalapeño and serrano peppers, CDC and FDA issued successive advisories recommending that consumers avoid eating jalapeño and serrano peppers grown in Mexico; the first nationwide jalapeño pepper advisory was issued on July 9 (Figure 2). The tomato advisory was lifted on July 17; the jalapeño and serrano pepper advisories remain in effect.

Reported by: J Jungk, J Baumbach, M Landen, New Mexico Department of Health. LK Gaul, L Alaniz, T Dang, EA Miller, Texas Department of State Health Services. J Weiss, Arizona Dept of Health Svcs. E Hedican, K Smith, Minnesota Department of Health. F Grant, T Beauregard, Mecklenburg County Health Department; D Bergmire-Sweat, D Griffin, J Engel, North Carolina Division of Public Health. S Cosgrove, S Gossack, Colorado Department of Public Health and Environment. A Roanhorse, H Shorty, Navajo Nation Division of Health. J Cheek, J Redd, I Vigil, Division of Epidemiology and Disease Prevention, Indian Health Service; Food and Drug Administration; Division of Foodborne, Bacterial, and Mycotic Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases; EIS Officers, CDC.

Editorial Note:
Contaminated produce eaten raw is an increasingly recognized vehicle for transmission of *Salmonella* and other pathogens (1). Each year, approximately 36,000 laboratory-confirmed cases of *Salmonella* infection are reported in the United States through national serotype-based surveillance (2). *Salmonella* Saintpaul is an uncommon serotype, causing, on average, 1.6 percent of all reported laboratory-confirmed *Salmonella* infections each year. In 2007, only 40 human isolates of the outbreak strain were submitted to PulseNet. This report describes the largest foodborne disease outbreak identified in the United States in the past decade, based on the number of culture-confirmed cases. Because many persons with *Salmonella* illness do not seek care or have a stool specimen tested, many more illnesses likely have occurred than those reported (3).

In this outbreak, epidemiologic studies revealed associations between illness and more than one raw produce item. Although most multistate enteric disease outbreaks have been linked to a single food vehicle, an outbreak attributed to both parsley and cilantro grown on one farm has been reported (4). The initial case-control study identified an association between illness and eating raw tomatoes. Subsequent studies identified an association between illness and eating raw jalapeño peppers, an item commonly eaten with tomatoes in Mexican-style cuisine. Epidemiologic data also suggested an association with raw serrano peppers. These associations triggered product alerts and led to product tracing and microbiologic studies, which indicated that jalapeño and serrano peppers grown, harvested, or packed in Mexico were contaminated with the outbreak strain. The epidemiologic and microbiologic results support the conclusion that jalapeño peppers were a major vehicle by which the pathogen was transmitted, and that serrano peppers also were a vehicle. Consumption of peppers was not implicated in either of the two multistate case-control studies. However, produce items such as peppers that are typically consumed in small quantities as ingredients of other dishes might not be remembered and can be difficult to implicate (5). Neither raw jalapeño nor serrano peppers have been identified previously as a vehicle for a foodborne disease outbreak in the United States. Little is known about the survival and growth characteristics of *Salmonella* on these peppers, although rapid growth in jalapeño pepper extract has been reported (6).

Tomatoes possibly were a vehicle for infection, particularly early in the outbreak. In the initial case-control study, illness was significantly associated with consumption of raw tomatoes and not with foods containing peppers, such as salsa or guacamole. Consumption of jalapeño or serrano peppers was not assessed in this initial study because in hypothesis-generating interviews conducted with 19 case-patients, only five (26 percent) reported eating peppers other than red or green bell peppers in the week before illness began. In addition, a survey of 75 case-patients in Texas whose illnesses began before June 7, using a questionnaire that asked specifically about pepper consumption, found a
relatively low proportion who reported eating raw jalapeño (39 percent) or raw serrano (8 percent) peppers in the week before illness began, whereas reported raw tomato consumption was high (85 percent). Finding the outbreak strain on two types of peppers from two farms supports the possibility of contamination of other produce items, including tomatoes, during growing, processing, or distribution.

Local, state, tribal, and federal response capacity often is strained during large and complex outbreaks, and structure and capabilities vary among jurisdictions. This can cause delays in identifying cases and in conducting investigations. In this outbreak investigation, the median time from illness onset to submission of the PFGE pattern of patients’ *Salmonella* isolates to PulseNet was 17 days; 90 percent were submitted within 27 days. Faster transfer of bacterial strains to public health laboratories and faster subtyping in those laboratories would result in more timely investigation of cases of infection. Epidemiologic investigations can benefit from faster methods for interviewing ill and well persons, improved interview formats, and rapidly adaptable electronic data gathering and transmission platforms. Improvements in the ability to trace contaminated produce quickly and accurately also would improve the speed of investigations, the speed and specificity of recalls, and the determination of the ultimate causes of contamination. For several years, CDC has been improving the efficiency of epidemiologic investigations through OutbreakNet, the network of public health officials that investigates outbreaks of enteric illnesses nationwide, and through participation in the Council to Improve Foodborne Outbreak Response,* a multidisciplinary working group.

In addition, FDA has been enhancing the safety of produce by collaborating with state officials, academia, and industry on multiyear initiatives to increase the safety of leafy greens and tomatoes. FDA and its partners are working to improve guidance and policies intended to minimize outbreaks and to improve produce-safety research and education.

References
Naimi TS, Wicklund JH, Olsen SJ, et al. Concurrent outbreaks of *Shigella sonnei* and enterotoxigenic *Escherichia coli* infections associated with
REPORT OF THE COMMITTEE

* Information available at www.cifor.us.

FIGURE 1. Number* and incidence rate† of laboratory-confirmed cases of Salmonella Saintpaul (outbreak strain), by state — United States, 2008§

* N = 1,442.
† Per 1 million population.
<table>
<thead>
<tr>
<th>Study (start date) and food item/exposure</th>
<th>Cases</th>
<th>Controls</th>
<th>Odds ratio</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>(%)</td>
<td>No.</td>
<td>(%)</td>
</tr>
<tr>
<td><strong>First multistate study (May 26)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw tomatoes</td>
<td>42/48</td>
<td>(88)</td>
<td>67/104</td>
<td>(64)</td>
</tr>
<tr>
<td>Tortillas</td>
<td>42/48</td>
<td>(88)</td>
<td>67/104</td>
<td>(64)</td>
</tr>
<tr>
<td>Salsa</td>
<td>39/47</td>
<td>(83)</td>
<td>69/104</td>
<td>(66)</td>
</tr>
<tr>
<td>Guacamole</td>
<td>27/48</td>
<td>(56)</td>
<td>47/104</td>
<td>(45)</td>
</tr>
<tr>
<td><strong>First Texas restaurant (June 20)</strong></td>
<td>16/50</td>
<td>(32)</td>
<td>25/103</td>
<td>(25)</td>
</tr>
<tr>
<td>Salsa</td>
<td>41/43</td>
<td>(95)</td>
<td>8/29</td>
<td>(28)</td>
</tr>
<tr>
<td><strong>Texas restaurant chain (June 24)</strong></td>
<td>32/32</td>
<td>(100)</td>
<td>49/58</td>
<td>(85)</td>
</tr>
<tr>
<td>Salsa</td>
<td>68/138</td>
<td>(49)</td>
<td>64/278</td>
<td>(23)</td>
</tr>
<tr>
<td>Eating at a Mexican-style restaurant</td>
<td>35/127</td>
<td>(28)</td>
<td>26/257</td>
<td>(10)</td>
</tr>
<tr>
<td>Pico de gallo</td>
<td>51/126</td>
<td>(40)</td>
<td>67/251</td>
<td>(27)</td>
</tr>
<tr>
<td>Corn tortilla</td>
<td>60/130</td>
<td>(46)</td>
<td>73/245</td>
<td>(30)</td>
</tr>
<tr>
<td>Salsa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minnesota restaurant (June 30)</strong></td>
<td>17/19</td>
<td>(89)</td>
<td>8/73</td>
<td>(11)</td>
</tr>
<tr>
<td>Jalapeño pepper</td>
<td>4/4</td>
<td>(100)</td>
<td>42/113</td>
<td>(37)</td>
</tr>
<tr>
<td><strong>North Carolina restaurant (July 17)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guacamole</td>
<td>26/41</td>
<td>(63)</td>
<td>42/107</td>
<td>(40)</td>
</tr>
<tr>
<td>Jalapeño pepper</td>
<td>9/41</td>
<td>(22)</td>
<td>9/107</td>
<td>(8)</td>
</tr>
</tbody>
</table>

---

*Confidence interval.
† Univariate analysis.
‡ Matched analysis.
§ Adjusted for consumption of tortillas in the week before illness onset.
** Multivariate analysis.
†† Adjusted for sex, Hispanic ethnicity, and additional age variation.
REPORT OF THE COMMITTEE
Salmonella Serotypes from Animals and Related Sources Reported during July 2007 – June 2008

National Veterinary Services Laboratory Veterinary Services

SUMMARY
Serotyping results for 18,267 *Salmonella* isolates from animals and epidemiologically related sources are reported for July 1, 2007 through June 30, 2008. The most frequently identified serotypes were *Salmonella* Typhimurium, *S.* Kentucky, *S.* Heidelberg, *S.* Senftenberg and *S.* Montevideo.

INTRODUCTION
*Salmonella* isolates submitted by animal disease diagnostic laboratories throughout the United States are received at the National Veterinary Services Laboratories (NVSL) for serotyping. The *Salmonella* are isolated from cases of clinical disease and from herd and flock monitoring. Data are included on *Salmonella* isolated by the Food Safety and Inspection Service (FSIS) as a result of Hazard Analysis and Critical Control Points (HAACP) testing. Data generated from the serotyping of research isolates as well as isolates submitted without a defined clinical role are not included in this report. There are two tables presenting serotype information by source: one from cases of clinical disease and one table presenting serotypes by source data from monitor samples, environmental samples, feed, and those listing other as the clinical role.

We did not receive any information from other laboratories serotyping *Salmonella* over the past year. We would encourage other laboratories serotyping *Salmonella* isolates of animal origin to resume sending information to NVSL to be included in the annual United States Animal Health Association (USAHA) summary. No identifiers about the origin of the isolates are needed other than the state and animal species of origin and whether the isolate came from a clinical case or surveillance study.

The serotype information is in the format of the White-Kauffman-LeMinor scheme which is followed by the World Health Organization (WHO) Collaborating Centre for Reference and Research on *Salmonella* and the Centers for Disease Control and Prevention (CDC). The subspecies designation precedes the antigenic formula for those serotypes other than subspecies I. Those serotypes previously reported as Arizona are now listed with “III” (both monophasic and diphasic) followed by the antigenic formula. Those serotypes belonging to subspecies II or IV that
had been previously named are now listed with their antigenic formula preceded by II or IV. *Salmonella java* is now named *S.* Paratyphi B var. L-tartrate+. Group E₂ and E₃ serotypes are now designated by the E₁ serotype name followed by “var. 15+” or “var. 15+, 34+”.

**DISCUSSION**

Serotyping results are presented for 18,267 *Salmonella* isolates. This year 44 percent of the isolates were from clinical cases and 56 percent were from monitor samples, compared to 38 percent and 62 percent last year, respectively.¹ Of the clinical isolates, 35 percent were of bovine origin and 32 percent were isolated from swine. Thirty-nine percent of the monitor samples were isolated from chickens and 12 percent were recovered from turkeys.

A total of 253 serotypes were identified from isolates recovered from animals, their environment, or feed in 40 states and the District of Columbia. The 10 most common serotypes (Table 1) accounted for 58 percent of the total isolates reported. Table 2 lists the 10 most common serotypes by clinical role: those from clinical cases and those from monitor samples. *Salmonella* Typhimurium, *S.* Heidelberg, *S.* Cerro, *S.* Senftenberg and *S.* Montevideo are found in both lists.

*Salmonella* Typhimurium was again the most frequently identified serotype from all sources and clinical roles. (Table 1) It was the most common serotype from clinical cases and the third most common serotype from monitor samples (Table 2). *Salmonella* Typhimurium was among the five most frequently identified serotypes isolated from chickens, swine, horse and dog/cat (Tables 3, 6, 7 and 8). Fourteen percent of all isolates, 22 percent of isolates from clinical cases, and 8 percent of isolates from monitor samples were identified as *S.* Typhimurium, compared to 13 percent, 21 percent, and 9 percent, respectively, last year.¹ Fifty-one percent of the *S.* Typhimurium isolates were identified as *S.* Typhimurium var. Copenhagen this year, compared to 53 percent last year.¹ The majority of *S.* Typhimurium isolates recovered from swine were *S.* Typhimurium var. Copenhagen (73 percent); whereas 37 percent of isolates of chicken origin were *S.* Typhimurium var. Copenhagen, and 19 percent of equine origin were *S.* Typhimurium var. Copenhagen.

An untypable serotype 4,5,12:i:- decreased to 164 this year from 262 last year¹ and 437 in 2006². Sixty-seven of these were isolated from chickens, 20 from cattle, and 25 from horses. This serotype is believed to be *S.* Typhimurium that has lost the ability to express the phase 2 flagellar antigen.

*Salmonella* Newport was the seventh most frequently identified serotype from all sources (Table 1) and third in clinical cases. (Table 2). It was the fourth most common serotype from clinical cases in cattle (Table 5) and accounted for 6 percent of the isolates of bovine origin. *Salmonella*
Newport was the second most common serotype from clinical cases in horses (Table 7) and accounted for 5 percent of the isolates of equine origin. Four percent of the total isolates from all sources and all clinical roles were S. Newport, compared with 4 percent last year\(^1\), 5 percent in 2006\(^2\), and 9 percent in 2005.\(^3\)

The number of *Salmonella* Enteritidis isolated decreased this year to 551 isolates compared to 774 isolates last year. Fifty-four percent of the isolates were of chicken origin and it was the most frequently identified serotype from chicken clinical cases and the third most common serotype from chicken monitor samples (Table 5). Eleven different phage types were identified among the 329 S. Enteritidis isolates that were phage typed. The most frequently identified phage types were type 8 (54 percent), type 13 (13 percent), and type 23 (11 percent). Two percent were untypable, and 2 percent reacted, but did not conform (RDNC.)

Fifteen different phage types were identified among 150 S. Typhimurium isolates that were phage typed. The most common phage types were DT104 and variants (67 percent) and U302 (9 percent). Five percent were untypable and 5 percent reacted, but did not conform.

REFERENCES
### Table 1: *Salmonella* Serotypes Identified Most Frequently From July 1, 2007 through June 30, 2008 with Comparison Data for 5 Years (All Sources, All Clinical Roles)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium**</td>
<td>2192 (1)</td>
<td>2448 (1)</td>
<td>3223 (1)</td>
<td>3211 (1)</td>
<td>2256 (1)</td>
<td>2810 (1)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1536 (2)</td>
<td>1963 (2)</td>
<td>1651 (3)</td>
<td>1360 (4)</td>
<td>740 (4)</td>
<td>1425 (4)</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>1173 (3)</td>
<td>1274 (3)</td>
<td>1668 (2)</td>
<td>1436 (3)</td>
<td>826 (4)</td>
<td>2454 (2)</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>807 (4)</td>
<td>773 (5)</td>
<td>812 (5)</td>
<td>734 (5)</td>
<td>667 (5)</td>
<td>749 (5)</td>
</tr>
<tr>
<td>Montevideo</td>
<td>761 (5)</td>
<td>623 (6)</td>
<td>847 (7)</td>
<td>579 (7)</td>
<td>276 (10)</td>
<td>718 (7)</td>
</tr>
<tr>
<td>Cerro</td>
<td>671 (6)</td>
<td>499 (11)</td>
<td>443 (13)</td>
<td>429 (11)</td>
<td>72 (10)</td>
<td>181 (7)</td>
</tr>
<tr>
<td>Newport</td>
<td>609 (7)</td>
<td>755 (6)</td>
<td>1060 (4)</td>
<td>1609 (11)</td>
<td>920 (28)</td>
<td>718 (19)</td>
</tr>
<tr>
<td>Enteritidis</td>
<td>551 (8)</td>
<td>774 (4)</td>
<td>483 (11)</td>
<td>468 (10)</td>
<td>327 (10)</td>
<td>428 (3)</td>
</tr>
<tr>
<td>Dublin</td>
<td>511 (9)</td>
<td>478 (12)</td>
<td>256 (18)</td>
<td>250 (17)</td>
<td>110 (19)</td>
<td>200 (17)</td>
</tr>
<tr>
<td>Anatum</td>
<td>475 (10)</td>
<td>580 (10)</td>
<td>860 (5)</td>
<td>352 (12)</td>
<td>197 (13)</td>
<td>469 (10)</td>
</tr>
</tbody>
</table>

** INCLUDES S. TYPHIMURIUM AND S. TYPHIMURIUM VAR COPENHAGEN
( ) RANK BEGINNING WITH THE MOST COMMON

### Table 2: Most Common Serotypes 7/07-6/08

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>1491 Kentucky 1358</td>
</tr>
<tr>
<td>Dublin</td>
<td>440 Heidelberg 928</td>
</tr>
<tr>
<td>Newport</td>
<td>404 Typhimurium 703</td>
</tr>
<tr>
<td>Derby</td>
<td>312 Senftenberg 543</td>
</tr>
<tr>
<td>Agona</td>
<td>310 Montevideo 511</td>
</tr>
<tr>
<td>Cerro</td>
<td>275 Enteritidis 457</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>264 Cerro 396</td>
</tr>
<tr>
<td>Montevideo</td>
<td>250 Anatum 311</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>245 Mbundaka 302</td>
</tr>
<tr>
<td>Muenster</td>
<td>183 Hadar 231</td>
</tr>
<tr>
<td>All Others</td>
<td>2540 All Others 2880</td>
</tr>
<tr>
<td>Total</td>
<td>6714 Total 8620</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

TABLE 3. MOST COMMON SEROTYPES, CHICKENS 7/07-6/08

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>23</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Kentucky</td>
<td>16</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>14</td>
<td>Enteritidis</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>7</td>
<td>Typhimurium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Senftenberg</td>
</tr>
<tr>
<td>All Others</td>
<td>34</td>
<td>All Others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

TABLE 4. MOST COMMON SEROTYPES, TURKEYS 7/07-6/08

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>136</td>
<td>Senftenberg</td>
</tr>
<tr>
<td>Hadar</td>
<td>40</td>
<td>London</td>
</tr>
<tr>
<td>Montevideo</td>
<td>31</td>
<td>Hadar</td>
</tr>
<tr>
<td>Saintpaul</td>
<td>18</td>
<td>Muenster</td>
</tr>
<tr>
<td>Agona</td>
<td>15</td>
<td>Saintpaul</td>
</tr>
<tr>
<td>All Others</td>
<td>106</td>
<td>All Others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>346</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

TABLE 5. MOST COMMON SEROTYPES, CATTLE 7/07-6/08

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dublin</td>
<td>423</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>351</td>
<td>Cerro</td>
</tr>
<tr>
<td>Cerro</td>
<td>255</td>
<td>Montevideo</td>
</tr>
<tr>
<td>Newport</td>
<td>200</td>
<td>Anatum</td>
</tr>
<tr>
<td>Montevideo</td>
<td>151</td>
<td>Mbandaka</td>
</tr>
<tr>
<td>All Others</td>
<td>988</td>
<td>All Others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2368</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

TABLE 6. MOST COMMON SEROTYPES, SWINE 7/07-6/08

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>742</td>
<td>Typhimurium</td>
</tr>
<tr>
<td>Derby</td>
<td>296</td>
<td>Derby</td>
</tr>
<tr>
<td>Agona</td>
<td>176</td>
<td>Infantis</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Choleraeuis</td>
<td>(Kunzendorf)</td>
<td>101</td>
</tr>
<tr>
<td>All Others</td>
<td>706</td>
<td>All Others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2181</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

496
# SALMONELLA

## TABLE 7. MOST COMMON SEROTYPES, HORSES 7/07-6/08

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>208</td>
</tr>
<tr>
<td>Newport</td>
<td>85</td>
</tr>
<tr>
<td>Oranienburg</td>
<td>55</td>
</tr>
<tr>
<td>Javiana</td>
<td>35</td>
</tr>
<tr>
<td>Anatum</td>
<td>32</td>
</tr>
<tr>
<td>All others</td>
<td>373</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>788</strong></td>
</tr>
</tbody>
</table>

## TABLE 8. MOST COMMON SEROTYPES, DOG/CAT 7/07-6/08

<table>
<thead>
<tr>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
</tr>
<tr>
<td>Newport</td>
</tr>
<tr>
<td>Dublin</td>
</tr>
<tr>
<td>Montevideo</td>
</tr>
<tr>
<td>Enteritidis</td>
</tr>
<tr>
<td>All Others</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

SALMONELLA APPENDIX A

PHLIS: 10 Most Frequently Reported Human Salmonella Serotypes, 2006
www.cdc.gov/ncidod/dbmd/phlisdata/salmonella.htm
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>Typhimurium</td>
<td>6872</td>
<td>16.9</td>
</tr>
<tr>
<td>2</td>
<td>Enteritidis</td>
<td>6740</td>
<td>16.6</td>
</tr>
<tr>
<td>3</td>
<td>Newport</td>
<td>3373</td>
<td>8.3</td>
</tr>
<tr>
<td>4</td>
<td>Heidelberg</td>
<td>1495</td>
<td>3.7</td>
</tr>
<tr>
<td>5</td>
<td>Javiana</td>
<td>1433</td>
<td>3.5</td>
</tr>
<tr>
<td>6</td>
<td>I 4, [5],12:i:-</td>
<td>1200</td>
<td>3.0</td>
</tr>
<tr>
<td>7</td>
<td>Montevideo</td>
<td>1061</td>
<td>2.6</td>
</tr>
<tr>
<td>8</td>
<td>Muenchen</td>
<td>753</td>
<td>1.9</td>
</tr>
<tr>
<td>9</td>
<td>Oranienburg</td>
<td>719</td>
<td>1.8</td>
</tr>
<tr>
<td>10</td>
<td>Mississippi</td>
<td>604</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Subtotal | 24250 | 59.6 |
Other    | 10392 | 25.6 |
Unknown  | 4042  | 9.9  |
Partially serotyped | 1442 | 3.5 |
Rough, mucoid, and/or nonmotile | 110 | 0.3 |
Total | 40,666 | 100 |

Relative Incidence for 2007 compared with 1996-1998 Selected Salmonella Serotypes:
Foodborne Diseases Active Surveillance Network (FoodNet), 1996-2007
Dr. Barton Behravesh, CDC

<table>
<thead>
<tr>
<th></th>
<th>Change</th>
<th>95% Conf. Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Typhimurium</td>
<td>52%↓</td>
<td>46%↓ to 58%↓</td>
</tr>
<tr>
<td>S. Heidelberg</td>
<td>21%↓</td>
<td>0%↓ to 37%↓</td>
</tr>
<tr>
<td>No Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Enteriditis</td>
<td>22%↑</td>
<td>1%↓ to 51%↑</td>
</tr>
<tr>
<td>S. Montevideo</td>
<td>8%↓</td>
<td>36%↓ to 32%↑</td>
</tr>
<tr>
<td>Increased</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Newport</td>
<td>68%↑</td>
<td>28%↑ to 119%↑</td>
</tr>
<tr>
<td>S. Javiana</td>
<td>58%↑</td>
<td>1%↑ to 148%↑</td>
</tr>
</tbody>
</table>
## SALMONELLA APPENDIX B

Salmonella Multiple Drug Resistance
National Antimicrobial Resistance Monitoring System (NARMS)
Jonathan G. Frye, Bacterial Epidemiology and Antimicrobial Resistance Research Unit, Agricultural Research Service

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Tot. # Tested</td>
<td>2391</td>
<td>3318</td>
<td>8508</td>
<td>7834</td>
<td>5739</td>
<td>6977</td>
<td>5353</td>
<td>4873</td>
<td>4412</td>
<td>3110</td>
<td>1926</td>
</tr>
<tr>
<td>Total # Pan Susc.(%)</td>
<td>65.8</td>
<td>51.9</td>
<td>55.7</td>
<td>52.9</td>
<td>48.4</td>
<td>52.3</td>
<td>48.7</td>
<td>48.1</td>
<td>51.9</td>
<td>50.6</td>
<td>51.6</td>
</tr>
<tr>
<td>Total # R = 1 (%)</td>
<td>9.4</td>
<td>8.1</td>
<td>8.8</td>
<td>9.8</td>
<td>7.5</td>
<td>8.0</td>
<td>8.2</td>
<td>7.7</td>
<td>7.5</td>
<td>12.4</td>
<td>14.7</td>
</tr>
<tr>
<td>Total # R &gt; 5(%)</td>
<td>11.1</td>
<td>17.9</td>
<td>14.8</td>
<td>19.4</td>
<td>22.4</td>
<td>22.2</td>
<td>25.1</td>
<td>24.2</td>
<td>19.7</td>
<td>18.6</td>
<td>15.1</td>
</tr>
<tr>
<td>Total # R &gt; 10(%)</td>
<td>0.8</td>
<td>2.0</td>
<td>1.3</td>
<td>5.5</td>
<td>5.4</td>
<td>7.3</td>
<td>7.0</td>
<td>3.2</td>
<td>2.8</td>
<td>3.6</td>
<td>1.4</td>
</tr>
</tbody>
</table>
## APPENDIX B

**S. Typhimurium – Pan Susceptible - Slaughter Isolates**

National Antimicrobial Resistance Monitoring System (NARMS)

Jonathan G. Frye, Bacterial Epidemiology and Antimicrobial Resistance Research Unit, Agricultural Research Service

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>65.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human</td>
<td>68.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle</td>
<td>67.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swine</td>
<td>45.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>61.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>31.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### APPENDIX B

**SAMONELLA – PAN SUSCEPTIBLE - SLAUGHTER ISOLATES**

National Antimicrobial Resistance Monitoring System (NARMS)

Jonathan G. Frye, Bacterial Epidemiology and Antimicrobial Resistance Research Unit, Agricultural Research Service

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>65.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human</td>
<td>68.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cattle</td>
<td>67.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swine</td>
<td>45.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>61.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey</td>
<td>31.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# APPENDIX B

Percent Multiple Resistance – Top Serotypes from Slaughter Cattle Isolates 1999-2007

National Antimicrobial Resistance Monitoring System (NARMS)

Jonathan G. Frye, Bacterial Epidemiology and Antimicrobial Resistance Research Unit, Agricultural Research Service

<table>
<thead>
<tr>
<th>Rank</th>
<th>Serotype</th>
<th>Pan-Susceptible</th>
<th>&gt; 2 ABX</th>
<th>&gt; 5 ABX</th>
<th>&gt; 10 ABX</th>
<th>&lt;</th>
<th>0.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Montevideo</td>
<td>92.9%</td>
<td>2.0%</td>
<td>0.7%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Anatum</td>
<td>76.1%</td>
<td>1.9%</td>
<td>1.1%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Newport</td>
<td>22.8%</td>
<td>76.4%</td>
<td>72.9%</td>
<td>0.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Muenster</td>
<td>92.9%</td>
<td>3.8%</td>
<td>1.1%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Typhimurium</td>
<td>46.2%</td>
<td>49.7%</td>
<td>24.4%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Typhimurium var.5-</td>
<td>13.1%</td>
<td>80.5%</td>
<td>16.0%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Kentucky</td>
<td>64.7%</td>
<td>3.6%</td>
<td>0.8%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mbandaka</td>
<td>90.2%</td>
<td>2.9%</td>
<td>0.7%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Cerro</td>
<td>88.4%</td>
<td>1.3%</td>
<td>0.3%</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Agona</td>
<td>36.0%</td>
<td>45.2%</td>
<td>41.0%</td>
<td>1.4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX B

VetNet patterns-source and year
National Antimicrobial Resistance Monitoring System (NARMS)
Jonathan G. Frye, Bacterial Epidemiology and Antimicrobial Resistance Research Unit, Agriculture Research Service

<table>
<thead>
<tr>
<th>Source</th>
<th>Year (n=total number of isolates for year)</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Source</td>
<td>2,397</td>
<td>2,842</td>
<td>2,350</td>
<td>1,848NC*</td>
</tr>
<tr>
<td>Bovine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No. of isolates</td>
<td>593</td>
<td>328</td>
<td>383</td>
<td>414</td>
</tr>
<tr>
<td>Predominant patterns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Braenderup JBPX01.0002 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agona JABX01.0099 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anatum JAGX01.0034 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerro JCGX01.0002 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of isolates</td>
<td></td>
<td>1,269</td>
<td>1,976</td>
<td>1,364</td>
<td>958</td>
</tr>
<tr>
<td>Chicken</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Predominant patterns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky JOPX01.0003 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky JOPX01.0001 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky JOPX01.0342 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heidelberg JFX10.0015 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of isolates</td>
<td></td>
<td>258</td>
<td>298</td>
<td>295</td>
<td>204</td>
</tr>
<tr>
<td>Porcine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Predominant patterns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adelaide TDA01.0001 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TYPHIMURIUM JBPX01.0004 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derby JDPX01.0005 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of isolates</td>
<td></td>
<td>5</td>
<td>15</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Ready to eat product</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Predominant patterns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIVE JEXX01.0003 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heidelberg JFX10.0011 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sentinel JMPX01.0008 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urbana JGQX01.0001 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of isolates</td>
<td></td>
<td>232</td>
<td>225</td>
<td>297</td>
<td>262</td>
</tr>
<tr>
<td>Turkey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Predominant patterns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heidelberg JFX10.0010 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ILLA 18.24.23- RKKX01.0001 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading JGQX01.0001 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saintpan JNX01.0023 ARS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE ON SCRAPIE

Chair: Jim Logan, Riverton, WY
Vice Chair: Charles Palmer, Redding, CA

Deborah L. Brennan, MS; Shane A. Brookshire, GA; Beth W. Carlson, ND; John R. Clifford, DC; Thomas F. Conner, OH; Walter E. Cook, WY; Linda A. Detwiler, NJ; 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; Burke L. Healey, NC; Susan J. Keller, ND; James W. Leafstedt, SD; Mary J. Lis, CT; Michael R. Marshall, UT; Cheryl A. Miller, IN; Alecia L. Naugle, MD; Brian V. Noland, ID; Kristine R. Petrini, MN; Jewell G. Plumley, WV; Michael R. Pruitt, OK; Paul E. Rodgers, CO; Joe D. Ross, TX; Larry A. Schuler, ND; Ben Smith, WA; Diane L. Sutton, MD; Lynn Anne Tesar, SD; Delwin D. Wilmot, NE; Nora E. Wineland, CO; Cindy B. Wolf, MN.

The Committee met on October 28, 2008 at the Sheraton Greensboro Hotel in Greensboro, North Carolina, from 12:30 p.m. to 3:45 p.m. There were 14 members and 26 guests present. The meeting was called to order by Vice-Chair Dr. Charles Palmer. Chair Dr. Jim Logan joined the committee meeting at 1:00 p.m. The Committee heard and discussed the following presentations:

United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) Scrapie Program Update – Epidemiological Update was presented by Dr. Diane Sutton, Veterinary Services (VS), USDA-APHIS.

In Fiscal Year 2008 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 slaughter surveillance (RSSS); 4) producer education, 5) ID compliance; 6) finalizing the National Scrapie Surveillance Plan; 7) completion of the Caprine Scrapie Prevalence Study; and 8) implementing the Veterinary Services Laboratory Submission System for regulatory scrapie slaughter surveillance.

Scrapie Flock Certification Program

As of September 30, 2008, there were 1,971 flocks participating in the Scrapie Flock Certification Program (SFCP). Of these flocks 505 were certified flocks, 1,436 were complete monitored flocks, 24 were export monitored and 4 were selective monitored.
National Scrapie Surveillance Plan

The National Scrapie Surveillance has been finalized and 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 US, explains the basis for implementing state-of-origin sampling targets and ultimately flock level surveillance, and establishes minimum targets for FY 2009 and 2010.

Infected and Source Flocks

As of September 30, 2008, there were 31 scrapie infected and source flocks, a decrease of 16 percent from September 30, 2007. There were a total of 61 new infected and source flocks reported for FY 2008, a decrease of 15 percent from FY 2008. Chart 1 shows the number of new infected and source flocks by year. The total infected and source flock statuses that were released in FY 2008 was 64. 174 positive scrapie cases were confirmed and reported by the National Veterinary Services Laboratories (NVSL) for FY 2008. Of these, 40 were RSSS cases, (collected in FY 2008), 128 positive field necropsy cases, 4 rectal biopsy and 2 third eyelid tests. Five of the field cases were goats that originated from the same herd. One RSSS case was consistent with Nor98 scrapie. NOTE: Ante-mortem scrapie testing in sheep and goats using rectal biopsy was approved for program use by USDA for in January 2008.

Approximately 2,438 animals were indemnified comprised of 51.4 percent non-registered sheep, 30.5 percent registered sheep, 9.6 percent non-registered goats and 8.5 percent registered goats.

Regulatory Scrapie Slaughter Surveillance (RSSS)

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 www.aphis.usda.gov/vs/ceah/cahm/sheep/sheep.htm. RSSS started April 1, 2003. It is a targeted slaughter surveillance program which is designed to identify infected flocks for clean-up. During FY 2008, collections increased by 6 percent overall and by 13 percent for black and mottled face sheep compared to FY2007. Improvement in the overall program effectiveness and efficiency is demonstrated by the 30 percent decrease in percent positive black faced sheep compared to FY 2007 (.27 to .19 percent, based on test results posted before October 10, 2008). During FY 2007, 43,887 samples were collected (chart 2). There have been 40 NVSL confirmed positive cases collected in FY2008. Face colors of these positives were 39 black and 1 white. The white face case was consistent with Nor98 scrapie. The percent positive by face color is shown in the chart 3 below. One black face case was in an AA_{136}QR_{171} ewe.
Caprine Scrapie Prevalence Study (CSPS)

CSPS was conducted from May 2007 to March 2008, to estimate the national prevalence of scrapie in adult goats at slaughter. 3,032 goats were sampled for scrapie testing. None tested positive for scrapie; from this we are able to conclude that the prevalence is less than 0.1 percent.

Scrapie Testing

As of September 30, 2008, 48,269 animals have been sampled for scrapie testing: 43,887 RSSS, 1,517 goats for the CSPS, 2,277 regulatory field cases, 139 necropsy validations, and 282 and 306 regulatory third eyelid and rectal biopsies respectively.

Animal ID

As of September 30, 2008, 145,343 sheep and goat premises had been assigned identification numbers in the Scrapie National Generic Database and 113,656 premises had received official ear tags.

Note: report based on data available as of October 10, 2008

Nor98-like Scrapie in the United States of America was presented by Drs. Christina M. Loiacono, S. Mark Hall, and Bruce V. Thomsen, National Veterinary Services Laboratory, USDA-APHIS-VS.

This paper describes the first six sheep diagnosed with Nor98-like disease in the United States and serves to acknowledge the increased efforts of diagnosticians and the USDA program to control and eradicate scrapie disease. Classical scrapie, a fatal neurodegenerative disease affecting the central nervous system of sheep and goats, is among a number of diseases classified as transmissible spongiform encephalopathies (TSEs). Recently, a distinct strain of scrapie was diagnosed in sheep in Norway and has been identified in numerous countries of the European Union (EU). The disease has been identified, among other names, as Nor98 or Nor98-like scrapie. Distinctions between classical scrapie and Nor98-like scrapie are made based on signalment, clinical signs, histopathology and immunodiagnostic results. In the past, the classical scrapie disease was confirmed by examination of the brain tissue for a triad of histopathological signs – vacuolation, loss of neurons and gliosis – and, more recently, by immunohistochemical (IHC) or biochemical detection of abnormal prion protein (PrPSc) in the brain, or lymphoid tissues. In the case of Nor98-like scrapie there is generally little or no vacuolation in the brain and, to date, no lymphoid accumulation of PrPSc has been detected. Classical scrapie typically has the most intense PrPSc immunostaining at the obex (motor nucleus of the vagus), while this area is spared in Nor98-like scrapie. Alternatively, Nor98-like scrapie consistently has PrPSc immunostaining in the spinal nucleus of the trigeminal nerve and variable, but often an intense immunostaining for PrPSc in the cerebellum. Thus the diagnosis of Nor98 and Nor98-like disease can be based on immunohistochemistry identifying abnormal
prion protein in regions of the brain not typically associated with classical scrapie. Additionally there is a distinct diagnostic western blot pattern for Nor98 and Nor-98 like disease consisting of three or more protein bands with the unglycosylated band being less than 15 kd, compared to classical scrapie in which the unglycosylated band is greater than 15 kd. Nor98 and Nor-98 like disease is associated with older sheep, usually greater than four years of age, while sheep in the range of three to five years of age are more commonly affected by classical scrapie. Clinical signs are uncommon with Nor98 and Nor98-like disease but when present most often include ataxia without pruritis. Genotypes known to provide sheep with resistance to classical scrapie are not spared from Nor98 and Nor98-like disease.

The six U.S. cases had no clinical signs reported. Three cases were detected during slaughter surveillance, two were detected as a result of classical scrapie being found in the flock, one found during testing associated with diagnostic necropsy. Five of the 6 cases had genotypes that are susceptible to classical scrapie and one was AARR. Only one Nor98-like scrapie case was found per flock.


The Role of Economics in Scrapie Regulations was presented by Mr. Paul Rodgers, American Sheep Industry Association.

Why Eradicate?
- The presence is scrapie in the U.S. restricts trade.
- The presence of scrapie in flocks costs producers money.
- It is costly to prevent if the disease is present in other flocks (still no early preclinical test).
- Eliminating any/all TSE’s from U.S. animal populations makes good sense.
- The cost to the sheep industry is estimated to be at least $25 million annually (death loss, loss of markets).
- Scrapie prevention costs to producers is high (closed flocks is the safest practice and that limits genetic improvement opportunities).

The National Accelerated Scrapie Eradication Program began in 2001. Many millions of dollars were spent trying to eradicate scrapie between 1952 and 1992. From 1992-2001 approximately $3 million per year was spent on scrapie control by USDA APHIS through the Scrapie Flock Certification program. Ten million dollars in CCC funds was added in 2001 when the accelerated program began. Current spending is approximately $18 million annually.

Scrapie costs the United States’ sheep industry an estimated $25 million annually in death loss and loss of marketability, and scrapie prevention costs are also significant. The economic value of the sheep
industry was estimated to be $767.5 million in 2007. The current federal investment in scrapie eradication is $3 per head of sheep in the U.S., making the value 43 times the cost at current spending.

Rapid, aggressive disease eradication programs are efficient. Federal program disease eradication history proves that low or slow investments over time ends up costing the public sector significantly. Strong investment in diagnostic tools, animal identification and tracking, and enforcement of compliance with program requirements will increase the return on investment to both private industry and government agencies.

Goat Genetics – Update on Progress was given by Dr. Stephen White, USDA-ARS. There are at least two PRNP genotypes that, to our knowledge, have never been observed in goats with scrapie despite the presence of such animals in positive flocks. Oral challenge experiments began this spring to investigate both genotypes. Additional numbers will be added to boost statistical power. And it will take some time for incubation before any assessments can be made.

Scrapie: Information From Canada Regarding Import Requirements for Sheep and Goats Imported from the United States was presented by Dr. Maria Koller-Jones, Canadian Food Inspection Agency.

A report from the Canadian Food Inspection Agency informed the committee that currently, Canada requires that the flock/herd of origin must be enrolled in either the export certified pathway or the complete monitored pathway (as long as the flock/herd is testing all on-farm deads) of the U.S. scrapie flock/herd certification program.

Canada intends to amend its import conditions to require that the flock/herd of origin:

- has been enrolled in the U.S. scrapie flock/herd certification program for a specified period of time, and;
- has been in compliance with the requirements of the export pathway or the complete monitored pathway plus testing of all on-farm deads, for a specified period of time.

It is expected that these new conditions for the importation of female breeding sheep and goats will come into effect in the fall of 2009.

Committee Business:

The Committee passed one resolution encouraging USDA to increase funding for scrapie eradication.
The Committee met on October 29, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 8:00 a.m. to 12:00 p.m. There were 17 members and 16 guests present.

Marie Bulgin, Caine Veterinary Center, presented a time-specific paper, A Novel Approach to Control Johne’s Disease in a Western US Range Flock. The paper is included in its entirety at the end of this report.

Stephen White, Animal Disease Research Unit (ARS), United States Department of Agriculture (USDA), Center for Integrated Biotechnology, Department of Veterinary Microbiology and Pathology, Washington State University, spoke about Sheep CCR5 variant reduces levels of ovine progressive pneumonia virus.

CCR5 is a chemokine receptor that regulates immune cell recruitment in inflammation and serves as a coreceptor for human immunodeficiency virus (HIV). A human CCR5 coding deletion (termed delta-32) results in strong resistance to HIV infection, and polymorphisms in CCR5 regulatory regions have been implicated in delayed progression to acquired immunodeficiency syndrome (AIDS). Both OPPV, also known as maedi-visna, and HIV are macrophage-tropic lentiviruses, have similar genomic structures, and cause lifelong persistent host infection, suggesting CCR5 may have a role in regulating OPPV provirus levels. Therefore, the ovine CCR5 genomic sequence was determined, and polymorphisms were obtained from the open reading frame and surrounding regulatory sites. One CCR5 variant contained a 4-base deletion within a known regulatory binding site, and a test for differential transcription from each allele in heterozygous animals showed a 3.9-fold transcription difference (P<0.0001). OPPV proviral levels were also measured in 351 naturally exposed Rambouillet, Polypay, and Columbia sheep. Deletion homozygotes showed reduced OPPV proviral levels among these animals (P<0.01). The association of this CCR5 deletion with OPPV levels will need to be validated in additional populations before the deletion can be recommended for widespread use in marker-assisted selection. However, because of the large impact on transcription and because CCR5 has roles in inflammation, recruitment of
effector cells, and cell-mediated immunity, this deletion may play a role in the control of infection with many diverse pathogens of sheep.

Kate O’Conor presented her work on anthelmintic resistance in sheep and goat herds titled, Is Your Dewormer Working - Case Studies of Anthelmintic Resistance in the Upper Midwest. Her work is funded through a competitive process aimed at involving veterinary students in research. She has tested statistically representative fecal samples in five flocks/herds and found significant anthelmintic resistance in one goat herd and one sheep flock. Test results have shown parasites to be insignificant in a third flock, effective anthelmintic treatment in a fourth flock and under-dosing to be contributing to parasite problems in a fifth flock.

Lindsey Garber, USDA, Centers for Epidemiology and Animal Health (CEAH), Veterinary Services (VS), Animal and Plant Health Inspection Service (APHIS) presented the plans for the 2009 National Animal Health Monitoring System (NAHMS) Goat Study. USDA has done preliminary work surveying producers and non-producers to find out the industries concerns and starting in February 2009 will start investigating these concerns.

The Committee heard three presentations on bighorn sheep-domestic sheep issues. First, Margaret Soulen-Hinson, Soulen Livestock, presented the Rancher Perspective of the Complexity of Grazing Sheep on Public Lands. Soulen-Hinson explained how integral each range (private and public) is to their operation. She explained how the sheep are managed for their own grazing needs, protection from predators and agency mandates.

Next, Mike Miller, Colorado Department of Interior presented the August 2008 CAST Report titled Pasteurellosis Transmission Risks between Domestic and Wild Sheep. This seven page report is available on the CAST website (www.cast-science.org), and also was presented as a time-specific paper in the Committee on Wildlife Diseases. Lastly, Walt Cook, Wyoming State Veterinarian presented a preliminary report of the working group which is a joint group from this Committee and the Committee on Wildlife Diseases. Their work has been initiated via conference calls and email communication; Greater understanding and progress was made amongst this group when able to meet face to face in Greensboro. Cook hopes to have a full report to be presented to both Committees next year. An important message that the working group wishes to share at this time is their belief based on scientific review that more research is needed to better delineate what role the domestic and bighorn sheep (BHS) play in the decline of certain populations of BHS. Research is also needed to better understand the immune system of BHS as it relates to disease defense and survivability. The Committee urges both USDA and the Department of the Interior to seek funding for bighorn sheep research (as stated in 2007 Resolution 15 and 64). Examples of
REPORT OF THE COMMITTEE

such dual funding include research funds for chronic wasting disease.

Committee Business:
This Committee has asked Jim Logan to serve as their representative on NAHRS. The Committee will also be asking USDA-APHIS-VS National Veterinary Services Laboratory (NVSL) for a greater explanation of inconclusive test results from the Brucella ovis enzyme linked immune sorbent assay (ELISA) on virgin rams, etc.

The Committee passed three resolutions, submitted to the Committee on Nominations and Resolutions.
A NOVEL APPROACH TO CONTROL JOHNE’S DISEASE IN A WESTERN U.S. RANGE FLOCK

M. W. Ayers, B. E. Mamer, M. S. Bulgin*
Caine Veterinary Center

Johne’s disease (paratuberculosis) in small ruminants, as with many ruminant species, is a chronic inflammatory bowel disease, caused by *Mycobacterium avium paratuberculosis* (MAP), resulting in chronic wasting and eventually death. Infection commonly takes place at a very early age, less than six months, but clinical signs may not be evident until greater than four years of age. Fecal-oral transmission is thought to be the most common route but intrauterine and transmammary transmission have been reported and may be of greater importance in small ruminants. The organism is variably shed in the feces depending on strain (cattle versus sheep), species infected, and stage of infection. The tendency is for cattle to shed higher numbers and for longer periods than in sheep which often do not develop diarrhea until the terminal stages of the disease. This variability in shedding and extended incubation period (especially with sheep) makes identification of subclinical carriers imperative for any control program. Diagnostic tests range from fecal culture (gold standard but very slow), sera and milk enzyme linked immune sorbent assay (ELISA), gamma-interferon, and Johnin PPD skin test. Sensitivities and specificities of these tests also are highly variable confounding interpretation.

Diagnosis and control of Johne’s disease in sheep has been especially frustrating due to many factors including: variable shedding of MAP, extended culture times often greater than 6 months, variable sensitivity/specificity of available ELISA tests, economical considerations of both testing and handling of sheep (especially in large range flocks) and time of year that ewes are available for testing. Based on our work previously reported (Mamer, et. al. United States Animal Health Association and American Association of Veterinary Laboratory Diagnosticians 2007 and Ayers et al WBC 2008) we have designed a test and sort program in an attempt to control Johne’s disease in a cooperative infected flock. The goal of the control program is to create a nucleus of Johne’s negative ewes that are bred to provide replacement ewe-lambs. White-faced ewes that have a white-faced ewe-lamb have milk collected on day two post-partum by herders and refrigerated or frozen until testing. Milk samples are tested undiluted (unless very viscous, then a 1:2 dilution is used) using the IDEXX Herdchek™ ELISA system. At present we are using an S/P ratio of 0.300 to 0.499 as suspect and greater than 0.500 as positive. Ewes testing positive or suspect are identified with a unique colored tag and removed from the replacement flock. Their ewe-lambs are also identified and are typically sold as fat lambs. Only ewe-lambs from test negative ewes are identified and designated to the replacement band.
January 2008 was the first year of implementation of this test and sort program. Two hundred ninety nine ewes were sampled and 86 indentified as suspect (43) or positive (43). These data suggest an incidence rate in the replacement flock of 28.7 percent. Plans are to locate as many ewes that had been identified as positive or suspect and perform follow up testing in the fall of 2008 and again at lambing in 2009. In this way we hope to be able to generate enough data points that we can refine the milk test S/P cutoff and make the results as predictable as possible. We will continue to test the replacement band and follow the incidence rate as a measure of progress.

A test and cull program is not a practical economic means to control or eliminate Johne’s disease in flocks of this size. However, control with reduction of clinical cases is necessary and therefore current plans are to continue the test and sort program outlined here with adjustments as necessary to maintain the goal of economic convenient control of Johne’s disease in this large western range flock.
REPORT OF THE COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Chair: John A. Smith, Baldwin, GA
Vice Chair: Julie D. Helm, Columbia, SC

Bruce L. Akey, NY; Alex A. Ardans, CA; John K. Atwell, NC; George P. Badley, AR; Deanna L. Baldwin, MD; Marilyn F. Balmer, MD; Sue K. Billings, KY; Richard E. Breitmeyer, CA; Deborah L. Brennan, MS; Paul W. Brennan, IN; John G. Brown, GA; Max Brugh, GA; David M. Castellan, CA; Tony A. Caver, SC; Bruce R. Charlton, Ca; Steven R. Clark, NC; Max E. Coats, Jr., TX; Stephen R. Collett, GA; Charles M. Corsiagli, CA; Debra C. Cox, MD; Sherrill Davison, PA; Thomas J. DeLiberto, CO; Richard L. Dutton, NE; Aly M. Fadly, MI; Tony M. Forshey, OH; Rose Foster, MO; Joseph P. Garvin, VA; Eric N. Gingerich, PA; Eric C. Gonder, NC; Randy R. Green, DC; James C. Grimm, TX; Scott J. Gustin, AR; Nancy E. Halpern, NJ; Jeffrey J. Hamer, NJ; William L. Hartmann, MN; Chris S. Hayhow, KS; Burke L. Healey, NC; Fidelis N. Hegngi, MD; Ruud G. Hein, DE; Michael E. Herrin, OK; Bill W. Hewat, AR; Donald E. Hoenig, ME; Frederic J. Hoerr, AL; Guy S. Hohenhaus, MD; Tom Holder, MD; Floyd P. Horn, MD; Dennis A. Hughes, NE; John P. Huntley, NY; Mark W. Jackwood, GA; Eric L. Jensen, AL; Hailu Kinde, CA; Daniel J. King, GA; Patrice N. Klein, MD; Stanley H. Kleven, GA; Spangler Kloppe, DE; Paul E. Knepley, PA; Kyle Kohlhaagen, IN; Michael D. Kopp, IN; Shannon M. Kozlowicz, NC; Ulysses J. Lane, NC; Hiram N. Lasher, DE; Dale C. Lauer, Mn; Chang-Won Lee, OH; Randall L. Levings, IA; David J. Ligda, IN; Tsang Long Lin, IN; Jose A. Linares, TX; Mary J. Lis, CT; Martha A. Littlefield, LA; Howard M. Magwire, MD; Jerry D. Maiers, KS; Edward T. Mallinson, MD; David T. Marshall, NC; Sarah J. Mason, NC; Philip M. Maynord, AR; MaryAnn T. McBride, NC; Robert G. McLean, CO; Andy Mcree, NC; Hugo Medina, MN; Thomas R. Mickle, GA; Andrea Mikolon, CA; Andrea M. Miles, NC; Gay Y. Miller, IL; Ricardo A. Munoz, TX; Donald S. Munro, PA; Lee M. Myers, GA; Thomas J. Myers, MD; Steven H. Olson, MN; Robert L. Owen, PA; Kristy L. Pabillon, CO; Mary J. Pantin-Jackwood, GA; James E. Pearson, IA; Jewell G. Plumley, WV; James T. Rankin, Jr., PA; Willie M. Reed, IN; Sebastian Reist, NJ; Donald L. Reynolds, IA; G. Donald Ritter, DE; Thomas J. Roffe, MT; A. Gregorio Rosales, AL; Michael L. Rybolt, DC; Y.M. Saif, OH; John P. Sanders, WV; David D. Schmitt, IA; Andy L. Schwartz, TX; Jack A. Shere, NC; H. L. Shivaprasad, CA; Shari C. Silverman, NJ; Marilyn M. Simunich, ID; Joe Starcher, WV; Philip Stayer, MS; Bruce N. Stewart-Brown, MD; David L. Suarez, GA; Seth R. Swafford, CO; David E. Swayne, GA; Hilary S. Thesmar, DC; H. Wesley Towers, DE; Deoki N. Tripathy, IL; Susan C. Trock, NY; Patricia S. Wakenell, CA; Don W. Waldrip, GA; Doug Waltman, GA; Gary L. Waters, MT; James A. Watson, MS; Michael J. Wood, VT; Ching-Ching Wu, IN; Ernest W. Zirkle, NJ.
REPORT OF THE COMMITTEE

The Committee met on October 7, 2008 from 1:00 to 5:30 p.m. and October 8, 2008 from 1:00 to 5:00 p.m. at the Sheraton Greensboro Hotel in Greensboro, North Carolina. There were 65 Committee members and 54 guests in attendance, for a total of 119. Chair John A. Smith presided, assisted by Vice-Chair Julie D. Helm. The Chair welcomed the Committee, summarized the 2007 meeting, and reported on the responses to the 2007 Resolutions and Recommendations.

2007 Resolution 53, Amendment of the National Organic Program Section 205.239 to Make Access to the Outdoors Optional for Poultry, was approved. The United States Department of Agriculture (USDA) Agricultural Marketing Service responded that the program contains provisions for temporary confinement to protect animal health and safety. The Committee has made several attempts to convince the National Organic Program to change this dangerous requirement, with little success.

2007 Resolution 54, Movement Protocols for Eggs, Egg Products, and Day-old Chicks within, out of, and into Disease Control Areas, was approved. USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) responded with a series of meetings and conference calls with the United Egg Producers, egg industry officials and veterinarians, the University of Minnesota Center for Animal Health and Food Safety, the Iowa State University College of Veterinary Medicine, and state animal health officials to develop continuity of business preparedness and response planning. The Committee is encouraged by and appreciative of the progress made by APHIS and the egg industry in working cooperatively on these issues.

2007 Resolution 55, Inclusion of Swine and Poultry Workers in Pandemic Influenza Planning, was approved. This Resolution was directed to the United States Department of Health and Human Services Assistant Secretary for Preparedness and Response and to the Centers for Disease Control and Prevention Advisory Committee on Immunization Practices. No response was received.

2007 Resolution 56, Low Pathogenicity Avian Influenza Program Funds, was approved. USDA-APHIS-VS responded with a review of the increasing enrollment, increasing funding, and success of this program.

2007 Resolution 57, Need for Ongoing Funding for Development of Additional Methods for Depopulation of Poultry and Livestock, was approved. USDA-APHIS-VS responded with a review of currently funded projects at the University of Georgia, the University of Delaware, Texas A&M University, the Mississippi Board of Animal Health, and the North Carolina Department of Agriculture, as well as at the Avian Influenza Coordinated Agricultural Project and Cooperative Research, Extension, and Education Service activities.

Dr. Eric Jensen, Aviagen, Inc., and Chair of the Mycoplasma
Dr. Sherrill Davison, University of Pennsylvania, and Chair of the Infectious Laryngotracheitis Subcommittee, gave the subcommittee report. The report was approved by the Committee and is included at the end of this report.

Dr. David Swayne, Southeastern Poultry Research Laboratory (SEPRL), Agricultural Research Service (ARS), and Chair of the Avian Influenza and Newcastle Disease Subcommittee, gave the subcommittee report. The report was approved by the Committee and is included at the end of this report.

Dr. Bruce Stewart-Brown, Perdue Farms, Inc., and Chair of the ad hoc Subcommittee on State/Federal Reportable Diseases Harmonization presented the subcommittee report. Dr. Stewart-Brown reported that the National Animal Health Reporting System (NAHRS) and the National Association of State Animal Health Officials (NASAHO) are also addressing this issue. The Chair appointed Dr. Stewart-Brown as the new Committee liaison with NAHRS, replacing Dr. Stanley Kleven who is retiring. The Committee agreed that Dr. Stewart-Brown in his capacity as NAHRS liaison would maintain contact with NAHRS and NASAHO and offer the assistance of this Committee in addressing the reporting of poultry diseases. The ad hoc subcommittee on disease reporting harmonization will remain active for at least another year to maintain contact with and be responsive to the activities of NAHRS and NASAHO. These activities are expected to fulfill the objective of this ad hoc subcommittee.

Dr. Scott Westall, Pilgrim’s Pride Corporation, and President of the Association of Veterinarians in Broiler Production presented the annual disease status report for the broiler industry. The report was approved by the Committee and is included at the end of this report.

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 at the end of this report.

Dr. Steven Clark, Alpharma Animal Health, gave the annual disease status report for the turkey industry. The report was approved by the Committee and is included at the end of this report.

Dr. Charles S. Roney, Veterinary Services, USDA-APHIS, presented the annual status report for the National Poultry Improvement Plan.
REPORT OF THE COMMITTEE

(NPIP) for the Senior Coordinator, Mr. Andrew H. Rhorer. The report was approved by the Committee and is included at the end of this report.

Dr. Matthew Erdman, National Veterinary Services Laboratory (NVSL), USDA-APHIS-VS, delivered the annual NVSL Diagnostic Bacteriology, Mycoplasma, Pasteurella, and Salmonella report. His report was approved by the committee and is included at the end of this report.

Mr. Dennis Senne, NVSL, USDA-APHIS-VS, delivered the annual Avian Import Activities report for Dr. Peter Merrill, USDA-APHIS Import-Export Animals Staff. Mr. Senne also presented the NVSL Avian Influenza and Newcastle Disease diagnostic reports and a report on the North American Animal Health Laboratory Network (NAAHLN). The reports were approved by the Committee and are included at the end of this report.

Dr. Lindsey Garber, Centers for Epidemiology and Animal Health (CEAH), USDA-APHIS-VS, reported on the National Animal Health Monitoring System (NAHMS) Small Enterprise Chicken Study for 2007-2008, and requested input on the 2010 Needs Assessment. Dr. Garber’s report was approved by the Committee and is included at the end of this report. Dr. Jose Linares, Texas Veterinary Medical Diagnostic Laboratory, pointed out the emergence of the “urban poultry” phenomenon, part of the local food movement, and suggested that some attention to the practices of this group is needed.

Dr. Eric Gingerich, University of Pennsylvania, gave a report on the activities of the USAHA Committee on Salmonella. The report of that Committee is found elsewhere in these proceedings.

Dr. John Smith, Fieldale Farms Corporation, delivered an update on the United States Poultry and Egg Association’s (USPEA) research grants program for Dr. Charles W. Beard, USPEA. Since 1968, USPEA has disbursed $22,330,299.17 in research funds. Funds have been provided to over 50 colleges and universities, USDA, and private research institutions. Research has focused on diseases, food safety, production, environmental issues, processing, and other areas. A committee of industry experts reviews grant proposals twice yearly, and approximately 30 percent of proposals are funded. Information about the program and the submission of grant proposals can be found at the USPEA web site www.poultryegg.org.

The Monday session adjourned at this point, at approximately 5:30 p.m. The meeting reconvened at 12:35 p.m. on Tues., Oct. 23, 2008.
Dr. Elizabeth Krushinskie, Mountaire Farms, presented some industry perspectives on the USDA Food Safety and Inspection Service (FSIS) Salmonella Initiatives Program. Her comments are included at the end of this report.

Drs. David Suarez and Mary Pantin-Jackwood, USDA-ARS-SEPRL, gave an update on Avian Influenza and other emerging and exotic disease research at SEPRL. Their report is included at the end of this report.

Dr. Michael David, Director of Sanitary International Standards, National Center for Import and Export, USDA-APHIS-VS, presented the annual update on the World Organization for Animal Health (OIE) poultry activities. His comments are included at the end of this report.

Dr. Jonathan Zack, USDA-APHIS-VS, gave an update on the USDA response plans for highly pathogenic Avian Influenza. His update is included at the end of this report.

Dr. Lee Myers, USDA-APHIS-VS, reported on the activities of the National Veterinary Stockpile. Her report is included at the end of this report.

Dr. Angela Pelzel, USDA-APHIS-VS, presented an update on the Live Bird Marketing System Working Group (LBMSWG) activities. The report is included at the end of this report.

Dr. Steve Weber, USDA-APHIS-VS, gave a presentation on Compartmentalization. His comments are included at the end of this report.

Dr. Clark Tibbets, TessArae LLC, delivered a presentation entitled "Modern, Precise Detection of Poultry Pathogens using Advanced Genomics", which is included at the end of this report.

Committee Business:

Dr. Floyd Horn, Dunkirk, MD proposed and the Committee approved a Resolution entitled Additional Resources for Validation of Genomics-based Pathogen Detection Technologies, urging the Congress to appropriate funds for USDA-APHIS-VS and ARS to validate multiplexed genome sequencing technology for rapid and precise diagnosis of dangerous animal diseases.
The subcommittee met at the Sheraton Hotel in Greensboro, North Carolina on October 26, 2008 with 35 attendees. Dr. C. Stephen Roney (NPIP) reported nearly a two-fold increase in the incidence of both *Mycoplasma synoviae* (MS) and *Mycoplasma gallisepticum* (MG) cases in meat-type parent stock chickens in the preceding year. Many of the MS positive parent stock flocks have not been depopulated because of the relatively low virulence of the field strains and economic considerations. Some in industry are considering the use of a live MS vaccine to reduce the susceptible populations. No live MS vaccines are currently available so this strategy would require obtaining a conditional license. The mycoplasma check test sera from the laboratory of Dr. Stanley Kleven, University of Georgia continues to be widely used and remains an invaluable asset for laboratory quality assurance. Dr. Naola Ferguson-Noel discussed the limitations of current diagnostic tests to identify mixed MG infections, specifically with finding wild-type strains in MG-vaccinated poultry.
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. In 2007 the subcommittee suggested the following action items:

- Studies of currently available vector vaccines by the in ovo route should be continued.
- Research should be conducted to develop newer molecular vaccines to control and prevent VLT.
- States should adopt the Model State Program – VLT (USAHA – 2005).
- Procedures of proper administration of Chick-embryo-origin (CEO) and Tissue-culture-origin (TCO) vaccines must be reviewed.
- Field evaluations must be conducted in conjunction with laboratory research to evaluate the efficacy of control procedures.

Update – 2008 Observations on VLT outbreaks: One outbreak was unusual in that it started in the summertime and continued unabated through the following summer, despite very hot temperatures. Although biosecurity and vaccination zones were used according to the plan, the outbreak expanded and lasted longer than anticipated and included cases in TCO, CEO, and Recombinant-vaccinated broilers and adult bird flocks. The litter management strategies were repeatedly reviewed during this outbreak and involved many players with which consistent communications were critical for compliance.

Experience has demonstrated that cooperative programs in which industry, government, academia, laboratories, and allied
industries work together to control the disease are the most successful approach currently available to minimize cases and stop outbreaks. These programs should consider the known epizootiology of the disease and should contain provisions for rapid diagnosis; the use of Geographical Information Systems (GIS) to design appropriate zones for biosecurity, vaccination, and movement routes to processing plants; and open communication and cooperation among all players. Rapid implementation of a vaccination program and inclusion of a larger area to gain more protection are important control measures.

**Vaccination Strategies:**

**Vaccines:** In addition to the commercially available CEO ILT vaccines and the TCO vaccine, there are two vectored ILT vaccines: Ceva-Biomune’s recombinant Fowl Pox –LT and the Intervet/Schering Plough Animal Health recombinant HVT/ILTV.

Biomune’s recombinant FP-LT vaccine (VECTORMUNE-FP-LT) was first developed for long-lived commercial layers and breeders. The product has been licensed for commercial layer pullets and breeders since September 2002. *In ovo* use by the broiler and broiler breeder industry prompted Biomune to acquire registration and labeling claims for use of the product at the hatchery. USDA approval of the efficacy data was granted on 12/11/07 and the final field safety trial is currently underway. The role and possible interference of maternal antibody is currently being investigated.

The recombinant HVT/ILTV (INNOVAX-ILT), officially licensed for use subcutaneously at one day of age, was introduced in the field in September 2007. The vaccine was intended to be used in long-lived birds. However, due to the vaccinal ILT situation in broilers in several states, the vaccine has been used extensively in broilers. More than 700 million broilers and approximately 50 million layers have been vaccinated. In broilers, the vaccine has been applied *in ovo* at mainly ½ dose and in several cases in combination with SB1. Layers have been vaccinated by the subcutaneous route and in most cases it has been combined with the Rispens MDV vaccine. Recently, several breeder flocks have been vaccinated at day of age subcutaneously in combination with SB1 or the Rispens MDV vaccine. Several vaccine administration issues have shown to play an important role in the outcome of the vaccination with the INNOVAX-ILT. These include application of the vaccine, onset of complete protection and compatibility with other vaccines or antibiotics.

**Field evaluation:** CEO vaccination affords excellent immunity but with it there is an economic downside of reactions and weight reduction. The use of CEO vaccine over an extended period in a dense production area was very detrimental to broiler growth and performance and led many to reevaluate vaccination methods. The use of recombinant
vaccines was preferable to the use of CEO in terms of zootechnical performance, but it did not stop the cases or the outbreak.

Individual companies would choose the best vaccination strategy (CEO and/or vectored) for their particular situation. This method grew from the diversity of broiler sizes and growing methods of the various industry partners. Some companies chose to use only vectored vaccine. Others used either entirely CEO or a combination of vectored and CEO in broilers. In general, both methods were used in most areas that have broiler operations. Vectored vaccines did not protect the broilers from ILT infection in some cases, but resulted in mild cases that recovered quickly and regained weight and livability by market age. CEO alone worked well in birds being raised to heavy market weights but was detrimental to birds marketed at a lighter weight. Combinations of CEO and vectored vaccines were used by other companies depending upon the prevalence of ILT field cases near their farms. A novel exit strategy that combines the use of CEO vaccines, the use of recombinant vaccines, and a gradual abandonment of CEO vaccination in a ring pattern towards a small zone considered most persistent was used and is still being evaluated.

**Research Update:** Decreased use of the CEO vaccines and the eventual substitution of live-attenuated vaccines by recombinant-LT vector vaccines have been considered the strategy towards a more efficient control of the disease. Fowl poxvirus (FPV) and herpesvirus of turkey (HVT) viral vector vaccines carrying ILTV genes have been developed and are commercially available. Recently the broiler industry has used FPV-ILT and HVT-ILT recombinant vaccines for off-label *in ovo* vaccinations against ILT achieving variable results. The objective of this study was to evaluate the efficacy of these vaccines to protect birds against currently circulating viruses and the standard USDA challenge strain under controlled experimental conditions. The first two experiments were performed to evaluate the protection elicited by the recombinant HVT-LT vaccine. Briefly, broilers vaccinated *in ovo* with half a dose of the vaccine and non-vaccinated broilers were challenged at 5 weeks of age. Protection was evaluated by scoring clinical signs, body weight gain before and after challenge, and the presence of the challenge virus by real-time PCR. Overall, vaccinated chickens showed a reduction in clinical signs, had a moderate reduction in body weight after challenge, but showed no reduction of the challenge virus replication in the trachea and conjunctiva, as compared to the non-vaccinated group. Therefore, based on this challenge model the HVT-LT vaccinated chickens were considered partially protected against clinical signs.

In a second group of experiments, broilers were vaccinated *in ovo* (half a dose) at 17, 18, and 19 days with the FPV-LT and HVT-LT vaccines, and challenged at 5 weeks of age. Protection was evaluated by scoring clinical signs. Chickens vaccinated
with the FPV-LT vaccine at 17, 18 and 19 days showed 45 percent, 61 percent, and 55 percent protection, respectively. Chickens vaccinated with the HVT-LT vaccine at 17, 18, 19 days post vaccination showed 48 percent, 78 percent, 84 percent, protection respectively.

**Conclusion:** Extensive use of recombinant ILT vaccines by mass *in ovo* application of reduced doses to commercial broilers suggests that such uses do provide partial protection against clinical signs. Such birds may become infected and shed virus. The role of these extra-label uses in the control of outbreaks remains to be elucidated and further study is needed. In particular, the viral load in recombinant-vaccinated birds after challenge and the establishment of latency in recombinant-vaccinated birds deserves further investigation. An economical ILT vaccine suitable for mass application that provides good protection against infection and shed without harsh vaccine reactions is sorely needed.

**Current suggested action items – 2008**
- Evaluations (field and laboratory) of currently available vector vaccines by the *in ovo* route 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 should be conducted.
- States should adopt the Model State Program –VLT (USAHA – 2005).
There have been several major developments over the past year with avian influenza (AI) and Newcastle disease (ND). Since July 2007 to June 2008, 30 countries have reported outbreaks of H5N1 high pathogenicity avian influenza (HPAI) in poultry and/or wild birds including Afghanistan, Bangladesh, Benin, Canada, China, Egypt, Germany, Hong Kong, India, Indonesia, Iran, Israel, Japan, Korea, Laos, Myanmar, Nigeria, Pakistan, Palestinian Territories, Poland, Romania, Russia, Saudi Arabia, Switzerland, Thailand, Togo, Turkey, Ukraine, United Kingdom and Vietnam (Source: OIE). There have been only a few reported cases of H5N1 HPAI in wild birds in Asia and Europe, but not a repeat of the large number of wild bird cases in European Union as occurred in the winter 2006. The United Kingdom experienced an outbreak of H7N7 HPAI on a single farm of 25,000 chickens in Oxfordshire during May 2008 that was resolved by stamping-out before spread to other facilities. Limited outbreaks of low pathogenicity avian influenza (LPAI) were reported in Korea (H7N8 in meat ducks), Dominican Republic (H5N2 in fighting cocks and backyard chickens), Portugal (H5N3 in partridges and other poultry), Denmark (H7N1 in geese, ducks and mallards), Haiti (H5N2 in backyard poultry and fighting cocks), Korea (H5N2 in ducks) and Germany (H5N3 in zoo and backyard poultry).

The major exotic poultry disease around the world is Newcastle disease (ND). For the period of July 2006 to June 2007, 73 countries reported ND cases. Many countries in the developing world have endemic ND and do not report occurrences of ND.

The 7th International Symposium on Avian Influenza (AI) will be held at the University of Georgia, Athens, Georgia, USA on April 5-8, 2009. Currently, the conference has sponsorship from U.S. Department of Agriculture (Agricultural Research Service; Cooperative State Research, Education and Extension Service; and Animal and Plant Health Inspection Service), U.S. Animal Health Association, U.S. Geological Survey, American Association of Avian Pathologists, Merial, Schering-Plough/Intervet, ABI, and Fort Dodge. There will be one day of split scientific sessions for poultry and wild birds, and one full day and two half days of joint sessions. The sessions will include: Global Reports on Avian Influenza; Pathogenesis and Pathobiology; Intervention and Control Strategies; 21st Century Diagnostics for Centuries Old Problems; Host and Environmental Factors that Impact Transmission.
and Mechanisms of Spread; Zoonotic Aspects of Avian Influenza; Vaccinology; Trade, Regulatory Control and Economics; Modeling of Avian Influenza Spread in Developing Control Strategies; Epidemiology and Ecology of AIV in the Natural Reservoir; HPAI H5N1 in Wild Birds; and Late Breaking Issues.
Based on yearly Agristats data for field condemnations, 7-day mortality, and total mortality, US broiler flock health has seen a slight decline over the past year. The decline was seen across all three parameters and is most likely due to continued issues with Infectious Laryngotracheitis (ILT), Runtting Stunting Syndrome (RSS), and newly identified Infectious Bronchitis Virus (IBV) variants. A poll of broiler production veterinarians ranks ILT, RSS, and IBV as the top three challenges facing the poultry industry.

ILT and IBV are the two highest-ranking respiratory diseases. New vaccines and vaccination techniques are currently being implemented to control ILT. Newly identified IBV variant GA 08 causes airsacculitis and increased salvage and condemnations. This virus has been isolated in Georgia and South Carolina and has a higher incidence in the winter. Work is underway to develop a vaccine for GA 08 virus.

RSS and Gangrenous Dermatitis are the two top-ranking immunosuppressive diseases. A consensus on the causative agent or agents of RSS has not been reached but Astroviruses and Rota-like or reo-like viruses are suspected. There is no doubt that RSS related immunosuppression has impacted flock uniformity and processability. It appears the incidence of Gangrenous Dermatitis has decreased and Infectious Bursal Disease (IBD) did not make the rankings this year.

Coccidiosis and Necrotic Enteritis are the top ranking enteric diseases. These issues are probably related and may take a more prominent role as feed costs increase.

Bacterial infections in pullets and breeders are of increasing concern. Spinal Abscesses in hens are being diagnosed more frequently as are Staphylococcus spp. infections in pullets and breeders.

Poultry exports have hit record levels in 2008. The weak U.S. Dollar and strong foreign currencies have created strong demand for poultry exports. The top three export markets are Russia, China, and Mexico. Russia has recently banned exports from several companies, which has created concern industry wide.

Input costs this year have been tremendous. High gas cost coming into winter will challenge producers and growers to look for ways to conserve. High grain costs due to ethanol mandates and subsidies along with weak market pricing have led to industry-wide cutbacks. Nutritional strategies are also changing due to high input costs. Nutritionists and Veterinarians will be challenged to make sure the nutritional needs of the birds are met. Failure to do so could result in classical deficiency diseases and immunosuppression.
Table 1. Ranking of Disease Concerns among 16 Broiler Production Veterinarians

<table>
<thead>
<tr>
<th>Disease Concern</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious Laryngotracheitis</td>
<td>11</td>
</tr>
<tr>
<td>Runting Stunting Syndrome</td>
<td>6</td>
</tr>
<tr>
<td>Infectious Bronchitis Virus</td>
<td>6</td>
</tr>
<tr>
<td>Mycoplasmosis</td>
<td>5</td>
</tr>
<tr>
<td>Gangrenous Dermatitis</td>
<td>3</td>
</tr>
<tr>
<td>Spinal Abscesses in Hens</td>
<td>2</td>
</tr>
<tr>
<td>Avian Influenza</td>
<td>1</td>
</tr>
<tr>
<td>Chick Quality</td>
<td>1</td>
</tr>
<tr>
<td>Coccidiosis</td>
<td>1</td>
</tr>
<tr>
<td>Femoral Head Necrosis</td>
<td>1</td>
</tr>
<tr>
<td>Legs-Skeletal Issues</td>
<td>1</td>
</tr>
<tr>
<td>Necrotic Enteritis</td>
<td>1</td>
</tr>
<tr>
<td>Salmonella</td>
<td>1</td>
</tr>
<tr>
<td>Staph in Pullets/Breeders</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2. Ranking of Non-Disease Concerns among 16 Broiler Production Veterinarians

<table>
<thead>
<tr>
<th>Concern</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports</td>
<td>5</td>
</tr>
<tr>
<td>High Gas</td>
<td>4</td>
</tr>
<tr>
<td>Feed/Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>Welfare</td>
<td>2</td>
</tr>
<tr>
<td>Antibiotic Issues</td>
<td>1</td>
</tr>
<tr>
<td>Food Safety</td>
<td>1</td>
</tr>
<tr>
<td>Labeling Standards</td>
<td>1</td>
</tr>
<tr>
<td>Market Cutbacks</td>
<td>1</td>
</tr>
<tr>
<td>Mycoplasma Testing</td>
<td>1</td>
</tr>
</tbody>
</table>
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 and 11 of 68 members responded. The survey revealed the following diseases of concern occurring in US caged layer flocks - 1) – *E. coli*/peritonitis, 2) - *Mycoplasma gallisepticum* (Mg), 3) – Cannibalism, 4) – Starve outs of baby chicks, and 5) - Calcium depletion/tetany. In cage-free layer flocks (6 respondents), the diseases in order of concern were 1) (tie) Cannibalism and Colibacillosis, 3) – Mites, 4) – Coccidiosis, and 5_ – Roundworms. Other issues and diseases of concern (11 respondents) were welfare, avian influenza (AI), *Salmonella enteritidis* (SE), and the lack of approved, effective treatments for most of our infectious or parasitic diseases.

Colibacillosis is a problem mainly of young flocks with mortality rates of 0.5 to 4 percent per week starting shortly after housing. It is felt that this condition is most often secondary to upper respiratory challenges with 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 eye drop 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. Calcium tetany is seen when young flocks that are slow to mature are placed on calcium-rich feeds too early. A post-molt problem with calcium tetany is also being found due to excessive calcium intake during the molt resulting in a shutdown on normal hormonal action to pull calcium from the medullary bone.

Cannibalism continues to be seen especially in high light intensity situations in both caged and cage-free birds. In these cases, the 10-day rule for beak trimming results in longer beaks than desired compared to a beak trim at 4 to 8 weeks and results in an increase in incidence and severity of cannibalism.

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 highly pathogenic H5N1 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 not capable of storing more than 72 hours of production. The United Egg Producers and the US Egg Association have proposed a “Movement Control Model Plan” for the table and breaking egg industries to allow movement of product within 48 hours after quarantine by assuring that a farm is negative for AI by 1) testing five dead birds per house per day by AI real time PCR and 2) 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 percent positive markets in 2004 to near 0 since. No significant AI isolations have been made in layer flocks in the US 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.

SE was felt to be an issue that was being addressed adequately by state and industry egg quality assurance programs until the announcement on September 22, 2004 that FDA was proposing a program for “Prevention of SE in Shell Eggs During Production”. FDA received over 200 written comments. Issues discussed were 1)
laboratory procedures and laboratory availability for testing, 2) funding for testing, costs incurred if eggs are diverted, and administration of the program, 3) lack of egg pasteurization facilities in many egg producing areas to be able to effectively divert eggs from high risk flocks, 4) wet washing houses required between flocks where SE positive manure samples were found in the previous flock whereas dry cleaning, fumigation, vaccination of in-coming pullets, plus good rodent control has been found to be effective, 5) the excessively low requirement for 45 F egg storage prior to processing, etc. Comments were reopened in May of 2005 to ask questions about pullets. The initiation of this program continues to be in doubt as it is stalled in the Office of Management and Budget (OMB), which has been studying it for over 2 years. The incidence of egg-related SE outbreaks continues steady apparently due to areas of egg production where SE risk reduction programs are either not effective or totally embraced.

Coccidiosis and necrotic enteritis has been increasing in incidence in caged layers especially on the east coast and in one strain of layer. Vaccination of pullets is being used successfully as control.

Diseases under control and of low incidence are as follows: infectious laryngotracheitis (ILT), 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 not to be a suitable replacement for chick embryo origin (CEO) vaccines in high challenge areas. The relatively new HVT-vectored ILT vaccine is showing great promise in high challenge regions and should reduce the amount of CEO vaccine used in layer flocks that may spread to broilers.

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.

Poultry welfare concerns are increasing as activist groups increase their activities in portraying the caged egg industry as not humane and promoting laws against caged egg production in several states including a major egg producing state, California. The ballot initiative sponsored by the Humane Society of the United States (HSUS) in California, Prop 2, is to take place this November and would essentially ban the use of cages for layers, veal calf stalls, and gestation stalls for sows. The group Californians for Safe Food (www.safecaliforniafood.org) are leading an attack to vote down this proposal and numerous veterinary and industry groups are supporting this opposition.

The egg industry has experienced record egg prices and profits since early 2007 and throughout 2008 in spite of increased corn and feed prices. Reduced numbers of layers due the UEP required reduction in layers per cage, fewer layer houses being built due to uncertainty about the future of caged layer production, and increased exports to Europe and Asia are felt to be the reasons.
REPORT OF THE COMMITTEE

Current Health and Industry Issues Facing the Turkey Industry

Steven Clark
Alpharma Animal Health

Becky Tilley
Goldboro Milling Company

Dave Mills
Jennie-O Turkey Store Company

In preparation for this report to the USAHA Committee on Transmissible Diseases of Poultry & Other Avian Species, Drs. Clark, Tilley, and Mills polled a majority of the US turkey industry professionals and veterinarians involved in turkey production to inquire about the health status of turkeys produced in August 2007 through August 2008. 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 lists (Table 1) the challenges by disease and issues.

The lack of approved efficacious drugs continues to be the top disease issue. The withdrawal of the NADA for enrofloxacin in 2005 for use in poultry leaves the industry with no adequate therapeutic response to colibacillosis (ranked #4), or fowl cholera (ranked #8). The controversy over the use of antibiotics in animal agriculture remains a major concern for the turkey industry and for all of animal agriculture. A recent example is the proposal by FDA to eliminate extra label use of cephalosporins in animal agriculture without sufficient examination of the risks and benefits involved. This loss is of particular concern to the turkey industry because cephalosporin treatment of individual breeder toms is one of only a few tools available for poultry veterinarians to use in outbreaks of fowl cholera. We urge the American Veterinary Medical Association (AVMA) to continue to call for and support the scientific examination of the evidence in the cases against the use of antibiotics in agriculture and to support the judicious use of antibiotics in animal agriculture as long as the benefits outweigh the risk.

Late mortality increased to the second-ranked health issue, as Colibacillosis slipped to fourth place. Late Mortality may be defined as mortality, in excess of 1.5 percent 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 percent 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 (#6) are ranked among the top concerns of the turkey
industry. Leg problems are a common complaint, including 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 #16 in 2008, from #22 in 2007. It is one disease with no efficacious drug approved for use in turkeys. There were 63 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.

Cellulitis remains a major disease issue across all geographic regions, as the survey average increased to a score of 3.3 and ranked #3, from 3.1 and #5, respectively, the prior year. Analysis indicates a range of concern; 33 percent (26 percent, prior year) of respondents score cellulitis a 5 (severe), 8 percent (22 percent, prior year) score it a 1. 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. The disease is now 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 serosanguinous 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 ongoing. Opinions vary as to risk factors and potential causes of the problem.

Poult enteritis of unknown etiologies has increased in importance, from position #7 to #5, although the score remained the same at 3.0. Some of the recent poult enteritis concerns have been characterized as Poult 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 #34 (Table 1) with 10 reported cases (Table 2).

Heat stress decreased from #6 ranking to #18 following a milder summer. Poult Enteritis Mortality Syndrome (PEMS, ranked #33 versus #31 previously), and protozoal enteritis (#24 versus #22) all decreased in ranking on this year’s survey. Ornithobacterium rhinotracheale (ORT, ranked #13 versus #17 previously), and Avian Metapneumovirus (AmPV, ranked #32 compared to #33) increased in importance in the latest survey.

Mycoplasma synoviae (MS, infectious synovitis) infections, ranked #27, 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 47 cases of MS reported (Table 2). The primary breeders have remained free of M. gallisepticum (MG), M. mleagridis (MM) and MS. Sporadic but increasingly frequent infections with Mycoplasma, both 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.

Unrealistic and uninformed demands on the turkey industry under the guise of animal welfare by activist groups opposed to any animal agriculture remain a major concern. The ultimate goal of these groups is theelimination of animal agriculture. AVMA has taken a leading role in the development of animal welfare principles and practices, affirming the ethical role of animal agriculture in our society. The industry continues to support the use of sound science in developing animal welfare principles and guidelines.

Current food-to-fuel mandates and subsidies have resulted in record high feed prices. Corn price has doubled, and price variability has more than doubled. The unprecedented increases in costs to produce turkeys and other food animals are proving to be very detrimental to both the livelihood of the livestock farmer and the consumer, with no relief in sight.

Highly pathogenic avian influenza (H5N1) continues to infect poultry in Southeast Asia, with sporadic introductions in Europe and Africa. Sporadic transmission to humans continues, and has world health authorities concerned about the possibility of further genetic mutation triggering a pandemic. Continued circulation of this virus through poultry allows for further genetic drift and/or shift that could result in a highly pathogenic and highly transmissible virus among humans. Eradicating this disease at its source continues to be the focus and burden of the international effort to eliminate this threat, but will demand more resources. The possibility of the spread of this virus to the United States through the illegal transport of infected birds or migration of infected wild
The use of invalid animal disease issues as non-tariff trade barriers, and the penalization of countries that have more open diagnostic systems remains a major concern for the industry. The most visible examples are the trade bans applied by Japan and others whenever a Low Pathogenic Avian Influenza (LPAI) subtype H5 or H7 is found in the U.S. Hopefully, importers of poultry and poultry products will align their policies with the new OIE chapter on avian influenza, if they have not done so. Industry professionals continue to support transparent and science-based standards in trade issues.

One industry concern is the recent FSIS focus on preharvest control of salmonella. While everyone desires safe food, public health officials and veterinarians must realize that the most effective interventions to prevent food-borne illness remain proper food preparation and handling. Proper food handling and appropriate processing technologies are the best way forward. Attempting to control food-borne disease by selectively eliminating what are normal intestinal inhabitants of domestic animals essentially represents a national certified raw meat program similar to the hazardous certified raw milk program. Such an effort is distracting to the main food preparation issues, and represents a major policy development failure. While significant progress has been made in *E. coli* 0157 control in beef, it must be pointed out that the improvements resulted from improved processing technology, not on-farm interventions. Pre-harvest interventions were not a factor.

Turkey Production in 2007 increased to 7869.22 from 7463.89 million pounds (live weight). Overall domestic per capita consumption for turkey products increased from 17.50 to 18.00 (lbs). Exports increased from 547 to 623 (million pounds) 2007 to 2008. Production increased to 271.685 million head slaughtered with an average live weight (lbs) of 28.96, compared to prior year of 262.460 and 28.44, respectively (reference: Turkey Sourcebook, National Turkey Federation).
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=24).

<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>4.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Late Mortality</td>
<td>3.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>3.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Colibacillosis</td>
<td>3.1</td>
<td>3.0</td>
</tr>
<tr>
<td>Poult Enteritis of unknown etiologies</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Leg Problems</td>
<td>2.9</td>
<td>2.0</td>
</tr>
<tr>
<td><em>Bordetella avium</em></td>
<td>2.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Cholera</td>
<td>2.6</td>
<td>3.0</td>
</tr>
<tr>
<td><em>Salmonella</em></td>
<td>2.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Breast Blisters and Breast Buttons</td>
<td>2.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Cannibalism</td>
<td>2.4</td>
<td>2.0</td>
</tr>
<tr>
<td>Fractures</td>
<td>2.3</td>
<td>3.0</td>
</tr>
<tr>
<td><em>Ornithobacterium rhinotracheale</em> (ORT)</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Osteomyelitis (OM)</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Tibial Dyschondroplasia (TDC, Osteochondrosis)</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Blackhead (Histomoniasis)</td>
<td>2.3</td>
<td>1.0</td>
</tr>
<tr>
<td>H3N2 Swine influenza</td>
<td>2.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Heat stress</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td><em>Mycoplasma iowae</em> (MI)</td>
<td>2.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Shaky Leg Syndrome</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Bleeders</td>
<td>2.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Coccidiosis</td>
<td>1.9</td>
<td>2.0</td>
</tr>
<tr>
<td>Avian Influenza</td>
<td>1.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Protozoal Enteritis</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Round Worms (<em>Ascaridia dissimilis</em>)</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Newcastle Disease Virus (NDV)</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td><em>Mycoplasma synoviae</em> (MS)</td>
<td>1.7</td>
<td>1.0</td>
</tr>
<tr>
<td><em>Mycoplasma gallisepticum</em> (MG)</td>
<td>1.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Necrotic enteritis</td>
<td>1.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Erysipelas</td>
<td>1.5</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>1.3</td>
<td>1.0</td>
</tr>
<tr>
<td>PEMS (Poult Enteritis Mortality Syndrome)</td>
<td>1.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Turkey Coronavirus</td>
<td>1.2</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Table 2. Turkey health survey (September) of US veterinarians in turkey production. Survey response (reply) is 100% (n=24).

<table>
<thead>
<tr>
<th>Case (numbers)</th>
<th>2008</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases (numbers) of Blackhead (Histomoniasis)</td>
<td>63</td>
<td>68</td>
</tr>
<tr>
<td>Cases (numbers) of <em>Mycoplasma synoviae</em> (MS)</td>
<td>47</td>
<td>52</td>
</tr>
<tr>
<td>Cases (numbers) of Turkey Coronavirus (TCV)</td>
<td>10</td>
<td>N/a</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

National Poultry Improvement Plan Status Report

Andrew R. Rhorer
Presented by Charles S. Roney
National Poultry Improvement Plan
USDA-APHIS-VS

Pullorum-Typhoid Status:
In calendar year 2007, there were no isolations/outbreaks of *Salmonella pullorum* reported to the Poultry Improvement Staff. There was one isolation/outbreak of *Salmonella pullorum* reported during calendar year 2008 from January to October 1, 2008. There have been no isolations of *Salmonella gallinarum* since 1988 in any type poultry.

| Hatchery Participation in the National Poultry Improvement Plan: Testing Year 2007 |
|---------------------------------|-------------------------------|
| Egg and Meat-Type Chicken Hatcheries Participating | 283 |
| Egg and Meat-Type Chicken Hatcheries Capacity | 718,723,839 |
| Turkey Hatcheries Participating | 48 |
| Turkey Hatcheries Capacity | 35,224,523 |
| Waterfowl, Exhibition Poultry and Game Birds Hatcheries (WEGBY) Participating | 775 |
| WEGBY Hatcheries Capacity | 25,592,182 |

| Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary: Testing Year 2007 |
|-------------------------------------------------|-----------------|
| U.S. Pullorum-Typhoid Clean: Participating- Number | 187 |
| Birds in Flocks-Number | 3,205,906 |
| Average per Flock | 17,144 |
| Primary Breeding Flocks – Flocks Proportion of Total | 27.8% |
| Primary Breeding Flocks—Birds Proportion of Total | 14.3% |

| Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary: Testing Year 2007 |
|-------------------------------------------------------------------------------------------------|----|
| U.S. Pullorum-Typhoid Clean: Participating- Number | 5,140 |
| Birds in Flocks-Number | 75,820,652 |
| Average per Flock | 14,751 |
| Primary Breeding Flocks – Flocks Proportion of Total | 9.7% |
| Primary Breeding Flocks – Birds Proportion of Total | 6.5% |
### Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary: Testing Year 2007

<table>
<thead>
<tr>
<th>U.S. Pullorum-Typhoid Clean: Participating – Number</th>
<th>518</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds in Flocks - Number</td>
<td>4,603,212</td>
</tr>
<tr>
<td>Average per Flock</td>
<td>8,886</td>
</tr>
<tr>
<td>Primary Breeding Flocks – Flocks Proportion of Total</td>
<td>20.6%</td>
</tr>
<tr>
<td>Primary Breeding Flocks – Birds Proportion of Total</td>
<td>7.1%</td>
</tr>
</tbody>
</table>

### Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks in the National Poultry Improvement Plan: Participation and Testing Summary: Testing Year 2007

<table>
<thead>
<tr>
<th>U. S. Pullorum-Typhoid Clean Participating</th>
<th>3,648</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birds in Flocks</td>
<td>1,475,373</td>
</tr>
<tr>
<td>Primary Breeding Flocks – Flocks Proportion of Total</td>
<td>32.6%</td>
</tr>
<tr>
<td>Primary Breeding Flocks – Birds Proportion of Total</td>
<td>48.2%</td>
</tr>
</tbody>
</table>

### Mycoplasma status:

\[ \text{Mycoplasma gallisepticum, Mycoplasma synoviae, and Mycoplasma meleagris positive breeding flocks} \]

National Poultry Improvement Plan 2007/8

<table>
<thead>
<tr>
<th></th>
<th>WEGBY</th>
<th>Egg-type Chickens</th>
<th>Meat-Type Chickens</th>
<th>Turkeys</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textbf{Mycoplasma gallisepticum}</td>
<td>17</td>
<td>0</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>\textbf{Mycoplasma synoviae}</td>
<td>17</td>
<td>4</td>
<td>86</td>
<td>5</td>
</tr>
<tr>
<td>\textbf{Mycoplasma meleagris}</td>
<td>0</td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>
**REPORT OF THE COMMITTEE**

Number of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2008

<table>
<thead>
<tr>
<th>State</th>
<th>Flocks</th>
<th>Birds in Flocks</th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>1</td>
<td>6000</td>
<td></td>
<td>15000</td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td>1</td>
<td>400</td>
<td>2</td>
<td>46000</td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td>3</td>
<td>3900</td>
<td>1</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>Indiana</td>
<td>15</td>
<td>158345</td>
<td>2</td>
<td>27479</td>
<td>15092</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1</td>
<td>6625</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td>16</td>
<td>183700</td>
<td>9</td>
<td>91600</td>
<td></td>
</tr>
<tr>
<td>Oregon</td>
<td>2</td>
<td>19516</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>16</td>
<td>166385</td>
<td>6</td>
<td>78450</td>
<td></td>
</tr>
<tr>
<td>Texas</td>
<td>1</td>
<td>10000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Phage types of *Salmonella enteritidis* isolates

<table>
<thead>
<tr>
<th>State</th>
<th>Flocks</th>
<th>Birds in Flocks</th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>10</td>
<td>143000</td>
<td>2</td>
<td>3700</td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td>5</td>
<td>54321</td>
<td>2</td>
<td>27479</td>
<td></td>
</tr>
<tr>
<td>Indiana</td>
<td>2</td>
<td>28900</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>21</td>
<td>16000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td>2</td>
<td>15000</td>
<td>2</td>
<td>46000</td>
<td></td>
</tr>
<tr>
<td>Oregon</td>
<td>2</td>
<td>12500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>19</td>
<td>7000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas</td>
<td>2</td>
<td>24000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

538
### Egg-type Chicken Breeding Flocks with Isolates of *Salmonella enteritidis* by Phage Type and Year 1989-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Flocks</th>
<th>Phage Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>1</td>
<td>13A</td>
</tr>
<tr>
<td>1990</td>
<td>11</td>
<td>13A, 13, 8, 28</td>
</tr>
<tr>
<td>1991</td>
<td>12</td>
<td>13A, 13, 8</td>
</tr>
<tr>
<td>1992</td>
<td>10</td>
<td>13A, 8, 28, 34, Untypable</td>
</tr>
<tr>
<td>1993</td>
<td>5</td>
<td>8, 2, Untypable</td>
</tr>
<tr>
<td>1994</td>
<td>3</td>
<td>13A, 8</td>
</tr>
<tr>
<td>1995</td>
<td>2</td>
<td>13A, 28</td>
</tr>
<tr>
<td>1996</td>
<td>5</td>
<td>13A, 8, 2, RNDC, Untypable</td>
</tr>
<tr>
<td>1997</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1998</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1999</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2000</td>
<td>4</td>
<td>13, 8</td>
</tr>
<tr>
<td>2001</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2002</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>2006</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td>2007</td>
<td>4</td>
<td>13, 8</td>
</tr>
<tr>
<td>2008</td>
<td>3</td>
<td>8</td>
</tr>
</tbody>
</table>

### U.S. *salmonella enteritidis* clean Egg-type Chickens: Number of flocks and birds in the flocks with *Salmonella enteritidis* isolates, 1990-2008

<table>
<thead>
<tr>
<th></th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flocks</td>
<td>68</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Birds in Flocks</td>
<td>679,871</td>
<td>77,179</td>
<td>201,342</td>
</tr>
</tbody>
</table>
During the period of August 15, 2007 through August 14, 2008, the National Veterinary Services Laboratories (NVSL) received 282 Pasteurella multocida isolates for characterization. Of these, 57 percent were submitted for somatic type analysis, 15 percent were submitted for DNA fingerprint analysis, and 53 percent of isolates were submitted for both tests.

Salmonella: During the period of July 1, 2007 through June 30, 2008, the NVSL serotyped 18,267 Salmonella isolates recovered from animals, their environment, or feed. Of the 4830 poultry isolates (26 percent of total isolates), 3417 were recovered from chickens or their environment and 1413 were recovered from turkeys or their environment. The most common serotypes found in poultry this year are listed in Tables 1 and 2.

### Table 1: Most Frequently Identified Serotypes from Chickens

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>Heidelberg</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Kentucky</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>Enteritidis</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>Typhimurium</td>
</tr>
<tr>
<td></td>
<td>Senftenberg</td>
</tr>
</tbody>
</table>

### Table 2: Most Frequently Identified Serotypes from Turkeys

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>Senftenberg</td>
</tr>
<tr>
<td>Hadar</td>
<td>London</td>
</tr>
<tr>
<td>Montevideo</td>
<td>Hadar</td>
</tr>
<tr>
<td>Agona</td>
<td>Muenster</td>
</tr>
<tr>
<td></td>
<td>Saintpaul</td>
</tr>
</tbody>
</table>

Mycoplasma: During the period of October 1, 2007 through September 30, 2008, the NVSL performed 187 avian Mycoplasma hemagglutination inhibition tests; a 35 percent decrease in testing from last year. During this same period, 1050 ml of hemagglutination antigen and 1058 ml of control sera were provided to other diagnostic laboratories.
Poultry and Hatching Eggs: During fiscal year (FY) 2008, 10,879,134 poultry including day old chicks, and 20,557,574 poultry hatching eggs imported into the United States.

Commercial Birds: The imports of commercial birds are limited to those that are exempt for the Wild Bird Conservation Act, serviced by the U.S. Fish and Wildlife Service. During FY 2008, 172,128 commercial birds were released from USDA-supervised private bird quarantine facilities.

Pet Bird Program: There were 531 pet birds imported into the United States through the home quarantine program during FY 2008.
Avian Influenza

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 4,129 specimens in 673 submissions from 9 states (Connecticut, Delaware, Florida, Massachusetts, Maine, New Jersey, New York, 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 includes all presumptive positive specimens detected at the State level, are reported here.

In FY 2008, AIV or APMV was isolated from 1 percent (82 of 673) of submissions and 4 percent (167 of 4129) of specimens tested. AIV subtype H5N2 was the most common subtype found in the LBMS this year; it was isolated from 51 specimens in 19 submissions. The H5N2 virus was isolated from 30 specimens from NJ, 19 from NY, and 2 from PA. AIV subtype H7 was isolated from 9 specimens; an H7N3 was isolated from one specimen from NJ and H7N7 from seven specimens from NJ and one specimen from PA. The H5 and H7 AIVs were shown to be 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 and H7 viruses to be most closely related to North American H5 and H7 viruses circulating in wild ducks. Other subtypes of AIV isolated, the states from which the specimens originated, and the numbers of isolations were: H1N1 (NY, n=8), H1N1,4 (NJ, n=1), H3N6 (NJ, n=5), H3N8 (PA, n=1). Twelve AIVs were isolated that were believed to be mixed infections where the N subtype was shown to be N1 (NJ, n=1; NY, n=2; PA, n=4) N1,4 (PA, n=2; NJ, n=1) or N2 (NJ, n=1; NY, n=1) but the H subtype could not be identified by conventional subtyping assays. The remaining 82 viruses isolated were identified as APMV; 80 were APMV-1 from 7 states (CT, FL, MA, NJ, NY, PA, and RI) and 2 were identified as pigeon paramyxovirus type-1 (PPMV-1) from NJ and PA, respectively. 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=55). All but 2 isolates were characterized as low virulent (lentogenic
pathotype) strains; the 2 isolates were characterized as pigeon paramyxovirus type-1 (PPMV-1), a pigeon-adapted variant of Newcastle disease virus.

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 confirmation testing of positive specimens. During FY 08, two detections of LP notifiable AI (LPNAI) involving commercial poultry were reported to the World Organization for Animal Health (OIE). The first detection occurred in June 2008 in a single flock (two houses) of 16,000 65-week-old broiler breeders in Arkansas that tested positive for antibodies to H7N3 during routine pre-slaughter testing. No clinical signs were noted in the flock at the time of testing. However, about three weeks prior to testing, the flock experienced a mild increase in mortality and drop in egg production and wild geese were observed to be present on ponds near the poultry houses. An H7N3 virus was isolated from the flock and shown to be LPAI and most closely related to North American H7 viruses circulating in wild waterfowl. The premises was depopulated. The second LPNAI detection occurred in August 2008 in a breeding and raise-for-release upland game bird facility in Idaho. The facility housed approximately 30,300 birds (pheasants, ducks, quail, chukars, and pigeons) and was involved in interstate sales. The flock was first detected when three pheasant carcasses, submitted to the Pennsylvania State University diagnostic laboratory, were found positive for H5 AIV, Pasteurella, and Mycoplasma. Additional specimens collected from the flock yielded AIV H5N8 and antibodies specific to H5N8 in the pheasants and mallard ducks and an H4N7 AIV in the ducks. The H5N8 and H4N7 virus were both shown to be LPAI. Active and passive surveillance in the surveillance zone surrounding the infected premises and trace backs have been negative for additional AIV infections. The flock was depopulated.

In FY 08, infections with LPNAI (H5 or H7 subtypes) were detected in five backyard flocks. Detection of H5 or H7 infection in backyard flocks, by virus isolation or PCR, is included in the semiannual reports to the OIE. Isolated detections of antibodies (alone) in a flock in the absence of clinical disease or epidemiologic link to an outbreak are not notifiable. The first detection in a backyard flock occurred in November 2007 when antibodies to H5N2 (and H3) were detected in turkeys reared in a multi-age, mixed species (turkeys, chickens, and ducks) operation in South Dakota. No virus was isolated and the premises was depopulated by on-site slaughter and controlled marketing of virus negative birds. The second case involved a mixed-species operation in Massachusetts in

TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
January 2008. Premovement testing of pheasants in the facility showed presence of antibodies to H5N2. Swab specimens collected from the birds were H5 positive by real-time RT-PCR but no virus was isolated. The flock was released from quarantine following two negative virologic tests. The third case was detected in February 2008 when H7N7 virus and specific antibodies were detected in a backyard flock of chickens, game fowl, and ducks (170 birds) in North Carolina. The virus was shown to be LPAI by sequencing and chicken pathogenicity test. The flock was depopulated. The forth case occurred in July, 2008 when a backyard flock of about 1,000 birds (multiple species) in New Hampshire was found to be positive for antibodies to H7N7 through routine serologic surveillance. Swab specimens were negative for AIV by rRT-PCR and virus isolation. The flock was released from quarantine following two negative virologic tests. The fifth and final detection of AIV in a backyard flock occurred in September 2008 when a mixed species operation of about 200 birds in Massachusetts was found to be positive for antibodies to H5N2. The flock was under quarantine at the time of this report.

In FY 2007, 392 submissions were received from 25 states for AIV antibody detection and antibody subtyping. The majority of the submissions (320) were from commercial turkeys in 13 states (Arkansas, Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, North Carolina, North Dakota, Ohio, South Dakota, Virginia and Wisconsin) that were positive for antibodies to subtypes H1 and/or H3 in combination with N1 and/or N2. Vaccination for H1 and H3 is commonly practiced in turkey breeder flocks that are raised in close proximity to swine. Therefore, the total number of positive flocks may represent multiple testing of the same breeder flocks to fulfill the quarterly testing requirements under the National Poultry Improvement Plan. Detection of non-H5 or H7 AIV or AIV-specific antibodies to AIV in poultry/birds is shown in Table 1.

**AI Diagnostic Reagents Supplied by the NVSL.** A total of 17,423 units of AGID reagents (antigen and enhancement serum) were produced and shipped to 88 state, university, and private laboratories in 37 states during FY 2008. The quantity is sufficient for approximately 2,090,760 AGID tests. An additional 1,343 units (161,160 tests) were shipped to 18 foreign laboratories.

**rRT-PCR Test Development and Proficiency Test Panels.** A new version of the H7 rRT-PCR assay (2008 H7 rRT-PCR assay) was developed at the Southeast Poultry Research Laboratory (Spackman et al.) to replace the H7 assay that has been in use since 2002. The new assay was needed to detect recent H7 viruses that were missed by the 2002 H7 assay. The 2008 H7 assay has been validated and a new protocol developed and distributed to the National Animal Health Laboratory Network (NAHLN) laboratories. The 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 2008, PTs were distributed to 257 diagnosticians in 55 laboratories for AI rRT-PCR and 254 diagnosticians in 54 laboratories for APMV-1 (Newcastle disease) rRT-PCR.

**AIV Surveillance in Wild Waterfowl.** In 2008, waterfowl surveillance for the highly pathogenic Asian strain of H5N1 in Alaska and the lower 48 states continued. The surveillance is a cooperative effort between USDA’s Animal and Plant Health Inspection Service (APHIS, NVSL), Wildlife Services (WS, National Wildlife Research Center, Fort Collins, CO) and the Department of Interior’s United States Geological Survey (USGS, National Wildlife Health Center, Madison, WI). Specimens collected from wild-caught and hunter-killed waterfowl, the environment and feces were screened by rRT-PCR for AIV specific RNA at WS, National Animal Health Laboratory Network (NAHLN) laboratories and at the USGS laboratory in Madison, WI. All presumptive H5 and H7 positive specimens were submitted to the NVSL for confirmation and virus isolation. Between October 2007 and September 2008, 814 presumptive positive specimens were received for confirmation testing. No HPAI H5N1 was detected; however, LPAI H5N1 virus was detected in specimens submitted from 2 states (MI, MT). A total of 58 H5 viruses (various N subtypes) from 22 states and 23 H7 viruses (various N subtypes) from 8 states were isolated. All H5 and H7 AIVs were characterized as LPAI viruses of North American lineage. Other AIV subtypes isolated included H1, 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 2008, 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 8 pigeons in two states (FL, and NY). In addition, vNDV was isolated from 15 wild cormorants specimens (10 submissions) from three states (CT, n=1; MN, n=5; and WI, n=9).

**Isolations of Low Virulent Newcastle Disease Virus (LoNDV).** During FY 2008, 52 isolates of APMV-1 were received for characterization at the NVSL or were isolated at the NVSL from diagnostic submissions from 9 states. All of the isolates were characterized as low virulent NDV by the intracerebral pathogenicity index (ICPI) and/or by deduced amino acid motif at the cleavage site of the fusion protein.

**ND Diagnostic Reagents Supplied by the NVSL.** A total of 262 vials (2ml each) of inactivated LaSota antigen were shipped to 10 domestic laboratories in 7 states and to 5 foreign laboratories. In addition, 45 vials (2ml) of ND antiserum were shipped to 9 domestic
laboratories in 5 states and 5 foreign laboratories.

**Table 1.** Subtypes of non-H5 or H7 low pathogenicity avian influenza virus (AIV) or specific antibodies detected in poultry/birds, FY 2008.

<table>
<thead>
<tr>
<th>State</th>
<th>Species</th>
<th>Subtype of AIV* (number)</th>
<th>Antibody Subtype (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
<td>Ostrich&lt;sup&gt;a&lt;/sup&gt;</td>
<td>H11N2, H?N2</td>
<td>H6</td>
</tr>
<tr>
<td></td>
<td>Black Swan</td>
<td></td>
<td>Multiple</td>
</tr>
<tr>
<td></td>
<td>Emu</td>
<td>H6N2 (7)</td>
<td>H6 (3)</td>
</tr>
<tr>
<td></td>
<td>Chicken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idaho</td>
<td>Mallard Duck</td>
<td>H4N7</td>
<td>H1N2, H4N7</td>
</tr>
<tr>
<td>Maryland</td>
<td>Wild Turkey</td>
<td></td>
<td>H10N3</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>Chicken</td>
<td>H6</td>
<td>H2,4,6N3</td>
</tr>
<tr>
<td></td>
<td>Pheasant</td>
<td>H6N1 (2)</td>
<td>H6</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Chicken</td>
<td>H6N5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turkey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>Ostrich</td>
<td>H8N2 (2)</td>
<td></td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>Duck</td>
<td>H3N8, H4N8</td>
<td>H1,6N2</td>
</tr>
<tr>
<td></td>
<td>Ostrich</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Dakota</td>
<td>Turkey</td>
<td>H1N1 (3), H3N2 (8),</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H6N5 (7), H1,10N7 (2),</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H1,6N5 (2), H10N7</td>
<td></td>
</tr>
<tr>
<td>Wisconsin</td>
<td>Turkey</td>
<td>H3N2</td>
<td>H3N2 (8)</td>
</tr>
</tbody>
</table>

<sup>*Low pathogenicity AIV by the chicken pathogenicity test.</sup>

<sup>*Zoological garden</sup>
The NAAHLN is one of several initiatives resulting from the Security and Prosperity Partnership (SPP) of North America, committed to in 2005 by leaders of United States, Canada, and Mexico. The SPP is a trilateral effort to increase security and enhance prosperity among the three nations through greater cooperation and information sharing. The purpose of the NAAHLN is to harmonize laboratory testing procedures to facilitate early detection of targeted diseases that could pose a threat to the animal/poultry industries of North America. In 2007 three Working Groups, comprised of subject matter experts from the National Veterinary Laboratories in each country, were formed to develop harmonization strategies for avian influenza, vesicular diseases, and tuberculosis, respectively. Diagnostic tests targeted for avian influenza include the agar gel immunodiffusion test, hemagglutination-inhibition and neuraminidase-inhibition tests, virus isolation, and real time RT-PCR. To date, efforts have focused on sharing of diagnostic test protocols, exchange of diagnostic reagents, training of laboratory staff, and inter-laboratory testing of harmonization panels. It is anticipated that harmonization for avian influenza will be completed in 2009.
The National Animal Health Monitoring System (NAHMS) is a nonregulatory division of the United States Department of Agriculture (USDA) designed to help meet the Nation's animal-health information needs. The Small Enterprise Chicken study was NAHMS' third study of the poultry industry, focusing on biosecurity and bird movement on operations with 1,000 to 19,999 chickens. A questionnaire was mailed in August 2007 to a sample of operations identified as having 1,000 to 19,999 chickens on the National Agricultural Statistics Service (NASS) 2002 Census of Agriculture, with a follow-up reminder sent to non-respondents 2 weeks later. In September 2007, non-respondents were contacted by telephone and surveys were completed via telephone interview. About two-thirds of these operations had any chickens at some time between October 2006 and September 2007 and provided information regarding their biosecurity and bird movement practices.

Over half of operations were contract operations with breeding birds, and one-fourth were contract operations without breeding birds. Only 17 percent of operations were independent (non-contract) operations. Contract operations generally had stricter biosecurity requirements compared to independent operations. A higher percentage of independent operations had outdoor bird access. Additionally, a higher percentage of operations with birds other than chickens had outdoor bird access compared to operations with chickens only. Movement of birds to locations in which other birds were present was rare. Employee contact with birds off the operation was also rare.

Results from this study will be used to parameterize the avian disease model to better prepare for potential disease outbreaks.

NAHMS is currently preparing for a poultry study to take place in 2010. In order to identify the information needs, 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.

Research and government stakeholders placed a high priority on avian influenza and biosecurity. Primary breeder and layer veterinarians were mostly concerned with compartmentalization, while broiler and turkey veterinarians were interested in cellulitis/gangrenous dermatitis.
Based on the input from stakeholders, we are considering objectives for a NAHMS 2010 poultry study as follows:

**Objective 1:** Estimate the prevalence and identify risk factors associated with cellulitis and gangrenous dermatitis on broiler and turkey farms.

**Objective 2:** We are having on-going discussions with industry and APHIS regarding a potential role for NAHMS in the compartmentalization efforts.
In 2000, the U.S. Department of Health and Human Services (HHS) developed a project called Healthy People 2010 that set a number of ambitious public health goals for the nation including goals addressing illness caused by food borne pathogens such as *Salmonella* and *Campylobacter*. The human salmonellosis goal established by Healthy People 2010 was set at 6.8 cases per 100,000 persons by 2010. In 2000, the case rate was 14.08. In 2005, it was 14.47, higher than the 2000 case rate and over twice the 2010 goal.

In response, the U.S. Department of Agriculture’s Food Safety Inspection Service (FSIS) embarked on an ambitious program of actions designed to reduce the contribution of the food products under their jurisdiction (red meat and poultry) to the human salmonellosis case rate. This program was detailed in a Federal Register Notice in February 2006 and consisted of a specific list of actions that the Agency intended to take, one of which was classifying establishments into process control categories (Category I, II, or III) based on their *Salmonella* sample set results. The Agency then established a goal of having 90 percent of all meat and poultry establishments in Category I by October 1, 2010. By June 30, 2007, however, neither turkey nor young chicken establishments had reached the desired 90 percent compliance rate. At that point, FSIS determined that more robust incentives, including web-based publication of individual establishment verification results, was necessary to encourage the industry to improve its performance in controlling *Salmonella*.

At the same time, it became increasingly apparent that several serotypes of *Salmonella* were contributing disproportionately to the salmonellosis burden. These were deemed to be “serotypes of public health concern.” CDC reported that *Salmonella* serotypes accounted for 38.6 percent of all human food borne infections in 2006. A CDC study determined that poultry *meat* is an effective vector for *S. enteriditis* (SE). FSIS data from 2006 showed that the proportion of SE isolates found among all poultry isolates of *Salmonella* jumped from 7.71 percent in 2005 to 13.66 percent in 2006. In addition, a *Salmonella* serotype having the antigenic formula I4,[5],12:i:- has been increasingly recognized by CDC as a leading cause of human illness. This same serotype was also becoming more common in young chicken isolates rising to 5th place in 2006 according to FSIS.

In January 2008, FSIS published a Federal Register Notice detailing the *Salmonella* Initiative Program (SIP). The Agency developed the SIP to offer regulatory waivers to Category I establishments as an incentive.
for **volunteer** meat and poultry slaughter and processing establishments to increase process control efforts for *Salmonella* and *Campylobacter*. The SIP is also intended to benefit the Agency by providing key microbial data from sampling and analysis conducted by the establishments that volunteer for SIP.

Unfortunately, this voluntary program became a de facto *mandatory* program for the broiler industry when the Agency required establishments currently operating with On Line Reprocessing (OLR) and HAACP-based Inspection Models Project (HIMP) waivers to participate in SIP. Over 90 percent of broiler slaughter establishments operate under one or both of these waivers. The program is essentially an unfunded federal mandate requiring extensive microbial testing that is both laborious and expensive. The data collected will increase the exposure of participating establishments to adverse regulatory and activist group actions that could threaten business continuity. The resultant data is neither confidential nor protected from Freedom of Information Act (FOIA) requests and FSIS has stated that it will be linked to public health databases in order to improve attribution efforts.

FSIS is also pursuing several additional initiatives that seek to reduce the acceptable level of *Salmonella* organisms in raw poultry products to essentially zero and to improve the ability of public health officials to trace back the source of salmonellosis cases to specific meat and poultry processing facilities. These include significantly reducing the *Salmonella* performance standard and corresponding categorization levels when the recent broiler baseline study is completed; including comminuted meat in the ground poultry performance standard; and considering an adulterant determination for *Salmonella* in microwaveable convenience foods containing raw poultry. The Agency has also forewarned the Industry that pathogen testing of raw finished poultry products is coming.

While we all agree that human cases of salmonellosis are a legitimate public health issue, the U.S. poultry industry should be rightfully concerned that this drive to de facto zero tolerance for a large group of organisms that are part of the normal microflora of healthy birds may ultimately be unachievable. The pathogen management tools available to the industry today will not result in compliance with the ever-diminishing expectations of the Agency and new interventions or strategies do not appear to be on the near horizon. The result of this constellation of FSIS efforts may not result in the intended outcome of safer meat and poultry, but instead have a marked and potentially economically devastating impact on U.S. poultry processors and, eventually, on the supply of domestically produced poultry meat.

---

1U.S. Federal Register Volume 73, Number 18, January 28, 2008
Research Update on Exotic and Emerging Poultry Diseases

David L Suarez, Mary Pantin-Jackwood, David Swayne, Laszlo Zsak, Darrell Kapczynski, Erica Spackman, Patti Miller, Michael Day, Stephen Spatz, and Qing Yu
Southeast Poultry Research Laboratory
USDA-ARS

Research on the understanding and control of viral diseases remains the goal at the Southeast Poultry Research Laboratory (SEPRL), Agriculture Research Service (ARS), USDA. The laboratory is administratively divided into two research units, the exotic and the endemic viral disease research groups. The following is a brief description of research accomplishments over the past year.

**Avian Influenza Virus diagnostics**

Support of the real-time RT-PCR tests used by the National Animal Health Laboratory Network (NAHLN) for both the H5 and H7 subtype tests were performed during the year. The H5 subtyping test, although originally designed to detect North American viruses, could detect with a previous modification to the forward primer, H5 viruses from Europe and Asia including the H5N1 HPAI viruses. However, diagnosticians at the veterinary diagnostic laboratory in Hong Kong identified several H5 viruses from Hong Kong that were missed by the current PCR test. These viruses were forwarded to SEPRL and sequence analysis showed the viruses were missed because of nucleotide mismatches in the probe region. This was confirmed through further testing. The viruses were a variant of the Fujian H5N1 lineage (Clade 2) that is widespread in China, Vietnam, and likely other countries in the region. Several alternative probes were designed and shown to improve the specificity so that all the H5 viruses in the panel were detected. These changes have not been validated for use in the NAHLN, but the information is being made available to national and international laboratories. A similar story was seen with the H7 subtype test. The H7 test was targeted to North American viruses, and because of the large sequence differences, it did not detect Eurasian viruses. In recent wild bird surveys in the U.S. a large number of wild bird H7 viruses were not detected by the H7 test. Sequence analysis showed multiple changes in the primers and probes that likely accounted for these differences. Because of the large number of differences, a new primer and probe were designed to develop a broader reacting test. The new test was able to identify all the North and South American viruses tested, and it had slightly improved sensitivity over the original test. The National Veterinary Services Laboratories (NVSL) performed a validation study on experimentally infected animals and field samples, and the test performed as expected. With this validation information the test replaced the original H7 test as the official
USDA test for the NAHLN program.

**Avian Influenza Virus epidemiology**

The USDA full coding sequencing genome project is starting to provide large amounts of data that is being annotated and released into GenBank. Currently about 175 viruses have been released in GenBank. As part of this project, a large number of recent H5N2 viruses from Live Bird Markets (LBMs) from the Northeast U.S. and H5 wild bird viruses were sequence and compared. Since the eradication of H7N2 viruses from the LBMs in the U.S., a small number of H5N2 viruses have been isolated. Over 30 viruses isolated over the course of the year were compared with sequence from all eight gene segment to see if the viruses were from a single or multiple introductions into the market. It appeared that at least 6 different introductions of virus occurred in the market system, but evidence of 3 lineages persisting for at least a few months was present. One lineage was predominant, and was present at the end of the study in 2007. Most of these viruses were still in ducks, so the virus had not appeared to have jumped into chickens at this time. Wild bird viruses were also compared from the Eastern U.S. at similar time points as the LBM isolates. The interest was not only wild bird ecology of H5N1 viruses, but to see if wild bird surveillance could be used predicatively to see what would be isolated from the LBM system. Over 30 viruses were examined, but all the viruses appeared to have unique combinations of genes from each other and from the LBM isolates. The surveillance, although designed to detect HPAI viruses in wild birds, did not appear to be useful for predicting poultry outbreaks.

**Avian Influenza vaccination**

Considerable effort is being made to evaluate new vaccine technology and provide advice on how to most effectively use the vaccines that are currently available. One area of work was to evaluate and develop different DIVA (Differentiate Infected from Vaccinated Animals) vaccine strategies. Two of these strategies are the heterologous neuraminidase (hNA) DIVA strategy and the NS1 DIVA strategy. The hNA strategy is a vaccination in which the hemagglutinin of the vaccine is matched to the field strain, i.e. H5 vaccine for H5 field strain, but the neuraminidase subtype is purposefully mismatched, i.e. N1 vaccine for N2 circulating strain. In experimental studies, this approach appeared to provide a clear differentiation of vaccinated and infected birds. This DIVA still suffers from several issues including a lack of a simple companion diagnostic test, availability of appropriate vaccines, and adequate validation information.

An alternative strategy is the NS1 (non-structural protein 1) approach. The NS1 protein is a non-structural protein that is not found in the influenza virion. Since killed influenza viruses are primarily whole virion preparations, vaccinated birds should not develop an antibody response to this protein. However, the NS1 protein is produced at high
levels in infected cells, and infected birds can develop an NS1 antibody response. Several reports suggested this would be a useful strategy, and we developed a baculovirus expressed NS1 protein to produce an ELISA test that had low background with avian samples. With this ELISA test, the antibody response was evaluated in infected and vaccinated and infected chickens. Unfortunately, using a H6N2 virus as challenge, only 2 of 10 birds were documented to have a serologic response after challenge. Similar results were seen with vaccinated and then challenged birds, in which only a few birds seroconverted after challenge. The lack of uniform response makes the NS1 strategy more difficult to apply since larger numbers of birds would need to be sampled to show freedom of disease with a high confidence interval.

A difference in response to AIV vaccination between Pekin-like and Muscovy ducks has been reported in Vietnam. A vaccination study was conducted in which ducks were vaccinated with the Chinese RE-1 vaccine using three different schedules (at 1 and 14 days of age; only at 14 days of age; and at 7 and 21 days of age) and then challenged with Dk/VN/88/07 HPAI H5N1 virus at 30 days of age. Although the best vaccination strategy for both Pekin and Muscovy ducks was to vaccinate at 7 and boost at 21 days of age, clear differences in response to vaccination was observed between them. Vaccinated and challenged Muscovy ducks presented higher mortality and more neurological signs than Pekin ducks. Pekin ducks had at least 2 log₂ higher HI titers in serum at the moment of vaccination compared to the vaccinated Muscovy ducks, regardless of the vaccination schedule. This study underlines the importance of tailoring AIV vaccination programs to different bird species.

**Avian Influenza Virus pathogenesis**

The mean infectious doses of selected avian influenza virus (AIV) isolates, determined in domestic poultry under experimental conditions, were shown to be both host and virus dependent and could be considered one measure of the infectivity and adaptation to a specific host. As such, the mean infectious dose could serve as a quantitative predictor for which strains of AIV, given the right conditions, would more likely be transmitted to and maintained in a given species and/or subsequently cause an AI outbreak in the given species. The intranasal (IN) mean bird infectious doses (BID50) for HPAIV isolates for White Leghorn (WL) chickens ranged from 1.2-4.7log10 mean embryo infectious dose (EID50). Although the upper limit for BID50 to predict infectivity and sustainable transmissibility for a specific species is unknown, a BID50 <4.7log10 was suggestive of such transmissibility. For the LPAIVs, there was a trend for domestic ducks and geese and Japanese quail to have the greatest susceptibility and WL chickens to be most resistant, but turkeys were susceptible to all three LPAIV tested when used at moderate challenge doses. This suggests domestic ducks
and geese, turkeys, and Japanese quail could serve as bridging species for LPAIVs from wild waterfowl to chickens and other gallinaceous poultry. These data provides support for the commonly held and intuitive belief that mixing of poultry species during rearing and in outdoor production systems is a major risk factor for interspecies transmission of AIVs and the emergence of new AIV stains capable of causing AI outbreaks as these situations present a more diverse host population to circumvent the natural host dependency or host range of naturally circulating viruses.

Better understanding of the molecular basis of AIV pathogenesis contributes to the development of improved prophylactic, therapeutic, and diagnostic reagents to control AI virus infections. With the use of a whole genome chicken 60-mer oligonucleotide 44K microarray we analyzed the transcriptional profiles of ducks infected with different strains of H5N1 HPAI viruses. This permitted the identification of genes differentially regulated after AIV infection. Differences observed in the innate immune response indicate different mechanisms potentially induced by AIV’s to modulate the host response in ducks. The differentially expressed genes identified are candidates for further hypothesis-driven investigation of genes determining resistance to AI viruses in ducks and other bird species.

The contribution of the Mx gene in resistance of chickens against AIV infection was also investigated. The Mx protein is an IFN-induced protein that confers resistance to influenza virus infection in mammalian species. A single Mx gene has been identified in chickens and is induced by interferons-α and β. Asn/Ser dimorphism at residue 631 in the Mx determines antiviral activity against H5N1 influenza virus in transfected cell lines. The Mx gene in chicken breeds is polymorphic; Mx 631Asn (Mx+) has antiviral activity; Mx 631Ser (Mx-) lacks antiviral activity. A higher frequency of the favorable allele +/+ is found in native breed lines of chickens, including breeding stock, and the -/- allele is more commonly found in highly selected lines of chickens (e.g. broiler lines). Mx +/+ or -/- chickens were infected with a highly pathogenic H5N2 virus and mortality was followed over 2-week period. A lower mean death time was observed in -/- Mx631 SNP lines of birds following HP challenge. Differences in cytokine responses, in particular IFNα, were also observed between Mx types. Increased IFNα expression correlated with increased MDT following high dose HPAI challenge. Future studies are planned to further examine the role and contribution of avian Mx to resistance to AI infection.

**Newcastle Disease Virus Epidemiology**

Sequence analyses of both domestic and foreign NDV isolates were conducted in the last year. In a collaborative project, inactivated viral samples from Mexico were sequenced and evaluated. The recent viruses were still Class II, Genotype V viruses as were viruses evaluated
from 1996-2002, but they clearly separated into a distinct group. This clear difference in viruses may be contributing to the perceived increase in clinical disease in layer flocks in Mexico because of the antigenic differences. These differences should remain a concern to the U.S. also, because of previous history of Mexican lineage viruses causing outbreaks in the U.S. In a separate study of wild pigeons and doves in the U.S. and number of virulent NDV viruses were isolated. The study was originally a West Nile Virus surveillance project, but a class II Genotype VI NDV virus was isolated from birds from two different states in the project. These viruses are the pigeon adapted variants that are seen worldwide, but this documents that they are relatively common in our wild pigeon and dove populations, at least in urban settings. The risk of spread to poultry remains unknown, but previous outbreaks in the U.K. have been traced to pigeon origins, and therefore this should remain a concern for U.S. producers.

**Newcastle Disease Virus Vaccine Studies**

Newcastle disease virus is recognized as having only a single serotype, so antibody to one virus will neutralize all NDVs. However, antigenic differences between different NDV viruses are also known to occur, and this antigenic variation does appear to affect protection. In previously published experiments with killed vaccines, it has been demonstrated that using a homologous vaccine provides better protection based on virus shedding than vaccinating with a less closely related virus vaccine based on differences in virus shedding. Recent work was conducted to see if homologous vaccination also provided improved protection with live vaccines. Using reverse genetics techniques, the HN and F genes of CK/CA/02 velogenic NDV was inserted into a less virulent virus that could be used as a live vaccine. A comparison of the recombinant vaccine with LaSota and using two different challenges, TXGB and CK/CA/02, it was demonstrated that using homologous vaccination provided better protection as measured by the number of birds shedding virus and the amount of virus being shed. This data provides support for consideration of updating our current vaccine viruses to more closely match the circulating strains to achieve the best protection possible.

**Enteric Viruses in Chickens and Turkeys**

Enteric diseases continue to cause substantial economic losses to the US poultry industry. Similar to surveys previously conducted at SEPRL, of 46 pooled samples from turkeys collected in the Midwest United States, 98 percent were positive for astrovirus, 65 percent were positive for rotavirus, and 22 percent were positive for reovirus. However, no specific association was found between the presence of a particular virus and enteric disease.

We continue to develop and improve diagnostic tests for enteric viruses in poultry. A reovirus S4-specific RT-PCR test was developed
for use in chickens and turkeys, and the astroviruses-multiplex test to
differentiate chicken and turkey viruses was improved. Characterization
of rotaviruses continues by sequencing the NSP4 and VP6 genes. The
use of the MA104 cell culture allowed the isolation of rotavirus from
samples containing other enteric viruses, permitting the further study of
these viruses.

Pathogenesis studies using genetically distinct turkey-origin
reoviruses (TRVs) showed that poults infected with certain TRV isolates
had moderate to severe bursal atrophy, suggesting virus-induced
immune dysfunction. In order to characterize the effect of TRV infection
on the turkey immune system, studies were conducted to quantify the
humoral and cell-mediated immune responses in poults infected with the
TRV isolate NC/SEP-R44/03. A marked effect on the cutaneous basophil
hypersensitivity response and on the antibody response to Newcastle
disease virus (NDV) exposure was noted in commercial and SPF poults
inoculated with NC/SEP-R44/03 at three days of age. All inoculated
poults had moderate to severe bursal atrophy. This immune dysfunction
and bursal atrophy was not noted in commercial poults inoculated at
three weeks of age.
The World Organization for Animal Health (OIE) has updated several animal disease Code chapters and appendices for 2008. At its May 2008 General Session Meeting, the International Committee adopted new text to several existing chapters. Of interest to the poultry industry, the following chapters were updated:

**Avian Influenza (AI).** For 2008, 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.

**Zoning and Compartmentalization.** Like the Code chapter on AI, the Code chapter on Zoning and Compartmentalization received only minor updates. Included in the chapter is the concept of “containment zones” which was first introduced last year. In addition, the Code now contains an appendix, which provides some general guidelines on the application of compartmentalization.

**Newcastle disease (ND).** The new Code chapter on ND was adopted at the May 2008 General Session. This chapter was further modified since it was first distributed for review and comment last year. The only ND virus that is reportable is that which either has an intra-cerebral pathogenicity index of 0.7 or greater in day-old chicks, or whose protein structure follows the basic amino acid sequence known to cause virulence. In addition, its definition of “poultry” has been modified to parallel that found in the AI Code chapter.

**Animal Welfare.** No new specific guidelines for animal welfare were adopted this past May. However, the definition of “animal welfare” was revised. This definition introduces a certain amount of subjectivity to the term, which has prompted the United States, as well as several other Member countries, to send in comments to the OIE asking that it be revised. In addition to the definition of animal welfare, the OIE will also be producing a discussion paper that will address guidelines on housing and husbandry of terrestrial animals. This document should be available by November or December of 2008.
Preparing for and responding to foreign animal diseases such as Highly Pathogenic Avian Influenza (HPAI) is a critical mission to safeguard our nation’s animal health and food supply. Coordination and cooperation between multiple levels of local, State and Federal government, and coordination and cooperation with the food and agriculture industry sector, is necessary to achieve strong capabilities for the emergency management goals of prevent, prepare, respond and recover.

A specific challenge of foreign animal disease preparedness and response is the ability to rapidly incorporate veterinary functions and countermeasures into emergency management operations, and the ability to scale-up veterinary functions and countermeasures in a moderate to large-scale outbreak.

Another challenge of foreign animal disease and response is establishing priorities for goals and objectives, and identifying those goals and objectives that become (or remain) competing interests during an actual incident or outbreak.

For instance, the goal of containing and eradicating a foreign animal disease within a control zone may be in potential competition with the continuity of business planning for food and agriculture sector premises or facilities located within a control zone, that seek to maintain continuity of business, or that seek to re-establish continuity of business as rapidly as possible, by demonstrating non-infection and effective biosecurity practices.

While some competing priorities may be impossible to identify or resolve prior to a specific incident or outbreak, other competing priorities can be partially resolved or mitigated prior to the incident or outbreak, by elevating the awareness of those competing priorities, identifying the resources needed to accomplish those competing priorities, and establishing commonly accepted and understood response objectives.

As each State and industry sector develops their HPAI and FMD response plans, it is critical that incident goals, objectives, strategies, procedures and timelines are coordinated with Federal planning. This will enhance coordination and communication between all partners, produce less chance for unmet expectations or overlooked actions, and speed up a successful response. In short, the coordination objective is to integrate, synchronize, and de-conflict all levels of preparedness and
planning, as much as possible, prior to an incident.

Assessments of the current capability for veterinary functions and countermeasures will help identify gaps or shortcomings in current response preparedness and planning, and help provide a framework to local, State, Tribal, Federal Tribal and Industry officials in assessing their individual response capabilities for HPAI and FMD, and identify those capabilities that need to be further addressed or elevated.

Preparedness goals for continuity of business in a control zone are the following:

- Identify the FAD agents that may cause potential quarantine or movement control restrictions.
- Establish biosecurity programs that are demonstrable and measurable, prior to the incident or outbreak of the FAD. Identify gaps or critical control point in biosecurity process and functions and provide correction prior to the incident or outbreak.
- Prioritize disruptions to business continuity by specific animal movements or animal commodity movements.
- Perform risk analysis or risk assessments for the animal movements or animal commodities that are potentially disrupted.
- Establish capability to perform diagnostic testing, as part of the infected zone or buffer zone surveillance plan, prior to the incident or outbreak. Surge capacity requirements for materials and personnel requirements need to be addressed.
- Establish capability to record and track herd health or flock health production parameters, to demonstrate herd or flock health at the start of an incident or outbreak. Identify information management systems or capability for storing and transferring information.
- Perform epidemiology assessment or questionnaire at the start of an incident or outbreak, to document the status of any contacts or traces to infected premises, contaminated personnel, or contaminated conveyances.
- Establish the relationships necessary to develop and implement continuity of business planning, with all associated local, State, and Federal stakeholders and agencies. Identify the resources needed to implement continuity of business planning. Recognize, discuss and analyze the economic consequences for the potential competing goal of containment and control of foreign animal diseases in control zones.
- Develop movement control model plans and protocols that can be implemented during an incident or outbreak. These model control movement plans need to take into account the emergency management and NIMS requirements for command, administration, logistics, planning, and operations.

The Egg Sector Working Group (comprised of egg industry officials
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

and the United Egg Producers (UEP), the University of Minnesota Center for Animal Health and Food Safety (CAHFS), the Iowa State University Center for Food Security and Public Health (CFSPH), APHIS CEAH staff, and APHIS NCAHEM staff have participated in a private-public-academic partnership to develop effective science based solutions for the continuity of business in a Control Area (Infected Zone and Buffer Zone) during a HPAI incident or outbreak.

The FY 2008 products of this private-public-academic partnership are the following:

• Draft Egg Movement Control Model Plan: Commercial Layer Industry Operations: Protocol for the Movement of Liquid Egg Product, Further Processed Egg Products, Inedible Egg, Table Eggs and Broken Egg Shells, Egg-Type Hatching Eggs, and Day-Old Chicks Within, Out of, and Into a Defined "Control Area".
• Rapid Decision Making Tool (FAST Eggs); Cooperative Agreement between ISU and APHIS.
• FAST Eggs Rapid Approval Program Biosecurity Checklist for Egg Production Premises and Auditors.
• FAST Eggs Active and Passive Surveillance Program using RRT-PCR and Flock Performance Indicators.
• FAST Eggs Spatial Risk Analysis Algorithm.
• CEAH, Egg Sector Working Group, and UMN CAHFS, An Assessment of the Risk Associated with the Movement of Pasteurized Liquid Egg and Its Products Into, Within, and Outside of a Control Area during a Highly Pathogenic Avian Influenza Outbreak for Pasteurized Liquid Eggs (PLE) Risk Assessment.

The FY 2009 goals are to complete the FAST Eggs cooperative agreement and deliverables, produce more commodity based risk assessments, and most importantly, obtain additional private-public-academic policy and science support, and identify the emergency management and incident command capabilities and resources needed to implement such planning in terms of command, administration, planning, operations, and logistics.
The National Veterinary Stockpile (NVS) is the nation’s repository of supplies, vaccines, equipment, and other critical veterinary resources. Established by Homeland Security Presidential Directive 9 and operational in 2006, we are able to deploy large quantities of veterinary resources anywhere in the continental U.S. within 24 hours. We exist because of the nation’s concern after 9/11 that terrorists could release animal diseases of catastrophic proportions that would deplete State and local response inventories, generate surge material requirements that would overwhelm traditional commercial sources, and prevent unaffected States from providing significant help for fear of the threat crossing their borders.

Our goal is to deploy countermeasures against the 17 most damaging animal diseases that affect human health and the economy, including foreign poultry diseases such as highly pathogenic avian influenza and exotic Newcastle disease. We also help state, tribe and U.S. territory animal health officials before an event, plan for and exercise the rapid request, receipt, staging, storage, and distribution of NVS resources during an event.

We provide the United States Department of Agriculture, Animal and Plant Health Inspection Service (APHIS) new, significantly improved support for responding to animal diseases. Our logistics experts manage critical delivery of the following emergency response resources in support of a damaging animal disease outbreak.

- Personal protective equipment for responders
- Depopulation equipment and supplies
- Decontamination supplies
- Field diagnostics
- Vaccines and vaccine delivery equipment/supplies
- Satellite communications equipment for reliable voice and data capabilities
- Depopulation, disposal, and decontamination (3D) commercial services

Using 3D commercial contractors to support an animal disease response is a novel approach. We qualify and manage these companies to assure they can provide large numbers of trained, medically qualified responders starting within 24 hours. The 3D personnel are experienced in responding to all-hazards, and working within the incident command system. They have expertise in cleaning and decontamination, transporting biological hazards, and other specialized skills. We value the poultry industry’s emergency response capabilities as local assets.
prior to and during deployment of NVS resources for a damaging poultry disease outbreak (i.e. highly pathogenic avian influenza and exotic Newcastle disease).

Our strategy is to secure countermeasures for all 17 animal disease threats. Future capabilities will include the following.

- Contractors fully trained in livestock and poultry animal disease response
- Additional animal handling & depopulation equipment
- Supply chain management system to coordinate inventory and deployments
- Vaccines and test kits
- Additional distribution centers to reduce deployment time

As a component of the APHIS National Center for Animal Health Emergency Management, we respond at the direction of APHIS management. Federal government emergency funding pays the costs for deployed NVS resources, including 3D commercial services, in response to a damaging animal disease outbreak. Payment is dependent upon concurrence of the state veterinarian, the area veterinarian in charge, and the regional director, and approval by APHIS executives.

We focus our outreach efforts on state/tribe/U.S. territory animal health partners, and appreciate the following groups providing information and recommendations through their representatives on the NVS Outreach Working Group during FY2008.

- APHIS VS National Incident Management Team
- APHIS VS Area Emergency Management Coordinators
- Multistate Partnership for Security in Agriculture
- National Assembly of State Animal Health Officials
- National Animal Health Laboratory Network
- National Association of State Departments of Agriculture
- National Emergency Management Association
- National Livestock Commodity Groups (National Pork Board, USA Poultry & Egg Export Council)
- Strategic National Stockpile
- State Strategic National Stockpile Coordinators
- Southern Animal & Agriculture Disaster Response Alliance
- U.S. Department of Homeland Security Office of Health Affairs

In collaboration with the NVS Outreach Working Group, we are developing NVS planning tools to assist state/tribe/U.S. territory NVS preparedness and response plans. The tools will provide guidance, suggested processes and mechanisms for how state/tribe/US territory animal health officials will plan to request, receive, stage, store, distribute and recover NVS resources. The toolkit will be posted on a secure portal of the NVS website http://nvs.aphis.usda.gov for state NVS planners.
In October 2004, Veterinary Services (VS) published Uniform Standards for H5 and H7 LPAI Prevention and Control in the LBMS to establish a more consistent approach by participating States in the control of LPAI in the LBMS. A revised and updated edition of the Uniform Standards was published in August 2008, which includes a new section on General Criteria for Indemnification of H5/H7 LPAI in the LBMS.

State participation is voluntary; participating States will enact regulations necessary for compliance of their live bird markets (LBMs), producers, and distributors. All LBMs, producers, and distributors that supply the markets must be registered or licensed with the State and must allow Federal and State inspectors access to their facilities, birds, and records. These facilities must also have written biosecurity protocols in place. USDA-APHIS coordinates and administers the program. USDA-APHIS provides personnel and resources to assist States with implementation and compliance with program requirements.

Surveillance in the LBMS remains a high priority. USDA-APHIS initiated cooperative agreements with 32 States and Territories in fiscal year (FY) 2008. In the Western Region, 12 States were awarded LBMS - LPAI cooperative agreements (Alaska, California, Colorado, Idaho, Iowa, Kansas, Missouri, Nebraska, Oklahoma, Oregon, Texas and Washington) to conduct LBMS surveillance. In the Eastern Region, 20 States and Territories have been awarded LBMS cooperative agreements (Alabama, Connecticut, Delaware, Florida, Georgia, Indiana, Kentucky, Massachusetts, Maryland, Michigan, Minnesota, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Vermont, Virginia, and Puerto Rico) to conduct LBMS surveillance. Many of these States also were awarded separate LBMS – HPAI cooperative agreements to conduct AI surveillance in higher risk areas. Additional States not previously listed that were awarded LBMS – HPAI cooperative agreements were Arizona, Illinois, Louisiana, New Hampshire, North Dakota, Rhode Island, South Dakota and West Virginia.

In February 2008, the annual LBM Working Group business meeting was held in Miami, Florida to address H5/H7 LPAI Prevention and Control program issues. More than 87 participating members of the industry and States attended the meeting. Even though the Northeast region remains a focal area of LBMS – AI disease control concern, the program has expanded to a national scope with the addition of new states in the Midwest and the Western regions. In addition, the LBMS-
WG discussed the program’s progress, shared ideas, and agreed on further implementation of the program.

As part of USDA’s continued initiative to combat Notifiable AI (NAI), APHIS/VS has conducted annual LBMS Continuing Education training workshops since 2004. The 2008 LBMS-CE course was held at the University of Connecticut, Storrs, CT on Aug 21-23, 2008. The purpose of the course was to inform and familiarize State and Federal employees working in the LBMS NAI surveillance activities throughout the United States with various aspects of the LBMS. These aspects included respiratory diseases that affect poultry, laboratory testing and sample collection, biosecurity and records auditing, personal protective equipment, demonstration of correct euthanasia techniques, geographic information system, State and Federal regulations, the role of USDA’s Investigation and Enforcement Services, Smuggling Interdiction and Trade Compliance, risk communication, an update on HPAI H5N1 events worldwide, and cultural sensitivity in the LBMS setting. Activities included the lectures, discussion groups, hands-on practical wet-labs, and a field trip to a LBMS Distributor. A total of 83 registrants attended to include 70 State and Federal personnel from 25 States and territories and 13 international participants from 9 countries representing Mexico, Dominican Republic, Egypt, Guadeloupe, St. Vincent and the Grenadines, Barbados, St. Lucia, Haiti, and Jordan.

From July 2007 to June 2008, 75,456 tests were conducted for H5/ H7 LPAI surveillance in the LBMS. Virus isolation and real-time reverse-transcriptase polymerase chain reaction (RRT-PCR) tests commonly were done on pooled samples of 5 swabs per tube. Therefore the actual number of samples collected is reflected as follows:

- 24,999 birds were tested for AI antibodies on agar gel immuno-diffusion (AGID).
- 44,105 birds and environmental samples were tested for AI virus-by-virus isolation (VI) represented by.
  - 6713 environmental tests conducted on pooled samples of 5 swabs per tube
  - 2108 bird tests conducted on pooled samples of 5 swabs/tube
- 141,112 tracheal/oral pharyngeal swab samples were tested for AI antigen RRT-PCR (pooled samples 5/tube).

Testing at the National Veterinary Services Laboratories (NVSL) is not included in this report, but all presumptive positive samples were submitted to NVSL for confirmation.

In FY08, 20 LBMS premises were found positive for NAIV (all H5N2 with an exception of 1 H5N9): 3 production flocks; 2 auctions; 15 retail LBMs. Also in FY08, 5 backyard premises were positive for NAIV.

As a result of the H5/H7 LPAI LBMS program and the surveillance and response efforts by VS and the States, the incidence of LPAI in LBMS, especially in the Northeastern United States, has decreased.
steadily. In comparison of the same time periods of July 06 – June 07 to July 07 – June 08, the percent of LBMS positive premises decreased 41 percent (from 34 to 20) and the number of positive live bird markets decreased 48 percent (from 29 to 15). None of the registered distributors tested were positive during July 07 – June 08 although 2 auction markets did test positive. Overall, since the initiation of the H5/H7 LPAI –LBMS program, the total number of LBMS positive premises has decreased tremendously especially in the Northeast region of New York, New Jersey, PA, and the New England States.
The World Organization for Animal Health (OIE) has fairly recently developed guidelines for different approaches that a country may consider when affected by animal diseases which could allow them to continue international trade. These approaches of zoning and compartmentalization have several basic similarities but are operationally different. Zoning creates subpopulations of susceptible animal species within a country on a geographic basis whereas compartmentalization creates subpopulations of susceptible animal species within related establishments having a common biosecurity management system.

Both approaches involve the establishment of biosecurity measures, which protect the sub-population of interest and continuous oversight to assure that the biosecurity measures are effective. The involved industry in a compartment has the primary responsibility to assure that the approved biosecurity measures are enforced and sufficient information is available to the certifying authority, the official Veterinary Services to initially approve the compartment and to assure that the biosecurity measures remain effective as disease prevalence changes in the country. Disease pathway analysis and a Hazard Analysis Critical Control Point approach are beneficial tools for identifying and mitigating disease risk when addressing biosecurity.

Proposed trading partners will also need to evaluate and approve compartments prior to initiating or continuing trade in the event of disease outbreaks of concern in an exporting country. Because of costs of biosecurity, the involved industry should also evaluate the benefit/cost of establishing and maintaining compartments as a factor in considering compartmentalization as a method to achieve business continuity.

The poultry industry in the U.S. is interested in the concept of compartmentalization and may propose the development of compartments.
Simultaneous Detection and Identification of Multiple Pathogens for Differential Diagnosis of Avian Influenza

Clark Tibbets
Tessarae, LLC

A prototype application is presented in which a relatively comprehensive differential diagnosis of avian influenza is performed in a single assay – directly and explicitly distinguishing all possible A/HN subtypes. The assay simultaneously tests for strains and variants of other avian viral and bacterial pathogens that can confound diagnosis of avian influenza, or compound the morbidity and mortality of influenza infection. The technology can detect and differentiate known and unknown, emergent strains and variants of targeted pathogens. Since the specimen must provide a template if diagnostic sequencing is to succeed, the likelihood of a false positive detection event is nil. Extensive sequence-based genotyping from assay results supports forensic epidemiology, critical for detection and tracking of naturally emergent infectious diseases, and attribution in possibly hostile encounters with a particular biothreat agent.

This new technology will enhance the role of regulatory agencies and practitioners in assuring the security of agriculture and the food supply. Diagnostic methods to date have employed classical culture or biochemical tests based on labeled markers, focused upon serial testing of single or few agents. Today’s evaluative methods are based on the limitations of such tests, and need to estimate likely risk of assay failure (false positive/false negative) compared to benchmark gold standard assay methods. If modern and unequivocal genomic methods of detection are ever to replace classical but slower and less precise “gold standards”, an entirely new paradigm for validation and official certification is essential. A cost-benefit assessment supports the upgrading of validation protocols and resources, as an investment with expectation of returns as superior information for critical agricultural, veterinary and public health decisions.

The threat of bioterrorism requires multiple pathogen detections within hours, not weeks, and test results must be specific enough to warrant appropriately measured response. The test must provide authorities with proof positive as to the strain, subtype and perhaps the source of the agent, and it should provide law enforcement agencies with forensic evidence leading to attribution. This set of capabilities and requirements are met by highly multiplexed pathogen gene sequencing-based diagnostic methods available today.
The Committee met on October 29, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 8:00 a.m. to 12:00 p.m. There were 15 members and 31 guests present.

Feral Swine Subcommittee on Brucellosis and Pseudorabies (PRV) update was presented by Dr. Carter Black, Subcommittee Chair. The full report was accepted by the Committee and is included as part of the report on the Committee on Brucellosis, elsewhere in these proceedings.

Swine Influenza Update was presented by Dr. Amy Vincent, National Animal Disease Center. Dr. Vincent presented a background on the rise of influenza virus infections in swine. H1N1, H1N2, and H3N2 viruses are currently circulating in the U.S. swine population. Emerge via drift, shift, interspecies transmission, or re-emergence. Double and triple reassortants emerged in 1997-1998. In 2003-2005, a human-like H1N1 emerged. H1N1 viruses have predominated since 2007. New genetic cluster of influenza viruses have been detected in the U.S. Two separate introductions of human H1 viruses have occurred containing the TRIG cassette which has been highly successful in swine. Limited serum cross-reactivity with swine H1. Zoonotic potential is unknown.

An H2N3 virus has been detected from two swine farms in Missouri with some changes suggesting adaptation from avian to mammal receptor binding. No human illness has been reported. No evidence that the virus.

The Committee met on October 29, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 8:00 a.m. to 12:00 p.m. There were 15 members and 31 guests present.

Feral Swine Subcommittee on Brucellosis and Pseudorabies (PRV) update was presented by Dr. Carter Black, Subcommittee Chair. The full report was accepted by the Committee and is included as part of the report on the Committee on Brucellosis, elsewhere in these proceedings.

Swine Influenza Update was presented by Dr. Amy Vincent, National Animal Disease Center. Dr. Vincent presented a background on the rise of influenza virus infections in swine. H1N1, H1N2, and H3N2 viruses are currently circulating in the U.S. swine population. Emerge via drift, shift, interspecies transmission, or re-emergence. Double and triple reassortants emerged in 1997-1998. In 2003-2005, a human-like H1N1 emerged. H1N1 viruses have predominated since 2007. New genetic cluster of influenza viruses have been detected in the U.S. Two separate introductions of human H1 viruses have occurred containing the TRIG cassette which has been highly successful in swine. Limited serum cross-reactivity with swine H1. Zoonotic potential is unknown.

An H2N3 virus has been detected from two swine farms in Missouri with some changes suggesting adaptation from avian to mammal receptor binding. No human illness has been reported. No evidence that the virus.
REPORT OF THE COMMITTEE

is still circulating.

During the 2007 Ohio county fair, pigs and people had flu-like symptoms. A swine H1N1 from the pigs was detected. Clinical signs were reproduced in pigs at the National Animal Disease Center (NADC). These produced more severe clinical signs than normally observed with influenza alone. They also produced severe lung lesions. Genetically there is nothing different about this group of viruses, but has increased virulence, increased shedding, potential to infect people, poor cross-reactivity with other H1 strains.

We need: better vaccines for pigs and people including modified live viruses (MLV), personal protective equipment (PPE) for people, and minimize contact between swine and avian species.

Swine Influenza Virus (SIV) Vaccinology:

In 2006, approximately 70 percent of sow herds were vaccinated (20 percent using autogenous vaccines). Circulating viruses are constantly changing. Maternal antibodies interfere with active immunity. Commonly circulating strains are genetically distinct from the vaccine source strains. Practitioners have seen enhancement of lesions in the field and laboratory (likely immune mediated). Studies have shown correlation of lesion enhancement with high IgA and low IgG responses. Live vaccines showed strong induction of mucosal antibody and high IgA and IgG.

MLV vaccines have shown better protection against heterologous challenge even in the face of maternal antibodies (although there was a decreased antibody response). Researchers saw no lesion enhancement using the MLV vaccine compared to the inactivated vaccine. Killed virus vaccines have been shown to enhance disease particularly in the face of a heterologous challenge. Killed vaccines work well when dealing with a homologous challenge.

Swine Influenza Surveillance System was presented by Dr. John Korslund, Veterinary Services (VS). VS submitted 2010 budget request for SIV reagent preparation, strain prevalence data, and reports of declining efficacy of commercial vaccines. CDC approached VS with request for proposals for SIV surveillance related to zoonotic issues. VS put together a proposal to CDC’s Coordinating Center for Infectious Diseases under Dr. Lonnie King.

VS’ proposed 2015 vision SIV goals:

- improve SIV epidemiology;
- speed vaccine approval;
- improve swine diagnostics;
- proactive response toward a potential pH issue; and
- retain jurisdiction over animal health issues.

SIV Surveillance plan:

Case definition for isolates of interest:

- Diagnostic laboratory submissions:
  - non-typable isolates;
TRANSMISSIBLE DISEASES OF SWINE

- “novel” SIV isolates; and
- unusually severe or atypical clinical presentations

- Suspected concurrent human and swine SIV infection:
  - public venue; and
  - pig herd linked epidemiologically.

The current plan would ask veterinarians to voluntarily report suspected human infection and lays out the distribution of isolates and information between stakeholder groups. All on-farm submissions are voluntary because SIV is not a reportable disease in livestock.

Feral Swine Control in Kansas was presented by Dr. Chad Richardson, Wildlife Services (WS). Richardson described the feral swine control program in Kansas which is somewhat unique compared to other states. He discussed the documented feral pig population in 1994. Kansas legislature passed act prohibiting import and possession of feral swine in 1995. Kansas Animal Health Dept. asked WS to help develop a statewide feral swine control program in 2006. Feral swine are considered livestock.

two goals: stop importation and stop current population spread.

Kansas law bans sport hunting, but retained the right of landowners to kill feral swine as a pest on their own property. Hunting tends to scatter the population. Trapping has been found to be more effective along with aerial hunting. Estimates are that there are approximately 1500 feral swine in Kansas. This program has removed approximately 500 to date.

In Summary, hunting isn’t an effective control measure, while trapping and aerial hunting is effective but more costly.

Classical swine fever (CSF) in the Dominican Republic and Haiti was presented by Dr. John Shaw, International Services (IS).

African swine fever (ASF) was eliminated from Hispaniola by depopulation of swine in 1979 – 1983. CSF was found in the Dominican Republic (DR) in 1997 (reported 228 outbreaks in 1998). USDA support in 2000 was $200,000 and then $5.1 million for five years in 2002.

CSF is a politically important disease in Haiti. Production there is nearly all backyard operations, except for five medium-sized production units, with few veterinarians available. The country vaccinated 627,290 animals in 2008 out of 820,216. However, they vaccinated only once.

Ten outbreaks were reported in 2008, with increased surveillance but there is no compensation for animals destroyed.

In the DR, more veterinarians, large producer groups and processors exist. In nearly 800,000 to 1 million swine, 24 suspected outbreaks occurred with no compensation available.

There is a need to strengthen both national programs. Leaders should take advantage of the current positive relations between the two governments. APHIS-IS is considering a new business model involving a check-off type program.
REPORT OF THE COMMITTEE

Passenger Pre-departure Inspection Program (PPIP): In 1996 there was 100 percent inspection of all Haiti and DR travelers at the port of entry. In 2001, PPIP inspection of all outgoing passengers from the DR but Haiti refused to participate.

Seven U.S. states with direct flights from Hispaniola allow garbage feeding. Approximately 70,000 passengers are found yearly with meat products (3.5 percent of passengers). DR passengers are twice as likely to travel with meat products than travelers from other countries.

The risk of introduction of foot-and-mouth disease (FMD) is a great concern particularly due to the high number of United Nations forces in the country – a number of which come from countries positive for FMD.

Dr. Patrick Webb, National Pork Board (NPB) gave a presentation on Waste Feeding. In the U.S. there are an total of 67,280 premises with more than 70 percent having a premises identification. In 2008, 113 million market hogs were harvested, including 7 million feeder pigs from Canada. Webb summarized waste feeding statistics in the U.S.:
- 160,000 head of market swine are currently fed waste products
- 600 pounds of feed to a 0-pound pig to 0 pounds.

Dr. Harry Snelson, American Association of Swine Veterinarians (AASV), presented the CSF 3D Video entitled Classical Swine Fever: The Differential We Can’t Afford to Forget. The video was developed by NPB, AASV, the Center for Food Security and Public Health at Iowa State University and USDA as an educational tool for producers and veterinarians to promote early recognition of CSF.

Updates on Program Standards for Swine PRV/Brucellosis and Implementation of the Revised PRV Surveillance Plan was presented by Dr. Troy Bigelow, Veterinary Services.

Summary of presentation:
Regarding PRV and swine brucellosis (SB) in FY 2008, which included eight PRV herds (Arkansas, Texas, Michigan and Florida) and four SB herds identified (South Carolina, Florida and Hawaii). Accelerated Pseudorabies Eradication Program (APEP) funds are no longer available.

PRV surveillance plan implementation includes reduction of sow and boar sampling from the five percent sampling goal in all states. Samples will be transferred to Kansas and Kentucky labs for analysis. New surveillance streams, including serological analysis stream, are anticipated early summer 2009. This will include National Animal Health Laboratory Network (NAHLN) laboratories.

For the U.S. trichina program, the federal rule has been finalized. It includes a voluntary certification program, which certifies producers with good management practices.
VS is currently addressing swine brucellosis and PRV programs,
including the following key issues:

- transitional definition not well understood or misused;
- inconsistent;
- diseases eradicated in the commercial herd;
- definition of the commercial herd; and
- Code of Federal Regulations (CFR) is outdated

VS is pursuing the hazard analysis critical control points (HACCP) concept, and is working towards getting this into the regulatory structure. Important points include:

- hazard analysis – identify at the state level;
- determine critical control points – where can disease risks be mitigated;
- critical limits – max. allowable incidence of disease we are controlling or eradicating;
- monitoring – surveillance;
- corrective actions – same as program standards we currently have, which allows some flexibility at the state level;
- recordkeeping system – used to verify HACCP is working as intended;
- validation – insures HACCP is working as planned, in which VS will review the state plans annually;
- provides oversight.

HACCP relies heavily on surveillance. Targeted surveillance can be determined by the state. HACCP would include a national surveillance program.

In summary, HACCP will define commercial compartment, prescribe the result—not the method, allow different plans depending on state-level risks; and state status may be lost by failing to comply. The current status of the concept is as follows:

- concept approved at USAHA in 2007;
- completed the regulatory work plan – first step in the regulatory process; and
- continue to gather input from stakeholders.

Putting Lipstick on the Scientific Pig was presented by Dr. Jennifer Greiner, National Pork Producers Council.

Focusing on fatigued hogs, there is a goal to carve fatigued pigs out of the non-ambulatory category. School lunch program standards would ban use of non-ambulatory animals. For swine, suspects must be segregated for recovery. Meat from non-ambulatory animals in California would be considered adulterated.

Animal well-being issues have risen to heightened levels. A House Agriculture committee inquiry has investigated animal handling, transport and antibiotic guidelines, as well as non-compliance penalties. Industry has taken a stance to condemn willful abuse of any animal. It is important that the industry review baby pig care guidelines going forward.
Food safety legislation has held the Food and Drug Administration at the target of key issues, which include facility registration and user fees; import restrictions and mandatory recalls.

Committee Business:

The Committee reviewed a Resolution, entitled Prevention of Introduction of CSF and Other Foreign Animal Diseases into the United States, which was approved and forwarded to the Committee on Nominations and Resolutions.
Mr. John B. Adams, VA; Dr. Bruce L. Akey, NY; Dr. Wilbur B. Amand, PA; Dr. Robert D. Angus, ID; Mr. Matthew M. Ankeney, MI; Dr. Joan M. Arnoldi, WI; Dr. Daniel R. Baca, TX; Dr. Lowell R. Barnes, IN; Dr. Bill Barton, ID; Dr. Derek J. Belton, NZ; Mr. Warren Bluntzer, TX; Dr. Bob H. Bokma, MD; Dr. Steven R. Bolin, MI; Dr. Richard E. Breitmeyer, CA; Dr. Becky L. Brewer-Walker, OK; Dr. Shane A. Brookshire, GA; Mr. Charles S. Brown, NC; Dr. Charles E. Brown, II, WI; Dr. Scott W. Bugai, TX; Dr. Erika A. Butler, ND; Mr. Mike Chaddock, DC; Dr. John R. Clifford, DC; Dr. Thomas F. Conner, OH; Dr. Robert A. Cook, NY; Dr. Walter E. Cook, WY; Mr. Ed Corrigan, WI; Dr. Daniel T. Crowell, NV; Dr. Donald S. Davis, TX; Dr. Anthony A. DiMarco, ME; Dr. Jere L. Dick, MD; Dr. Leah C. Dorman, OH; Mr. Phil T. Durst, MI; Dr. Michael T. Dutcher, WI; Ms. Reta K. Dyess, TX; Dr. Anita J. Edmondson, CA; Dr. Dee B. Ellis, TX; Dr. Steven R. England, NM; Dr. Donald E. Evans, KS; Dr. John R. Fischer, GA; Dr. Dave E. Fly, NM; Dr. James M. Foppoli, HI; Dr. W. Kent Fowler, CA; Dr. Nancy A. Frank, MI; Mr. Bob Frost, CA; Dr. Tam Garland, DC; Dr. Michael J. Gilsdorf, MD; Dr. Linda Glaser, MN; Dr. Lawrence R. Green, WA; Mr. Velmar Green, MI; Dr. Jennifer L. Greiner, DC; Dr. Thomas J. Hagerty, MN; Dr. Steven L. Halstead, MI; Dr. Timothy J. Hanosh, NM; Dr. Beth Harris, IA; Dr. William L. Hartmann, MN; Dr. Burke L. Healey, NC; Mr. Del E. Hensel, CO; Dr. Bob R. Hillman, TX; Dr. E. Ray Hinshaw, AZ; Dr. Donald E. Hoenig, ME; Dr. Sam D. Holland, SD; Dr. James H. Hollis, IN; Mr. Fred Huebner, IA; Dr. Dennis A. Hughes, NE; Dr. John P. Huntley, NY; Dr. Billy G. Johnson, AR; Mr. Jon G. Johnson, TX; Ms. Shylo R. Johnson, CO; Dr. John B. Kaneene, MI; Dr. Susan J. Keller, ND; Mr. Karl G. Kinsel, TX; Mr. Terry L. Klick, OH; Dr. Paul Kohrs, WA; Dr. Carolyn Laughlin, OH; Dr. Steve K. Laughlin, OH; Mr. John C. Lawrence, ME; Dr. Maxwell A. Lea, Jr., LA; Dr. Rick Linscott, ME; Ms. Sharon L. Lombardi, NM; Dr. Konstantin Lyashchenko, NY; Mr. Stephen Maddox, CA; Dr. Phillip M. Mamer, ID; Mr. Daniel M. Manzanares, NM; Dr. Bret D. Marsh, IN; Dr. Chuck E. Massengill, MO; Dr. John Maulsby, CO; Dr. Robert M. Meyer, CO; Dr. Andrea Mikolon, CA; Dr. Susan K. Mikota, TN; Mr. Tom L. Mikulka, ME; Dr. Michael W. Miller, CO; Dr. Michele A. Miller, FL; Mr. Ernie A. Morales, TX; Dr. Henry I. Moreau, LA; Dr. Jeffrey T. Nelson, IA; Dr. Pauline Nol, CO; Dr. Dustin P. Oedekoven, SD; Dr. Bruno Oesch, CHE; Dr. Kenneth E. Olson, IL; Dr. Kathleen A. Orloski, CO; Dr. Mitchell V. Palmer, IA; Dr. Janet B. Pauver, IA; Dr. Kristine R. Petrini, MN; Ms. Laurie S. Prasnicki, WI; Dr. Michael R. Pruitt, OK; Mr. Chris V. Rathe, WA; Dr. Anette Rink, NV; Ms. Nancy J. Robinson, MO; Dr. Earl Rogers, UT; Dr. Enrique A. Salinas, MEX; Dr. Mo D. Salmon, CO; Mr. Bill Sauble, NM; Mr. Shawn P. Schafer, ND; Mr. Galen H. Schalk, MI; Dr. David D. Schmitt, IA; Dr. Dennis L. Schmitt, MO; Dr. Stephen M. Schmitt, MI; Dr. Larry A. Schuler, ND;
REPORT OF THE COMMITTEE

Dr. Andy L. Schwartz, TX; Mr. Charly Seale, TX; Dr. Sarah B. S. Shapiro Hurley, WI; Dr. Anne L. Sherwood, WA; Mr. Les C. Stutzman, NY; Dr. R. Flint Taylor, NM; Mr. George A. Teagarden, KS; Mr. Cleve Tedford, TN; Dr. Tyler C. Thacker, IA; Dr. David Thain, NV; Dr. Charles O. Thoen, IA; Dr. Lee Ann Thomas, MD; Dr. Kenneth J. Throlson, ND; Dr. Paul O. Ugstad, TX; Dr. Ray Waters, IA; Dr. Scott J. Wells, MN; Ms. Diana L. Whipple, IA; Mr. Dave Whittlesey, CO; Dr. Richard D. Willer, HI; Dr. Brad L. Williams, TX; Dr. Delwin D. Wilmot, NE; Mr. Kyle W. Wilson, TN; Mr. Ross Wilson, TX; Dr. George O. Winegar, MI; Mr. Josh L. Winegarner, TX; Mr. David W. Winters, TX; Ms. Jill Bryar Wood, TX; Mr. John F. Wortman, Jr., NM; Dr. Glen L. Zebarth, MN.

The Committee met on October 9, 2008, from 8:00 a.m. to 1:30 p.m. at the Sheraton Greensboro Hotel, Greensboro, North Carolina. There were over 140 members and guests in attendance. Dr. Kathleen M. Connell and Dr. Michael S. VanderKlok presided. In her opening remarks, Dr. Connell reviewed the day’s agenda and welcomed members and guests. The Chair determined that a quorum was present to conduct business.

The Chair made two announcements concerning the Tuberculosis (TB) Scientific Advisory Subcommittee (SAS) and the Bi-National TB and Brucellosis Committee Coordinator. In 2008, the TB SAS did not receive any specific assignments and data was not provided for evaluation and comment. The Subcommittee Chair, Dr. Mitch Palmer, National Animal Disease Center, Agricultural Research Service, United States Department of Agriculture (USDA), notified the TB Committee Chair that the Subcommittee did not meet this year, so no report was provided.

Dr. Billy Johnson, Bi-National TB and Brucellosis Committee Coordinator, was unable to attend the 2008 TB Committee meeting. Dr. Connell submitted a written report on the Bi-National Committee (BNC) June 23-24, 2008, meeting in Chihuahua, Mexico. The full text of this report is included in these proceedings.

Formal presentations began with Dr. Bruno Oesch, Prionics, Switzerland, who gave a Time Specific Paper entitled Bovigam interferon gamma assay development and its use in international TB programs. This paper is included in its entirety in these proceedings.

Dr. Kathy Orloski, Epidemiologist, National TB Eradication Program, Veterinary Services (VS), Animal and Plant Health Inspection Services (APHIS), USDA, followed with presentations on the current status of the U.S. bovine TB eradication program and an update on the U.S. national surveillance program for bovine TB. The full text of her reports is included in these proceedings.
Dr. John Clifford, Deputy Administrator, VS-APHIS-USDA, addressed the Committee on the challenges faced by the bovine TB eradication program. The full text of this report is included in these proceedings.

A special presentation on Australia's TB eradication program was given by Dr. Bill Scanlan, Senior Principal Veterinary Officer for the Department of Agriculture, Fisheries and Forestry. The full text of this report is included in these proceedings.

Dr. Maria Koller-Jones, Senior Staff Veterinarian, Animal Health and Production Division, Canadian Food Inspection Agency, Ottawa, Ontario, provided an update on the current status of the Canadian bovine TB eradication program. The full text of this report is included in these proceedings.

The current status of Mexico's campaign against TB and an update on Mexico's national surveillance program was delivered by José Alfredo Gutiérrez Reyes, Subdirector de Sanidad en Especies Mayores, Dirección de Campañas Zoosanitarias, Dirección General de Salud Animal, Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria (SENASICA). The full text of this report is included in these proceedings.

State updates followed, provided by Dr. Richard E. Breitmeyer, State Veterinarian, California Department of Food and Agriculture; Dr. Mike VanderKlok, Bovine TB Eradication Coordinator, Michigan Department of Agriculture; Dr. Bill Hartmann, Minnesota State Veterinarian and Board of Animal Health Executive Director; Dr. Tim Hanosh, New Mexico Livestock Board; and Dr. Bob Hillman, Texas State Veterinarian and Executive Director of the Texas Animal Health Division.

Dr. Rich Breitmeyer provided the update for California. To date, California has detected three (3) dairy herds in Fresno County affected with bovine tuberculosis (TB), and seven (7) total infected animals, including singleton reactors in two of the herds.

These cases are summarized below to clarify the number of affected herds, number of infected cattle, epidemiological findings, and our joint State/Federal response.

The first affected herd was detected through routine slaughter surveillance on a cow in December 2007. Four additional infected cows were detected in this 5,000-head herd through testing. All five cows were infected with the same strain of M. bovis. This dairy was depopulated in late July 2008, with no additional infected animals detected. The dairy has completed its cleaning and disinfection, and is now in the process of restocking. The source of the infection in this herd has not been determined.
The second affected herd was tested because they purchased 16 cows in 2007 from the first affected herd. One of those purchased cows was found to be infected with *M. bovis* when she was removed from the herd. The *M. bovis* strain type from this cow matches that in the first affected herd. This herd was depopulated in early August 2008, with no additional infection in the 1,000 cattle. The facility has been cleaned and disinfected. The few traces from this herd are being completed.

The third affected herd was tested as a trace-in to the index herd (one 4-H heifer from this herd entered the first affected herd). During testing, one infected eight-year old cow was detected. Because of herd movements, two dairies, together containing approximately 13,000 cattle, are now involved in this investigation. These herds have been tested twice, all CFT responders removed, and tissues from over 500 cattle have been examined at necropsy or slaughter with no additional infected animals being detected. The *M. bovis* strain type from this herd differs from the strain type in the first and second affected herds. Traces of cattle (primarily registered Holstein breeding bulls) from this herd since 2003 are ongoing.

Attempts to determine the origin of both strains of bovine TB are ongoing. According to genotyping conducted by USDA, the *M. bovis* isolates from these cases are typical of strains associated with dairy cases in the Southwest US and Mexican-origin cases. They are distinct from the isolates diagnosed in California in 2002-2003, and from the isolates in Michigan and Minnesota. Isolates most closely matching the first (and second) affected herd(s) include a 2008 case from New Mexico and a 1997 slaughterhouse case from a California feedlot. The *M. bovis* strains most closely matching the isolate from the third herd are three Texas slaughterhouse cases in 2006-2007 with either unknown sources or trace-backs to Mexico, an isolate from a 2003 affected herd in Texas, and a 2007 slaughterhouse case from a California feedlot.

In response to detecting the first affected herd, a joint State/Federal TB Task Force was established in early January 2008. Currently, about 80 people are dedicated to analyzing cattle movement records, identifying and testing cattle, and implementing and verifying disease control measures. To assist this ongoing effort, USDA Veterinary Services is now providing Incident Management Teams, rotating on a three week basis. Task Force participants are now deployed from all areas of California and several other states.

To date, approximately 170 herds and 220,000 cattle have been tested. Tracing movements out of these herds has led to traces to 18 states and Canada. In California, it is anticipated that approximately 200,000 additional cattle will be tested over the coming months. We are very encouraged by the fact that we have not yet demonstrated significant, active spread of disease, from any of the affected herds, and the number
of positive animals remains very low – including two herds with only a single infected animal each.

We especially want to recognize and thank USDA for their support of this effort and for the many state and federal animal health staff that have sacrificed time away from family to assist with this effort.

Dr. Mike VanderKlok provided the update for Michigan.

Dr. Bill Hartmann provided Minnesota’s update. Minnesota has been working to eradicate bovine tuberculosis (TB) since the first infected herd was found in the State in 2005. Now, only three years later, the State has been granted Split State Status. This effectively split Minnesota into two TB zones; a majority of the state is Modified Accredited Advanced (MAA), while a small part of northwestern Minnesota, where TB has been found, remains Modified Accredited (MA). Minnesota signed a Memorandum of Understanding (MOU) detailing the conditions of the approval of Split State Status.

The MA Zone was created to include all 11 previously infected cattle herds. The zone also provides a buffer of 17 miles or more around the area where 24 TB-positive deer were found. As a condition of the MOU, the Minnesota Board of Animal Health will conduct increased surveillance outside the MA Zone. The MOU calls for 1,500 cattle herds to be TB tested, a figure which is weighted for herds deemed ‘high-risk’. The Board will be focusing primarily on herds in the six counties surrounding the MA Zone.

The Minnesota Department of Natural Resources (DNR) will also increase its surveillance efforts by testing 1,800 free-ranging white tailed deer in and around the MA Zone. This level of surveillance will continue for five years after no infection is found.

Per the MOU, herds in the MA Zone will undergo a wildlife evaluation and develop a herd plan. All cattle from the zone are required to have official identification before moving off the farm. The State is currently using a combination of a USDA metal ear tag and an RFID tag. Movements of these animals will be routinely and continuously monitored at sales barns through out the state.

Several objectives must be accomplished to meet Minnesota’s goal of eradicating TB. The State must detect and depopulate infected cattle herds, eliminate disease transmission in the Management zone, reduce the cattle population, protect remaining cattle from contact with potentially infected deer, and reduce the deer population. To achieve these objectives, Minnesota has implemented buyout and fencing programs. Forty-five eligible herd owners are taking part in the herd buyout. This will remove approximately 4,000 head of cattle from the Management Zone. All buyout cattle must be removed from the zone by January 31, 2009. Herds remaining in the management zone have had a wildlife risk assessment. It was determined that 28 premises in will be need deer-
REPORT OF THE COMMITTEE

exclusion fencing to protect cattle herds and feedstuff from deer.

During the 2007-08 deer hunting season, DNR removed 2,656 deer from the Management Zone by using a combination of aerial shooting, sharp shooting, regular hunting season, a special hunt, and land owners shooting deer on their property.

Minnesota is utilizing all of its resources to eradicate TB. The Board would like to thank the many states acknowledging Minnesota’s efforts by recognizing its Split State Status. By working together, we can accomplish our goal of eradication.

Dr. Tim Hanosh reported that the state of New Mexico had its TB status reduced from accredited free with a small modified accredited advanced zone in the central eastern part of the state to state wide modified accredited advanced. The reduction in status occurred on September 11, 2008. The reason for the reduction in status involved two incidences of TB in the Clovis, New Mexico area outside of the MAA zone.

The first incident responsible for the reduction in status involved the DoRene/Milagro dairy herd comprised of two dairies, DoRene Dairy and Milagro Dairy and one heifer raising facility. Milagro Dairy is now called Clover Knolls Dairy and is under separate management. The DoRene/Milagro herd was declared TB infected in June 2007. All herds epidemiologically linked to the DoRene/Milagro herd were tested by November 2007 with no other cases of TB diagnosed. The epidemiology report was submitted to the USDA on November 30, 2007. Of the 5981 animals traced out of the DoRene/Milagro herd, 3 remain untraceable. The DNA fingerprint from this herd matches Schuberg Dairy in Arizona, Bromley Feed Yard in Texas and two Mexican origin steers. The owner of the DoRene/Milagro herd accepted a depopulation agreement which was completed December, 2007. The depopulation involved the taking of over ten thousand animals to slaughter. The cleaning and disinfecting was completed by the end of January 2008. At present both dairies are back at full capacity and have undergone their six month assurance TB tests. Both dairies are scheduled to have a 12 month assurance test also.

The second incident responsible for the reduction in status involved the F and F Feed Yard. F and F Feed Yard was mainly involved with feeding steers, approximately 1450, and cull cows, approximately 180 dairy cows; however, the feed yard was also used as a facility to market a small number of recycled dairy cows. Recycled cows are cull cows that, instead of going to slaughter, are bought by cattle dealers and resold to other dairies as replacements. The recycled cows at F and F Feed Yard were in pens with dairy bulls. The cows were kept with the bulls for a few months. If the cows were successfully bred they were sold as replacements, if not they were sold to slaughter. F and F Feed Yard was declared as an infected herd in May 2008 due to a recycled cow that was illegally transported from F and F Feed Yard to Erath County Dairy Sales in Stephenville, Texas. The cow was one of a load of 36 that entered
Texas without a CVI, export inspection or current TB test. At Stephenville the load of cows was purchased and was to return to New Mexico. Before entering New Mexico the cattle were TB tested and one cow was positive on Caudal Fold, Gamma interferon and, ultimately, on histopathology and culture. The cow was purchased at a packer sale in Portales, New Mexico on October 4, 2007 and, according to the dealer, was at F and F Feed Yard until he had her transported to Stephenville in late February, 2008.

The dairy of origin for the infected cow is located in southeastern New Mexico. It has been a closed herd since 2001 and culls better than average cows. The management and biosecurity at the dairy are excellent. The dairy underwent a whole herd test, 4880 cows, in April 2008 with no diagnosis of TB. The dairy will undergo an assurance test in January 2009.

All cattle at F and F Feed Yard were TB tested in April and May of 2008 with no cases of TB diagnosed. The feed yard was depopulated with the last animal leaving July 16, 2008. Cleaning and disinfecting has been completed according to the depopulation plan.

The DNA fingerprint for the F and F cow is not a match for the DoRene/Milagro herd nor the Mitchell Dairy which is the dairy in New Mexico in its last year of a test and remove herd plan; however, the F and F DNA fingerprint is similar to the Green Valley DNA fingerprint in California and at least one Mexican origin steer. To date no epidemiological link has been found between F and F and Green Valley. The F and F Feed Yard epidemiology is underway and will take several months to complete.

Mitchell Dairy is the herd that was responsible for the creation of a small MAA zone in eastern central NM in July 2005. The dairy remains under quarantine and has one more whole herd test to undergo before being eligible for being released from quarantine. The next whole herd test is scheduled for July 2009; if no positive cases of TB are diagnosed the dairy will be released from quarantine. The dairy will be required to undergo one assurance test in July 2010.

New Mexico has applied for split state status that will involve creating a new MAA zone encompassing Curry and Roosevelt counties. The proposed zone will be larger than, and will incorporate, the former MAA zone. New Mexico is working with the USDA in completing the tasks required to attain the proposed MAA zone.

Dr. Bob Hillman completed state updates by giving the report for Texas.

During the 2007 TB Committee meeting, five Subcommittees were established to address specific issues. Subcommittee Chairs or their representatives gave updates on Subcommittee activities during the past year.
REPORT OF THE COMMITTEE

In Chair Tyler Thacker’s absence, Dr. Kathy Orloski, Epidemiologist, National TB Eradication Program, VS-APHIS-USDA, gave the Subcommittee on Diagnostic Test Review update, which is included immediately following this report.

In the Chair Janet Payeur’s absence, Dr. Michelle Miller, Disney Animal Programs, Department of Veterinary Services, gave the Subcommittee on Elephant TB Guidelines update. The full report is included at the end of this report.

Mr. Phil Durst, Subcommittee Chair, gave the report of the Subcommittee on TB Test and Remove Policy, which is included immediately following report.

Committee Business:
At the conclusion of formal presentations, Dr. Connell reported on the four Resolutions from 2007, Numbers 25 through 28. VS-APHIS-USDA responded promptly in writing to all four resolutions.
Four resolutions were approved and forwarded to the Committee on Nominations and Resolutions.
The purpose of these criteria is to provide guidelines to the TB Scientific Advisory Subcommittee for the evaluation of diagnostic tests for the detection of Mycobacterium bovis infected animals. It is incumbent upon the sponsor of the test to define the intended purpose of the test (i.e., as a presumptive, supplemental, and/or primary diagnostic test), the proposed interpretation standards, specific application and intended species. Defining the purpose of the new test is critical in establishing the benchmarks for evaluation. The new test will be evaluated according to guidelines described below for Phase I, II, and III. After the evaluation process has been initiated, the sponsor may not make substantive changes in reagents or methods for conducting the test. If substantial changes in the new test are made, the sponsor must reevaluate the test beginning at Phase I. Variances from these guidelines must be approved by the the United States Animal Health Association Committee on Tuberculosis or its designate.

Test Submission and Approval Process

Results may be submitted for review to the Chair of the TB Scientific Advisory Subcommittee (TB SAS) at any time. The TB SAS will review the data by conference call/email or at the regularly scheduled subcommittee meeting at the annual USAHA annual meeting. The recommendation of TB SAS will be submitted to the Chair of the TB Committee. If needed, the TB SAS will develop and submit a resolution to the TB Committee Chair. The TB Committee Chair will determine whether the recommendation will be immediately released to the TB Committee or held until the annual TB Committee Meeting. At the next TB SAS and TB Committee meeting the results of the TB SAS recommendations will be reported to the TB Committee in its annual report.

PHASE I: Preliminary evaluation for diagnostic sensitivity and specificity

The objective of this Phase is to determine if the proposed test has sufficient diagnostic sensitivity (DSe) and diagnostic specificity (DSP) to be fit for its intended propose.

Diagnostic Sensitivity

The new test must be evaluated on Mycobacterium bovis infected animals by the submitting organization and the results submitted to USDA/APHIS/VS for statistical evaluation of test performance. The new
REPORT OF THE COMMITTEE

test must be evaluated on a sufficient number of animals to reasonable demonstrate that the sensitivity of the new test is fit for its intended purpose. The formula in Appendix A can be used to estimate the number of animals needed to evaluate DSe with a margin of error of 5% (\(e =5\%\)). Estimates of DSe and DSp in the US are listed in Appendix B. In this part of the preliminary evaluation, laboratory work (histopathology and/or bacteriology) necessary to determine \(M. bovis\) infection will be conducted at the NVSL, OIE Veterinary TB Reference Laboratories, National Veterinary Reference Laboratories or a laboratory acceptable to the USDA.

**Diagnostic Specificity**

The new test must also be evaluated from at least 10 herds from accredited-free states (or herds that are accredited-free and those with no history of exposure to \(M. bovis\)) to demonstrate that the test is equivalent to or better than that of the test currently used. The formula in Appendix A can be used to estimate the number of animals needed to evaluate DSp with a margin of error of 2% (\(e =2\%\)). The testing will be done by the submitting organization and the results will be submitted to the USDA for statistical evaluation of test performance. Herds should be representative of the target industry and be diverse in regard to geographic location, breed/species and age.

Results of Phase I trials will be presented to the TB SAS. If the proposed test has sufficient DSe and DSp to fulfill its intended purpose, the test will be recommended for Phase II.

**PHASE II: Side by side blind comparison**

The objective of Phase II is to determine if the proposed test is fit for its intended purpose by directly comparing the current test side-by-side with the proposed test. This phase should provide sufficient data to show, with confidence, that the proposed test will meet program needs.

**Diagnostic Sensitivity**

Both the new test and official test will be evaluated in animals from at a sufficient number of \(M. bovis\)-infected herds to ensure that the new test is fit for its intended purpose. The formula in Appendix A can be used to estimate the number of animals needed to evaluate DSe with a margin of error of 3% (\(e =3\%\)). Both tests will be applied to each animal. Whole herds or randomly selected animals from a herd must yield at least one infected animal, which has been subjected to side-by-side testing. Results of testing with one test will not be available to those responsible for determining the results of the other test. All tested animals will be examined at slaughter for detection of tuberculous lesions. Tissues from different organs and lymph nodes will be examined using histopathologic and bacteriologic procedures. Laboratory work (histopathology and bacteriology) will be conducted at the NVSL, OIE Veterinary TB Reference Laboratories, National Veterinary Reference Laboratories or a laboratory acceptable to the USDA. Results of antemortem testing will
not be available to the laboratory. The submitting organization will be responsible to run the new test. At least 50% of the samples must be of North American origin and the origin of samples must be delineated in data presented to the TB SAS Subcommittee.

**Diagnostic Specificity**

Both the new test and currently used test will be evaluated on animals from at least 10 accredited-free US herds to ensure that the new test is fit for its intended purpose. The formula in Appendix A can be used to estimate the number of animals needed to evaluate DSp with a margin of error of 2% ($e = 2\%$). In this part of the blind comparison, preferably all, or a predetermined random sample, of at least 25% the total animals must be tested side by side. Herds should be representative of the target industry and be diverse in regard to geographic location, breed/species and age.

Results of Phase II trials will be presented to TB SAS. If the proposed test has sufficient DSe and DSp to fulfill its intended purpose, the Committee will recommend that the test be approved for Phase III testing. If the USDA determines that the new test performance in Phase II is equivalent to or better than the current official test, then the new test would be recommended for conditional/temporary approval as an official test for a period of 1 to 5 years, with annual reviews for continuation. The sponsor of the new test must have completed the USDA, Center for Veterinary Biologics requirements for licensure prior to conditional approval.

**PHASE III: Field trial of use of new test**

The primary objective of Phase III is to determine if the proposed test is sufficiently robust to be used under field trials. In addition DSe and DSp will continue to be evaluated.

During a 1 to 5 year trial, the new test will be performed by accredited veterinarians and/or certified laboratories, under natural field conditions. The USDA will assess the performance of the new test on routine samples.

Diagnostic Sensitivity and Specificity will continue to be evaluated by the USDA. Data from side by side comparisons (in Phase II) between the new test and current official test, for the proposed use, can be applied to complete Phase III. If the new test performance evaluates equivalent to or better than the currently used test, it will be referred to the TB Committee for recommendation as an official test.

**Definitions:**

**Criteria for defining infection with *Mycobacterium bovis***

Infected: An animal will be considered infected when *Mycobacterium bovis* has been isolated from one or more tissues AND/OR the animal has mycobacteriosis compatible lesions with the presence of *M. bovis* confirmed by PCR. Culture and histology will be performed following the current protocols at the National Veterinary Services Laboratories.
Exposed: Animals not meeting the criteria for Infected but residing in a herd that has confirmed *M. bovis* infected animals will be defined as exposed and will not be used to determine specificity.

Non-infected: For determining specificity, an animal will be considered non-infected when it comes from an accredited TB-free herd or from a herd with no history of exposure to *M. bovis*.

**Appendix A: Calculation of Sample Size**

Sample size for Phase I and II should be calculated using the method of Griener and Gardner\(^2\) or Jacobson\(^3\) using the formula:

\[
 n = \left( \frac{1.96}{e} \right)^2 \theta (1 - \theta)
\]

Where: \(e\)=margin of error and \(\theta\) = estimate of sensitivity or specificity from pilot or preliminary study. Both terms are calculated using the decimal form.

The following table provides an example:

<table>
<thead>
<tr>
<th>Estimated DSe or DSp</th>
<th>10%</th>
<th>8%</th>
<th>5%</th>
<th>3%</th>
<th>2%</th>
<th>1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>80%</td>
<td>61</td>
<td>96</td>
<td>246</td>
<td>683</td>
<td>1537</td>
<td>6147</td>
</tr>
<tr>
<td>82%</td>
<td>57</td>
<td>89</td>
<td>227</td>
<td>630</td>
<td>1418</td>
<td>5670</td>
</tr>
<tr>
<td>84%</td>
<td>52</td>
<td>81</td>
<td>207</td>
<td>574</td>
<td>1291</td>
<td>5163</td>
</tr>
<tr>
<td>86%</td>
<td>46</td>
<td>72</td>
<td>185</td>
<td>514</td>
<td>1156</td>
<td>4625</td>
</tr>
<tr>
<td>88%</td>
<td>41</td>
<td>63</td>
<td>162</td>
<td>451</td>
<td>1014</td>
<td>4057</td>
</tr>
<tr>
<td>90%</td>
<td>35</td>
<td>54</td>
<td>138</td>
<td>384</td>
<td>864</td>
<td>3457</td>
</tr>
<tr>
<td>92%</td>
<td>28</td>
<td>44</td>
<td>113</td>
<td>314</td>
<td>707</td>
<td>2827</td>
</tr>
<tr>
<td>94%</td>
<td>22</td>
<td>34</td>
<td>87</td>
<td>241</td>
<td>542</td>
<td>2167</td>
</tr>
<tr>
<td>96%</td>
<td>15</td>
<td>23</td>
<td>59</td>
<td>164</td>
<td>369</td>
<td>1475</td>
</tr>
<tr>
<td>98%</td>
<td>8</td>
<td>12</td>
<td>30</td>
<td>84</td>
<td>188</td>
<td>753</td>
</tr>
<tr>
<td>99%</td>
<td>4</td>
<td>6</td>
<td>15</td>
<td>42</td>
<td>95</td>
<td>380</td>
</tr>
</tbody>
</table>
### Types and Validity of Official Tuberculosis Tests

<table>
<thead>
<tr>
<th>Family</th>
<th>Test</th>
<th>DSe</th>
<th>DSp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovidae</td>
<td>CFT</td>
<td>82%</td>
<td>96%</td>
</tr>
<tr>
<td></td>
<td>CCT</td>
<td>74%</td>
<td>96%</td>
</tr>
<tr>
<td></td>
<td>SCT</td>
<td>92%</td>
<td>85%</td>
</tr>
<tr>
<td>Cervidae</td>
<td>SC-DS</td>
<td>80-85%</td>
<td>61-98%</td>
</tr>
<tr>
<td></td>
<td>CCT</td>
<td>95%</td>
<td>95%</td>
</tr>
</tbody>
</table>

CFT= Caudal Fold Test  
CCT= Comparative Cervical  
SCT= Single Cervical  
SC-DS = Single Cervical Double-strength


1. As outlined in Definitions section.  
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON ELEPHANT TUBERCULOSIS

Michele Miller
Disney Animal Programs

This subcommittee was formed in October 2007 by the chair of the USAHA Committee on Tuberculosis, Dr. Kathy Connell, at the request of the American Association of Zoo Veterinarians National Wildlife TB Working Group. In the past, National Tuberculosis Working Group for Zoo and Wildlife Species has been responsible for developing and revising the “Guidelines for Control of Tuberculosis in Elephants”. Specifically, the group requested the USAHA TB committee chair to:

- Designate a group of experts to provide comment and input on the current draft guidelines
- Provide recommendations to the Working Group regarding changes or other advisement prior to finalizing the Guidelines

Request that the Committee or the designated group provide recommendations for the composition and direction of the future working group revising the Elephant Guidelines.

The members of the working group felt that due to the increasing public awareness and regulatory aspects of elephant tuberculosis that it would be more appropriate to address these under the auspices of the USAHA TB committee.

The USAHA Elephant and Wildlife TB Scientific Advisory Subcommittee was formed and met to review and revise the draft guidelines. The subcommittee recommends replacing the 2003 Guidelines with the 2008 version of the “Guidelines for Control of Tuberculosis in Elephants”. A summary of changes between the versions include:

- Addition of serological testing using the Chembio® ElephantTB STAT-PAK assay to trunk wash cultures for annual testing.
- Mandatory MAPIA follow-up testing for all STAT-PAK positive samples.
- Reclassification of elephant management groups using both culture and serological results (groups 1-5).
- Increased monitoring/surveillance of seropositive culture-negative elephants, although these animals would not have any travel restrictions or requirements for treatment (prophylactic treatment is optional).
- Addition of euthanasia option for culture positive elephants.
- Updated necropsy and reference information.

The subcommittee respectfully submits this report along with the “2008 Guidelines for Control of Tuberculosis in Elephants” to the TB Committee for acceptance.
Bovine tuberculosis (bTB) Test and Remove Performance and Policy Recommendation:
A Report from the TB Test & Remove Policy Subcommittee

Introduction
In the eradication efforts for bovine Tuberculosis (bTB) in the US, herd depopulation has been favored. Certainly, within a herd in which infection has been identified, sacrifice of herdmates eliminates the potential of infected, yet undetected animals and therefore, the risk of spread through them to other herds. Yet, as herds become larger, as indemnity dollars become scarcer and as the impact of cattle herds on local economies is evaluated, herd depopulation can be very expensive and viewed as undesirable.

As seen in Michigan, depopulation does not eliminate the risk of new infection of bTB from outside sources. Four of 22 depopulated and subsequently repopulated beef herds were diagnosed with bTB a second time. In addition, depopulation is traumatic for herd owners where through careful breeding and care, a producer has built his or her herd into something better than it was several years before.

Test and removal of infected animals within a herd has been practiced for years in the United States and internationally. Through test and remove, bTB was eliminated in states during the 1940’s and 1950’s. However, since 1985, only 15 herds in the US have undergone Test and Remove, some of which were subsequently depopulated in the El Paso Milkshed buyout.

Current USDA policy (VS Memo 552.38, March, 2008) defining the bTB status for states or zones prescribes the number of affected herds allowed at each status level. Herds in a Test and Remove program are termed “affected herds” throughout their quarantine period which is generally four to four and a half years. Because of this, states are reluctant to offer Test and Remove as an option if it will mean a potential down-grading of their status.

USAHA TB Committee Subcommittee on TB Test & Remove Policy
At the TB Committee meeting during the 2007 annual meeting of the US Animal Health Association (USAHA), a subcommittee on bTB Test & Remove policy was established with the appointment of P. Durst as chair. The subcommittee members are:
- Phil Durst, MS. Michigan State University Extension - Chair
- Dan Grooms, DVM, Ph.D., Michigan State University College of
REPORT OF THE COMMITTEE

Veterinary Medicine

- Mike Chaddock, DVM, EML, Associate Executive Director, Association of American Veterinary Medical Colleges
- Tim Hanosh, DVM, New Mexico Livestock Board, Asst. State Veterinarian
- Sharon Lombardi, Executive Director - Dairy Producers of New Mexico
- Al Squire, DVM, Dairy Producers of New Mexico
- Linda Glaser, DVM, Minnesota Board of Animal Health
- Dan Baca, DVM, USDA-APHIS, Texas
- Anita Edmondson, BVM&S, MPVM, MRCVS, Staff Veterinarian, California Department of Food and Agriculture
- Mitch Palmer, Ph.D., Veterinary Medical Officer USDA ARS
- Victor Cabrera, Ph.D., University of Wisconsin

This paper looks at the evidence of the effectiveness of Test and Remove (T & R) in eliminating bTB and controlling risk of spread and makes a policy change recommendation in regard to the counting of herds in a test and remove program.

**US herds that went through Test & Remove since 1985**

The committee examined records of the 15 herds that went through a T & R protocol since 1985. These herds are listed in Table 1, identified by initials, state, year of diagnosis and approximate number of tested head at the time of diagnosis. In addition, the total number of animals diagnosed with bTB in all testing is shown.

**Table 1. US Dairy Herds that have gone through bTB Test & Remove Protocols since 1985**

<table>
<thead>
<tr>
<th>Farm</th>
<th>State</th>
<th>Year</th>
<th>Cows</th>
<th>Total pos.</th>
<th># Head Initially Dx</th>
<th>Current status</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV</td>
<td>TX</td>
<td>1985</td>
<td>1200</td>
<td>16</td>
<td>2</td>
<td>EPMS BO</td>
</tr>
<tr>
<td>RG</td>
<td>TX</td>
<td>1985</td>
<td>1400</td>
<td>13</td>
<td>2</td>
<td>EPMS BO</td>
</tr>
<tr>
<td>DD</td>
<td>TX</td>
<td>1985</td>
<td>370</td>
<td>4</td>
<td>1</td>
<td>EPMS BO</td>
</tr>
<tr>
<td>ID</td>
<td>TX</td>
<td>1990</td>
<td>3700</td>
<td>9</td>
<td>3</td>
<td>EPMS BO</td>
</tr>
<tr>
<td>ED</td>
<td>TX</td>
<td>1991</td>
<td>280</td>
<td>1</td>
<td>1</td>
<td>EPMS BO</td>
</tr>
<tr>
<td>LD</td>
<td>TX</td>
<td>1992</td>
<td>160</td>
<td>2</td>
<td>2</td>
<td>EPMS BO</td>
</tr>
<tr>
<td>WD</td>
<td>TX</td>
<td>1993</td>
<td>600</td>
<td>4</td>
<td>4</td>
<td>Released</td>
</tr>
<tr>
<td>GD</td>
<td>NM</td>
<td>1994</td>
<td>7300</td>
<td>1</td>
<td>1</td>
<td>Released</td>
</tr>
<tr>
<td>BD</td>
<td>TX</td>
<td>1996</td>
<td>5000</td>
<td>2</td>
<td>1</td>
<td>EPMS BO</td>
</tr>
<tr>
<td>TD</td>
<td>MI</td>
<td>2000</td>
<td>150</td>
<td>1</td>
<td>1</td>
<td>Released</td>
</tr>
<tr>
<td>KD</td>
<td>MI</td>
<td>2000</td>
<td>100</td>
<td>8</td>
<td>1</td>
<td>Quarantine</td>
</tr>
<tr>
<td>MD</td>
<td>NM</td>
<td>2002</td>
<td>1500</td>
<td>2</td>
<td>1</td>
<td>Quarantine</td>
</tr>
<tr>
<td>RD</td>
<td>MI</td>
<td>2002</td>
<td>40</td>
<td>1</td>
<td>1</td>
<td>Released</td>
</tr>
</tbody>
</table>

1 El Paso Milkshed Buyout: 2002 - 2005
Disease prevalence within herds

These herds were low prevalence herds, with apparent prevalence rates upon initial diagnosis of less than 1 percent in herds greater than 200 head (10), and in herds less than 200 head, four of the five herds had only one animal diagnosed positive initially, the other had two positive animals. Other herds that were diagnosed with bTB during this same period and subsequently depopulated were in some cases high prevalence herds, however, in other cases were similarly low prevalence herds.

Issue of within herd transmission

In 8 of the 15 herds, all bTB positive animals ever identified in the herd were diagnosed in the initial diagnostic test. That is, in just over half the T & R herds, subsequent testing did not reveal any evidence of within herd transmission or latent, undisclosed positive animals. All of these herds were test negative in up to 18 whole herd tests over periods from 5 to 14 years thereafter (Table 2). Some of these herds are intact and continue to be tested annually.

In 7 of the 15 herds, bTB positive animals were subsequently diagnosed upon continued testing as part of the T & R program. Of those, six herds had animals detected within a 4 year period of the initial diagnosis. This is within the current quarantine period. Therefore, if all these herds had been under a herd plan that called for a minimum four year quarantine, almost all would be been detected prior to release of quarantine.

It is true that in the late 1980’s that several herds (RG, DV, ID, BD, DD) in the T & R program had cattle diagnosed positive after they were released from quarantine. However, quarantine at that time, following 1980’s UM&R rules, was as short as 12 months.

It is also true that a few of those herds (RG, DV, ID) had repeated diagnoses of positive cattle (cows and heifers) of the same DNA strain as the original infection over a period of up to 12 years. However, the total prevalence rate was still very low (less than 2%) in these herds and following the last positive animal detected, went years and many negative WHTs without additional positive animals found. These herds were destroyed in the El Paso Milkshed Buyout.

Impact of time

Within a dairy herd, the herd life of animals follows a routine. According to calculations by Ferris, 2008 (unpublished) using DHI data, 80% of a dairy herd’s animals have left a herd four years after a point in time. Ninety-five percent have left the herd by 6 years. This is the general case in non-infected herds.

The Test & Remove protocol which removes CFT responders on the first two tests after diagnosis, increases the rate of herd turnover by removing animals that may indicate exposure to the bacteria. For example,
in the DD herd of Michigan, 49 additional cattle were slaughtered after the first two screening tests following diagnosis. Those cattle represented over 17% of the herd. So both the natural management of dairy cattle and the T & R protocol, tend to eliminate cattle that were in the herd at the time of exposure, within several years of diagnosis. Therefore, confidence in the ability to eliminate bTB in the herd increases with time.

Effectiveness of Test & Remove

The data show that in the 15 herds that went through a T & R protocol, that 6 have been released from quarantine and are still clear of bTB. Three of those have gone over 6 years since the last diagnosed animal. Two herds remain under quarantine, and 7 were destroyed in the EPMS BO. Before those herds were destroyed, four of those Texas dairies had gone over 6 years without further diagnosed animals. Table 2 shows the time (years) and number of whole herd tests that were negative since the last positive animal in these herds.

While it cannot be said with 100% confidence that any of these herds were or are completely free of bTB, the confidence in their freedom is high and increases with time.

Table 2. US Dairy Herds that have gone through bTB Test & Remove Protocols since 1985

<table>
<thead>
<tr>
<th>Farm</th>
<th>State</th>
<th># Years since last diagnosed animal</th>
<th># Negative WHT since last diagnosed animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>DV</td>
<td>TX</td>
<td>6.5</td>
<td>18</td>
</tr>
<tr>
<td>RG</td>
<td>TX</td>
<td>3.8</td>
<td>11</td>
</tr>
<tr>
<td>DD</td>
<td>TX</td>
<td>9.0</td>
<td>11</td>
</tr>
<tr>
<td>ID</td>
<td>TX</td>
<td>3.0</td>
<td>5</td>
</tr>
<tr>
<td>ED</td>
<td>TX</td>
<td>9.5</td>
<td>13</td>
</tr>
<tr>
<td>LD</td>
<td>TX</td>
<td>8.8</td>
<td>10</td>
</tr>
<tr>
<td>WD</td>
<td>TX</td>
<td>11.0</td>
<td>11</td>
</tr>
<tr>
<td>GD</td>
<td>NM</td>
<td>14.0</td>
<td>11</td>
</tr>
<tr>
<td>BD</td>
<td>TX</td>
<td>1.2</td>
<td>5</td>
</tr>
<tr>
<td>TD</td>
<td>MI</td>
<td>8.0</td>
<td>13</td>
</tr>
<tr>
<td>KD</td>
<td>MI</td>
<td>4.0</td>
<td>6</td>
</tr>
<tr>
<td>MD</td>
<td>NM</td>
<td>3.5</td>
<td>5</td>
</tr>
<tr>
<td>RD</td>
<td>MI</td>
<td>6.0</td>
<td>8</td>
</tr>
</tbody>
</table>

Changes in T & R Protocol

The science of diagnosis of disease continues to advance and changes have been made in T & R protocols which improve the ability to detect infected animals. We expect those changes to continue. For example, gamma interferon blood levels have been used in Michigan T & R herds in parallel with the caudal fold test (CFT) as an additional screening test in the first two tests after diagnosis. In this protocol, any animal that responds to either the CFT or is identified as a suspect by gamma interferon were taken for slaughter. Improvements in the ability to detect infected animals increases the confidence that bTB can be eliminated from a herd.
TUBERCULOSIS

Risk of Spread of bTB from Test & Removal herds

The January, 2005 UM&R prescribes a T & R program that keeps the herd quarantined for at least 4 years after initial diagnosis. When any subsequent animal is diagnosed, the clock resets on the quarantine period and the testing protocol. Herd plans prescribe rules for additions to herds as well as the removal of animals and products from the farm. A good herd plan should limit risks to other herds specific to the herd operation. It has not been shown that any other herd has been infected by bTB from these herds in T & R protocol whether during or off quarantine.

Relative Cost of Depopulation vs. Test & Removal

Using figures from the New Mexico Livestock Board for the MD herd, both USDA and state of New Mexico testing and indemnity costs of a herd in a Test & Remove protocol can be compared to the indemnity costs if the herd had been depopulated instead. This herd, of approximately 1500 head, was initially diagnosed bTB positive in 2002. There was one positive animal diagnosed at that time. Subsequently, in 2005, another animal was diagnosed as positive. This herd is still under quarantine so costs do continue.

Depopulation costs, based on an initial offer made to the owner, would have totaled about $3.75 M (Table 3). That is simply the indemnity costs and does not include the personnel who would have to be involved, trucking or disposal. The total costs of T & R, over the period 2002-2008, including personnel, testing and indemnity has been just over $0.5 M. It is obvious that depopulation of this herd would have cost over seven times that spent in six years on Test & Remove.

Note also that this herd is not an ideal case in that, because a second animal was diagnosed positive later, the protocol began again and indemnity costs increased over $100,000 as CFT responders were taken for two tests. In addition, the quarantine clock reset resulting in continued testing costs beyond 4.5 years had there been no subsequent infections identified.
REPORT OF THE COMMITTEE

Table 3. Costs of testing and indemnity for Test & Removal and indemnity estimate for depopulation

<table>
<thead>
<tr>
<th>Test &amp; Remove</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing (CFT, gamma interferon and CC)(^1)</td>
<td>$191,310</td>
</tr>
<tr>
<td>Indemnity 2002-2006 (actual)</td>
<td>$306,608</td>
</tr>
<tr>
<td>Indemnity 2007-8 (estimated)(^2)</td>
<td>$15,000</td>
</tr>
<tr>
<td>Total Test &amp; Remove:</td>
<td>$512,918</td>
</tr>
<tr>
<td>Depopulation</td>
<td></td>
</tr>
<tr>
<td>Indemnity (1500 head @ $2500 ea.)(^3)</td>
<td>$3,750,000</td>
</tr>
</tbody>
</table>

\(^1\) Testing costs include laboratory fees and per diem personnel costs for testing and reading. Fuel costs are also included.

\(^2\) Three animals were indemnified in 2008, it is estimated that 2-3 animals were indemnified in 2007.

\(^3\) Depopulation costs here do not include personnel per diem or any other costs other than indemnity.

Also note that this herd of 1500 head, though large by some standards, is not the largest herd found infected with bTB. The costs of indemnifying a large herd may be prohibitive.

Loss of income

Communities and states depend on income generated by businesses not only for tax income on profits, but also the turnover of dollars in communities as purchased inputs and services and employee wages and taxes. Again, using this same dairy (MD), we can estimate the loss of income in one year if this herd had been depopulated. Assuming 1500 cows, producing 220 hundredweights (cwt.) of milk annually, valued at $16 per cwt. There would have been a loss of $5.28 M in milk income alone, not to mention the value of calves and cull animals. Even small herds have a major impact on the economy of their communities in rural areas. The Pennsylvania Center for Dairy Excellence calculated the multiplier effect of dairy income to be $2.50 in wages and related business for every $1 a dairy farm spends.

Strengthening Test & Remove

Test and Remove may be economically better for governments as well as economically better for the community, but there may still be questions about whether it is safe enough for the cattle industry within a state and for neighboring states and trading partners. In addition, one must ask whether it is safe for people and for wildlife.

We believe that the answer is in developing a strong herd plan in conjunction with the producer and then monitoring the compliance with the plan throughout the entire quarantine. A proposed herd plan outline accompanies this document. Note that the herd plan must be practical and feasible in order to be credible with the producer and likely to be followed.
The herd plan should address steps to reduce the chances for transmission on the farm to other cattle and people who work there or that come there, and off the farm to other farms and to wildlife. In addition, the herd plan should address steps that would reduce greatly the potential for reintroduction of bTB from off the farm via cattle purchases, fenceline cattle contact, wildlife or humans.

The latter prudent steps are ones that any farm should take in an area where bTB has been identified. Test and Remove herds are no more likely than their non-infected neighbor to become infected with bTB again through reintroduction.

The actions required to reduce risk will depend on the nature of the risk to the herd. A thorough epidemiological investigation should be conducted to determine the risks. However, every herd that is diagnosed with bTB suffered a breakdown of biosecurity that allowed the cattle to be exposed to the bacteria. Therefore, every herd in a T & R program needs to evaluate and strengthen their biosecurity practices.

Impact of Current Rules

VS Memo 552.38 (March, 2008) spells out the maximum allowable number affected herds within MAA states/zones with fewer than 30,000 herds and in MA states/zones with fewer than 10,000 herds. According to NASS figures, 42 states including California, New Mexico, Minnesota and Michigan, have less than 30,000 herds, so rather than being the exception, this is the majority case and currently impacts all states with bTB.

For MAA status, a maximum of three affected herd-years are allowed. Affected herds that are not depopulated (T & R herds) are counted each month as 1/12 of an affected herd-year. Each year, therefore, for a minimum of four years they count the same even though confidence increases with time that these herds are bTB-free. Any additional herds diagnosed during that time add to the count.

In addition, the 2005 UM&R - V, D, 2, b, (1) states that to return to TB-free status, a MAA state/zone must be TB-free for 2 years after the last herd is released from quarantine. In the case of T & R, this would add two years on to a four year quarantine, in effect, six years after the last case of bTB diagnosed. Again, this presents states with a significant disincentive to offering T & R.

Proposed Changes

We propose that changes be made to the USDA rules in how T & R herds affect the calculation of number of bTB affected herds with respect to determining state/zone status.

In order to assure that T & R is safe for the industry and the nation, we propose that the changes be applied only to herds that meet the requirements as “Approved” T & R herds. Those requirements include four criteria:

a) A maximum prevalence rate of 1.5% in herds greater than 200
REPORT OF THE COMMITTEE

head or up to 3 infected cattle in herds less than 200 head.

b) A herd plan approved by the state veterinarian and AVIC with concurrence of the APHIS Administrator.

c) A completed or progressing epidemiological investigation of bTB in the herd.

d) A review of the approval status annually or upon subsequent diagnosis of infected animals in the herd.

This is not to say that herds which do not meet all these criteria cannot undergo a T & R protocol, but that the benefits to the state as a result of the proposed changes would be limited to “Approved” T & R herds. Specifically, we propose that USAHA urge the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to adopt changes to VS Memo 552.38 in the counting of affected herd years for “Approved” T & R herds by reducing the value to 75% of an affected herd after 12 months, 50% after 24 months, and 25% after 36 months when no additional infected animals are found.

The benefit we propose is a less punitive count of herd years during the quarantine period. It would not change the quarantine period, nor the testing program, only the count. Our proposal compared to the current rules is illustrated in Table 4. Affected herd years are calculated as the number of months within the program year that a herd is affected times 1/12 and that is multiplied by a factor which in the current rules is implied as 1.0. This proposal would change the factor.

Table 4. Affected herd years factor:

<table>
<thead>
<tr>
<th>Time after diagnosis of most recent infected animal</th>
<th>Factor for herd-years for “Approved” T &amp; R herds</th>
<th>Current rules VS Memo 552.38</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 months</td>
<td>1.00</td>
<td>1.0</td>
</tr>
<tr>
<td>12 months</td>
<td>0.75</td>
<td>1.0</td>
</tr>
<tr>
<td>24 months</td>
<td>0.50</td>
<td>1.0</td>
</tr>
<tr>
<td>36 months</td>
<td>0.25</td>
<td>1.0</td>
</tr>
</tbody>
</table>

In addition, we propose that the UM&R rule be changed so that the last two years (24 months) of quarantine for T & R herds be counted for the requirement to apply for advancement to the next higher bTB status. Adoption of this proposal would enable states to have greater flexibility in providing the opportunity for herds to become approved T & R herds with less threat to state or zone status. Yet, we do not believe that this policy proposal would increase the risk to other herds or states, nor would it deter the US from reaching its goal of being bTB free.
As Chair of USAHA's Committee on TB, Dr. Kathleen M. Connell attended the meeting of the US-Mexico Binational Tuberculosis and Brucellosis Committee (BNC) in Chihuahua, Mexico, June 23-24, 2008. Meetings began on June 23, 2008, with a pre-planning meeting held with Veterinary Services Animal and Plant Health Inspection Services United States Department of Agriculture (VS-APHIS-USDA). Agendas were reviewed for the Tick, Brucellosis and TB meetings.

The BNC meeting was held on June 24, 2008. Due to the absence of Dr. Billy Johnson, BNC Coordinator, the meeting was presided over by Mr. Jay Whitten.

Through the efforts of the BNC, the US continues to assist Mexico with its TB eradication and control efforts to ensure equivalency and transparency in the Mexican program. Export documents have been simplified, but adequate tracing can still be assured. Mexican states are not required to brand using their own state brand, but national branding with the "M" brand will continue to indicate Mexican origin cattle. Cattle without adequate "M" or "MX" brands will be rejected at US entry ports when presented for importation into the US.

A review of Mexico's national TB program will take place in February 2009. The same team will conduct the review in order to compare changes and advances from the national program review the team conducted three years ago.

Dr. Francisco "Paco" Collazo-Mattei, VS-APHIS-USDA, provided a presentation on pending action items. Many were further discussed in federal meetings held between USDA and Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA).

Dr. Rick Willer, Arizona State Veterinarian and BNC Treasurer, was unable to attend. Dr. Dave Fly, New Mexico State Veterinarian, provided the treasurer's report on his behalf and the report was approved.

Dr. Bob Hillman, Texas State Veterinarian and Executive Director of the Texas Animal Health Division, provided reports for Texas and California.

Dr. Hillman reported that California is Brucellosis-Free. The state had three TB-infected herds and lost its TB-Free status. The index herd was detected through slaughter surveillance. The herd is under quarantine and has been tested.

The second herd was initially tested as a trace-in herd. A singleton
REPORT OF THE COMMITTEE

A responder was found, but the DNA fingerprint did not match that of the index herd, so it this second herd was not the source of infection.

The third California herd was tested as a trace-out herd. Initial tuberculin testing was negative, but this herd is considered exposed. Once animal from this herd was found to have TB lesions at slaughter and they were histopathologically compatible with *M. bovis*.

Texas regained its TB-Free status as of September 2006. This required a vast amount of work by the Texas cattle industry, the Texas Animal Health Commission and USDA. Texas has Brucellosis Class A status, but in the fall of 2007 applied to change its status to Class Free.

Texas is conducting traces on animals it received from New Mexico, California, Colorado and Oklahoma. The majority of these are dairy traces. The focus of infection has been identified in a feedlot.

The feedlot case involves 17 rodeo cattle in two pens of a feedlot with about 400 head of cattle. All 17 rodeo cattle were TB lesioned animals and the entire feedlot has been declared exposed, is under a hold order and will go to slaughter. They were a put together lot of “used” rodeo cattle, mostly from Kansas and Oklahoma. They had no “M” brand or inadequate “M” brands. Only one or two of these animals had a Mexican ear tag. This investigation involves Texas, as well as Oklahoma, Kansas and some other states.

Texas has serious concerns about retaining its TB status and Dr. Hillman strongly expressed that Mexico must stop shipping TB-exposed cattle to Texas. Continued and steady progress must be made in Mexico’s TB Program to reduce the TB cases coming into the US.

Dr. Dave Fly, New Mexico State Veterinarian, provided reports for New Mexico and Arizona. He reported that New Mexico has been Brucellosis-free since 1996. The state earned split status for TB in July 2005, with the majority of the state considered Free. The entire state will be downgraded to Modified Accredited Advanced due to recent TB cases. The state is also conducting traces from Oklahoma. Dr. Fly continued by reporting that Arizona has been Brucellosis-free since 1988 and TB-free since 1978.

US border states continue to receive imported Mexican cattle that are later determined to be TB infected. There is a need for progress in Mexico’s non-status states or zones. The US Border State Veterinarians support the need to restrict cattle from Mexico’s Accreditation Preparatory states or zones for movement to quarantined feedlots only.

US Border State Veterinarians are very concerned about the risk posed by Mexican-origin rodeo or roping cattle and will implement their own state restrictions requiring a herd of origin test in Mexico and an annual TB test in the US. Finally, they would like to see the US and Mexico work on development and implementation of electronic export documents.
Dr. Kathy Orloski, Epidemiologist for the US National TB Eradication Program, gave her report on the US surveillance program. Her presentation included statistics and information on granuloma lesion submissions, bovine TB cases detected at slaughter and tuberculin skin testing.

She provided data listing the number of TB-affected herds in the US from 2000 to 2008 and gave a breakdown of those herds by state. She discussed in detail the granuloma submissions from 2000 to 2007 and submission rates for slaughtered adult cattle.

Dr. Orloski continued her presentation by detailing the TB found in cattle at slaughter from 2001 to 2007. She gave more details on granuloma submissions that were histologically compatible for *M. bovis* from October 1, 2007, to May 31, 2008, and detailed the confirmed TB cases for that same period. There were 28 cases of *M. bovis*-positive cattle detected at slaughter during this period—27 cases in fed cattle and one case in an adult animal.

She provided a map of Mexico, highlighting the origin of the five TB cases found in the US with Mexican eartags. She showed a chart listing the number of TB cases per 100,000 Mexican cattle exported from 1995 to 2007. She concluded her presentation with information on the number of caudal fold tuberculin (CFT) tests conducted in the US from October 1, 2006, to September 30, 2007.

Dr. Orloski was asked what action is taken if US states have a CFT test response rate less than 1%. She replied that each state submits an annual report, documenting its surveillance. Each state is responsible for monitoring its testing veterinarians’ response rates.

She was asked about the documents on the second Chihuahua case. She replied that the documents on that case are being prepared and will be provided to Mexico.

Dr. Bill Hench, Senior Staff Veterinarian for the US National TB Eradication Program, gave his report on the US program. His presentation included statistics and information on the National TB Program staff and corresponding activities, current state statuses, TB-affected cattle herds in 2008 and an update on US regulations.

Seven members make up the US’s National TB Program staff:
- Dr. Lee Ann Thomas, Ruminant Health Program Director
- Dr. Francisco "Paco" Collazo-Mattei, Ruminant Health Program Assistant Director
- Dr. Michael Carter, Acting Program Manager
- Dr. Kathy Orloski, Staff Epidemiologist
- Dr. Bill Hench, Senior Staff Veterinarian
- Dr. Alejandro Perera, Veterinary Services/International Services Staff Veterinarian
- Dr. Debra Cox, FSIS Liaison

The US National TB Program is assisted by two regional
REPORT OF THE COMMITTEE

epidemiologists, Dr. Mark Camacho, Eastern Region, and Dr. Bob Meyer, Western Region. In addition to routine workload, staff activities have included conducting the Designated TB Epidemiologist course in July 2008 and a TB retreat held in April 2008. The staff is also evaluating various serological tests from several manufacturers.

Dr Hench gave details on the history of the TB eradication and control efforts in the US and illustrated that portion of his presentation with a US map showing current TB status for the states and territories. He focused separately on the Eastern and Western Regions and delineated the TB-affected cattle herds in 2008.

He concluded his presentation by giving an update on pertinent US regulations. Those rules being revised include the bovine TB rule, the captive cervid TB rule, the indemnity rule and the roping steer rule.

Mexican reports followed. Northern Sonora has Brucellosis Class A status, which is similar to the TB status of Modified Accredited Advanced.

Dr. Collazo-Mattei reviewed the pending action items to be completed for recognition of Northern Sonora’s Brucellosis status.

Dr. José Alfredo Gutiérrez Reyes, SAGARPA/Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria (SENASICA), responded with an update. The next steps are to address and clarify any remaining questions, receive SAGARPA’s update on progress with the Norma Oficial de Mexico (NOM) revision, proficiency testing for those laboratory personnel conducting Brucellosis testing, schedule another site review for Northern Sonora and then amend the US Code of Federal Regulations regarding Sonora’s status.

Dr. Salvador Solis, SAGARPA, gave a presentation on Mexico’s National TB Strategic Plan 2008-2012. The country does not have enough funding available to conduct a test-and-remove program to eliminate TB-positive cattle. Quarantines are imposed on zones of the country where it is not feasible to reach 0.5% prevalence and on dairy zones and a TB elimination program is followed for these zones. Four negative herd tests are necessary before the quarantines will be lifted. Animal health officials are looking for ways to create a fund to pay for depopulation of TB-infected production units.

Reports followed on Mexican border states. These states include Baja California (Zones A and B), Sonora (Zones A and A2), Chihuahua (Zones A and B), Coahuila (Zones A and B), Nuevo Leon (Zones A and B) and Tamaulipas (Zone A). These states export 70% to 80% of the cattle from Mexico to the US.

Mexico’s Modified Accredited states/zones include Nayarit (Zones A and B), Puebla (Zones A1, A2 and B), Quintana Roo, Veracruz, Zacatecas-Jalisco, Sinaloa and Yucatan. Some of these states do not have B Zones.

Mexico’s Accreditation Preparatory states/zones include Colima,
Chiapas, Michoacan, Durango, Guerrero and Tabasco. Colima and Durango exported cattle to the US.

Mexican and US industry representatives presented their concerns and requests. Chihuahua provided an informative presentation on its centralized database system, TBControl.

A question was asked on the difference between the green and the blue ear tag used on Mexican cattle. The green tag signifies the premises of origin. The blue tag is used for export. All identifying ear tags should be left on the animal for exportation.

Mr. Andy Groseta, President of the National Cattlemen’s Beef Association (NCBA), addressed the group. He said that NCBA supports Chihuahua’s electronic database. He mentioned that Sonora is also considering an electronic system similar to Chihuahua’s and he would like to see a response to Sonora’s proposal of electronic certificates and signatures. He also talked about the US’s Country of Origin Labeling (COOL) and its impact on exportation of Mexican cattle.

Dr. Fly and Dr. Roberto Valdez discussed restructuring of the BNC. Membership would increase to include representatives from US feeders and a Mexican cattleman exporter. No decisions have been made on the number and positions of those who vote on issues or on who should be eligible to participate in discussions during the meetings.

The number of meetings has decreased from three annually to two—one meeting held in conjunction with NCBA’s annual meeting and one held during the Mexican cattlemen’s annual meeting. The BNC will no longer hold a meeting during the USAHA annual meeting. For the two meetings, all materials will be provided in English and Spanish. The first day of meetings will consist of presentations and reports. The second day will involve discussions.

The BNC’s next meeting will be held the last week in January 2009, in Phoenix, Arizona, in conjunction with the NCBA annual meeting. Dr. Johnson, BNC Coordinator, will coordinate with NCBA to choose the specific dates.
Bovine tuberculosis (TB), a zoonotic disease with a major economic impact, continues to be a significant problem with a global perspective. The BOVIGAM® interferon gamma (IFN-γ) assay constitutes a laboratory-based tuberculosis test and is widely used complementary to the tuberculin skin test. The assay consists of a first step culturing whole blood with antigens and stimulating leucocytes to produce IFN-γ which is quantified by ELISA in a second step. The first step measures the cell-mediated immune response (CMI) and critically depends on the sample quality, stimulation reagents and culture conditions.

The CMI is known to be impacted negatively by stress. We have stimulated fresh blood from animals with or without stress with mitogens resulting in significantly lower IFN-y production in stressed animals and therefore potentially leading to false negative results. These results furthermore emphasize the utility of a positive control for stimulation.

Tuberculosis-specific stimulation is currently done with tuberculins. We have analyzed tuberculins from different sources to define an optimized and standardized tuberculin concentration for the use with the BOVIGAM® interferon gamma (IFN-y) assay. The results show that sensitivity and specificity of PPDs from each supplier can be optimized by titrating PPD B vs. PPD A activity in the BOVIGAM® interferon gamma (IFN-y) assay for positive and negative animals, respectively. The use of alternative antigens, e.g. a cocktail of recombinant antigens for stimulation resulted in improved diagnostic sensitivity and specificity.

These recent developments in measuring the CMI therefore represent excellent tools for control and eradication of bovine tuberculosis.
The cooperative State–Federal–Industry effort to eradicate bovine TB from the United States has made significant progress toward eradication, markedly decreasing the prevalence of the disease. However, the goal of eradication has been elusive despite renewed efforts. Remaining challenges — primarily infected wildlife and infected cattle from Mexico—hinder eradication.

In fiscal year 2008, a total of eleven affected cattle herds were identified. These eleven herds were all located in areas where affected herds have been found in the past. In contrast, seven affected herds were discovered in FY 2007. Slaughter surveillance for tuberculosis (TB) continued to exceed our national goals in FY 2008, and three of the newly affected herds were detected as a result of this surveillance and epidemiologic investigations. This demonstrates the integral role of slaughter surveillance in our eradication program. Nevertheless, TB response plans remain critical in areas where the disease has recently been detected.

In April 2008, as a result of the discovery of four affected herds in a four month period, the State of Minnesota was reclassified to MA status. In September 2008, the State of New Mexico was reclassified as MAA as a result of identifying two newly affected herds in the AF zone during the preceding sixteen months. California was also reclassified as MAA in September 2008 following the discovery of three affected dairy herds in a four month period.

At the end of FY 2008, forty-eight States, Territories and one zone were TB Accredited-Free (AF), including Puerto Rico and the U.S. Virgin Islands. Two States (CA and NM) were modified accredited advanced, one State (MN) was modified accredited and one State (MI) had split State status. Of these, twenty states and the U.S. Virgin Islands have maintained AF status for over twenty-five years; twenty states have been AF for fifteen or more years; five states have been AF for ten or more years; two states and Puerto Rico that have been AF for five or more years; and one state and one zone have had AF status for less than five years.

Three affected herds detected prior to FY 2005 remain under quarantine and test and removal herd plans. The first of these herds is a dairy herd in New Mexico which declined to depopulate. Two dairies in Michigan also remain under quarantine and test and removal herd plans. One of these quarantined dairies in Michigan is a reinfected herd. All three herds continue to undergo regular herd testing as part of their herd testing program.
REPORT OF THE COMMITTEE

plans. Michigan herd plans also include requirements for mitigating the risk of infection from wildlife.

During FY 2008 herd depopulations were accomplished at a cost of $31,174,028, including $30,020,355 in the Western Region and $1,153,673 in the Eastern Region. Indemnity costs for caudal fold tuberculin test positive animals in affected herds, comparative cervical tuberculin test- or gamma interferon-positive and suspect animals in non affected herds and for certain other situations were $1,675,078 for the Western Region and $362,713 for the Eastern Region. Total indemnity costs for all purposes were $33,211,819.

Veterinary Services continues to work with Mexico on ensuring there is equivalency between the two countries' requirements. To accomplish this, reviews of Mexican State TB programs have been conducted under the umbrella of the U.S. & Mexico Binational Committee. Six review trips were completed in FY2008. The review teams examined TB program integrity, progress and the level of prevalence. There were two reviewers working under contract, seven that were VS or IS employees, and eight that were employed by State or industry agencies in Arizona, California, Missouri, and Texas. The contributions of those States and industry groups are recognized and appreciated.

VS has been proposing a number of substantive changes to the Code of Federal Regulations (CFR) to enhance bovine tuberculosis eradication efforts. Changes to the bovine, cervid, “international”, “roping steer”, and the indemnity regulations were in various stages of revision and review. These rules are under review pending the TB listening sessions and the need to develop new approaches for TB control and eradication in the future. VS expects that major revisions to the CFR will proceed based on input from stakeholders.

Updates on States with Recent Infection

California update: Three affected dairy herds were identified in California during FY 2008. The first herd was identified as a result of a routine slaughter trace from an FSIS inspected slaughter establishment. Further epidemiological investigations found two more affected herds. DNA typing of the bovine TB strains recovered from the three herds shows that they are not the same strain associated with the 2003 outbreak. As a result of finding the second affected dairy herd, California’s status was reclassified as MAA in an interim rule published in the Federal Register on September 18, 2008.

A TB Task Force was initiated by Veterinary Services (VS) to assist the California Department of Food and Agriculture in responding to the outbreak of bovine TB detected in three large dairy herds. The Task Force has assisted with epidemiological case development and on-farm herd testing; within California, a total of 178 herds with 233,161 cattle have been tested. Approximately 160 additional herds with an estimated 300,000 head of cattle are scheduled for testing over the next several months. At
least 14 other states and Canada have received TB exposed cattle from this outbreak. The Task Force is expected to continue into early 2009. Two of the three herds involved have been depopulated with federal indemnity. Disposition of the third herd is currently pending.

**Michigan update:** In Michigan, three beef herds were detected in FY 2008. All three herds are located in northern Lower Michigan in the bovine MAZ and were detected through annual surveillance testing. All herds have been depopulated with federal indemnity.

**Minnesota update:** Four beef herds were identified as affected in Minnesota between October 2007 and February 2008. These herds were identified as a result of continued surveillance and epidemiologic investigations. The source of this outbreak has not yet been determined and epidemiologic investigations are continuing. In addition to these new beef herds discovered in FY 2008, surveillance of free ranging white-tailed deer is on going through hunter-harvested and targeted culling sample collection. All affected herds in Minnesota identified to date have been depopulated with federal indemnity.

As a result of finding these additional herds, Minnesota was reclassified as MA status in an Interim Rule published in the Federal Register on April 9, 2008. The State of Minnesota and USDA are currently collaborating to implement the agreements and enact the regulations to recognize split state status for Minnesota. Minnesota is seeking to implement two zones for TB status purposes.

**New Mexico update:** In FY 2007, a multi-premises dairy operation was determined to be affected. This dairy operation encompassed two premises in New Mexico’s AF zone and totaled approximately 12,000 head of cattle. A “Task Force” was initiated to assist New Mexico with the eradication efforts associated with this herd and was successfully concluded in the first quarter of FY 2008. During second quarter FY 2008 a mixed purpose cattle herd was identified as affected in New Mexico’s AF zone. As a result of finding two affected herds in New Mexico’s AF zone within a forty-eight month time period, the state of New Mexico was reclassified to MAA status in an interim rule published in the Federal Register on September 11, 2008.

The State of New Mexico and USDA are currently collaborating to implement the agreements and enact the regulations to recognize split state status for New Mexico. New Mexico is seeking to implement two zones for TB status purposes.
Update on the US National Surveillance Program for Bovine Tuberculosis
Fiscal Year 2008

Dr. Kathy Orloski
Veterinary Services-Animal and Plant Health Inspection Services
United State Department of Agriculture

Surveillance for bovine tuberculosis (TB) in the US consists of slaughter surveillance in cattle and live animal testing in cattle and captive cervids. A total of 11 affected cattle herds were detected during federal fiscal year 2008 (FY 2008), including 7 beef herds, 3 dairies and 1 mixed use cattle herd. During FY 2000 – 2008, a total of 72 affected cattle and 2 captive cervid herds were detected. Of these, 64.9 percent were beef herds, 29.7 percent were dairies and 5.4 percent were mixed used cattle and captive cervid herds.

A total of 10,666 granulomas were submitted from 170 US slaughter establishments that slaughtered 33.6 million cattle, including 6.6 million adult cattle. The number of granuloma submissions has increased each year since FY 2000 when 436 granuloma lesions were submitted. When considering only the cattle slaughtered in the 40 largest capacity adult slaughter establishments, 15.9 granulomas were submitted per 10,000 adult cattle slaughtered, exceeding the submission standard of 5 granulomas per 10,000 adult cattle slaughtered for FY 2008. Of these 40 slaughter establishments, 33 (82.5 percent) met the submission standard of 5 granulomas per 10,000 adult cattle killed and 7 establishments did not. This represents a decrease in the number of establishments meeting the submission standard from FY 2007, when 37 establishments met the target submission rate.

A critical component of the granuloma submission program is diagnostic laboratory support. Three diagnostic laboratories provide outstanding support for the national bovine TB surveillance effort. A total of 7,561 (70.9 percent) samples resembling granulomas were evaluated by National Veterinary Services Laboratories (NVSL), 2,261 (21.2 percent) by the Food Safety Inspection Service (FSIS) Pathology Laboratory in Athens, Georgia, and 843 (7.9 percent) by the California State Diagnostic Laboratory located in Tulare, California.

Slaughter surveillance continues to detect TB in both adult and fed cattle. Thirty-four TB cases were found in cattle in US slaughter plants during FY 2008, compared with 24 cases in FY 2007. No cases of TB were detected in bison or captive cervids slaughtered under state or federal inspection during FY 2004 through FY 2008.

Of the 34 TB cases in FY 2008, one case occurred in an adult dairy cow. This case resulted in the identification of one affected dairy herd in California and the subsequent epidemiologic investigation identified two additional affected dairies. Two of these herds have been depopulated.
with federal indemnity. The decision to depopulate the third dairy is currently under discussion.

The remaining 33 cases were detected in fed steers or heifers considered to be beef-type cattle. These cattle had been fed in Texas (29 cases, 87.9 percent), Washington (2 cases), Nebraska and Kansas (1 case each). The Washington cases occurred in Canadian origin feeder heifers that had been moved directly to a feedlot from the port of entry and were maintained there until slaughter; the State of Washington restricts all cattle in this feedlot to slaughter only. No domestic cattle in the feedlot were exposed. Canadian RFID tags and feedlot tags were collected for each animal and the case was closed by USDA in 2 weeks. The feedlot records were sufficient to trace movements of individual animals and indicated that the two animals were never in contact with each other while in the feedlot. The genotyping results for the isolates from these 2 cases indicate the strain is identical between the 2 animals and is the same strain as a recent Canadian TB case.

Nine fed cattle cases were of Mexican origin. The state of origin for 8 cases with Mexican official eartags include Chihuahua, 4 cases; Coahuila, 2 cases, Tamaulipas, 2 cases. For 1 case from a Kansas feedlot, the Mexican state of origin is under investigation. An outbreak consisting of 19 affected cattle occurred in a Texas feedlot; genotyping results revealed the strain was identical in all animals suggesting disease spread after the animals arrived in the feedlot. These 19 animals were in 2 lots within the feedlot and consisted of retired rodeo and roping cattle that had been assembled from market sales in Kansas and Oklahoma. One case had an official Mexican eartag indicating origin in Chihuahua.

Of the remaining 4 cases in fed cattle, investigations are ongoing. One case occurred in a retired roping steer (unrelated to the Texas feedlot outbreak) that had been in either Utah or New Mexico prior to slaughter. This case had no identification and further tracing may not be possible. One case occurred in a domestic steer and was traced back to an affected herd in Minnesota. No epidemiologic information is available yet for the remaining 2 cases, one of which did not have eartags at the time of slaughter.

Information recently collected on feeder and rodeo/roping cattle from Mexico support the contention that rodeo/roping cattle are present in the United States for substantially longer periods of time than feeder cattle. Mexican origin feeder cattle are in the United States a median of 9.6 months (range 4.5 to 16.6 months, n=26) whereas rodeo/roping cattle are in the United States a median of 24.3 months (range 7.8 to 49.0 months, n=21). The occurrence of TB in roping/rodeo cattle presents a higher risk to domestic cattle, given their frequent movement and longevity, and their identification is often removed, interfering with epidemiologic investigation and risk mitigation. In FY 2007, approximately 1.1 million cattle were imported to the US from Mexico; a small percentage were imported for use in rodeos and roping events.
REPORT OF THE COMMITTEE

TB cases detected through routine slaughter inspection resulted in 0.7 TB cases per 100,000 imported cattle, using the 8 FY 2008 TB cases with official Mexican identification and FY 2007 Mexican cattle import records. This represents a substantial decrease from 1995 through 1997, when there were 7.3 to 18.7 infected cattle were detected per 100,000 imports annually. Beginning in 1998 through the present, the annual rate has ranged from 0.7 to 5.4 infected cattle per 100,000 imports. Though this represents a sustained decrease from earlier years, infected cattle continue to be imported from Mexico and present an ongoing risk of TB transmission to US cattle.

National TB surveillance is also accomplished through tuberculin skin and interferon gamma testing. Preliminary data for caudal fold tuberculin tests conducted during FY 2008, show that 1,366,186 tests were conducted on cattle and bison with 20,229 responders (1.5 percent, 48 states and Puerto Rico reporting). The response fraction by state, for states testing greater than 300 cattle, ranged from zero to 3.9 percent (median, 0.6 percent). A national standard for caudal fold testing was implemented in 2005, based on an expected false positive response fraction of approximately one percent (Uniform Methods and Rules, Appendix C, January 2005). At the national level, this standard was met; however, in FY 2008, there were 13 states that did not meet this standard, having a response fraction of less than 0.25 percent.

The gamma interferon test (GI) has been available as an official test in the national eradication program for bovine TB since 2005. Four laboratories throughout the United States are approved to conduct gamma interferon testing (California, Michigan, Texas, National Veterinary Services Laboratory). Collectively, these laboratories reported testing 15,601 blood samples during FY 2008. Cattle from 20 states were tested; however, 93.7 percent of tests were for cattle from five states (California, Michigan, Minnesota, New Mexico, Texas). During Spring, 2008, an increase in the proportion of positive samples was noted in the California and Texas laboratories and was investigated. This problem was determined to be due in part to variability in the reactivity of the stimulating M. avium tuberculin used in the test, though this did not fully explain the problem observed. An informal working group was formed involving the laboratories and the test manufacturer and is continuing to address this issue.

During FY 2008, a total of 287 suspects (1.5 percent) were reported to USDA from the 19,147 captive cervids tested by the single cervical test. During routine testing, a fallow deer from a captive herd in New York tested positive by skin testing and was subsequently euthanized. A postmortem examination detected gross lesions that were histologically compatible for mycobacteriosis and polymerase chain reaction was positive for Mycobacterium tuberculosis complex (which includes M. tuberculosis and M. bovis). Culture to identify the Mycobacterium species is underway. The affected herd has been quarantined and animals on
nearby farms will be tested. In addition, the New York State Department of Environmental Conservation will be conducting surveillance of road- and hunter-killed deer in the area where the suspect case occurred.
REPORT OF THE COMMITTEE ON WILDLIFE DISEASES

Chair: John R. Fischer, Athens, GA
Vice Chair: Stephen M. Schmitt, Lansing, MI

Wilbur B. Amand, PA; Neil J. Anderson, MT; Robert D. Angus, ID; Marianne Ash, IN; Mark W. Atkinson, NV; Daniel R. Baca, TX; Scott C. Bender, AZ; Warren Bluntzer, TX; Charles S. Brown, NC; Kristina Brunjes, KY; Scott W. Bugai, TX; Erika A. Butler, ND; Robert A. Cook, NY; Walter E. Cook, WY; Joseph L. Corn, GA; Todd Cornish, WY; Daniel T. Crowell, NV; Donald S. Davis, TX; Thomas J. DeLiberto, CO; Leslie A. Dierauf, WI; Mark L. Drew, ID; Tim J. Feldner, MT; Bob Frost, CA; Frank D. Galey, WY; Robert F. Gerlach, AK; Paul Gibbs, FL; Colin M. Gillin, OR; Linda Glaser, MN; Dean Goeldner, MD; Greg N. Hawkins, TX; Donald E. Hoenig, ME; Sam D. Holland, SD; David L. Hunter, MT; Sherman W. Jack, MS; Kevin Keel, GA; Susan J. Keller, ND; Karl G. Kinsel, TX; Patrice N. Klein, MD; Terry L. Klick, OH; Terry J. Kreeger, WY; Jim R. Logan, WY; Phillip M. Mamer, ID; Kristin Mansfield, WA; Chuck E. Massengill, MO; Leslie A. McFarlane, UT; Robert G. McLean, CO; Daniel G. Mead, GA; Robert M. Meyer, CO; Michael W. Miller, CO; Michele A. Miller, FL; Pauline Nol, CO; Mitchell V. Palmer, IA; Glenn E. Plumb, WY; Michael R. Pruitt, OK; Thomas J. Roffe, MT; Emi K. Saito, CO; Shawn P. Schafer, ND; Sarah B. S. Shapiro Hurley, WI; Jonathan M. Sleeman, VA; David E. Stalknecht, GA; Joe Starcher, WV; Cynthia M. Tate, WY; Cleve Tedford, TN; Robert M. S. Temple, OH; Charles O. Thoen, IA; John "Brad" Thurston, IN; Kenneth Waldrup, TX; Diana L. Whipple, IA; Dave Whittlesey, CO; Margaret A. Wild, CO; Richard D. Willer, HI; David W. Winters, TX; Cindy B. Wolf, MN; Jill Bryar Wood, TX; Taylor H. Woods, MO; Scott D. Wright, WI; Martin A. Zaluski, MT; Glen L. Zebarth, MN.

The Committee met on October 28, 2008 at the Sheraton Greensboro Hotel, Greensboro, North Carolina, from 8:00 a.m. to 12:00 p.m. There were 39 members and 54 guests present.

Mike Miller, Colorado Division of Wildlife, presented a time-specific paper titled the CAST Commentary – Pasteurellosis Transmission Risks Between Domestic and Wild Sheep. The paper in its entirety is included at the end of this report.

Working Group Report on Development of Best Management Practices for Grazing Domestic Sheep and Goats Where Contact with Bighorn Sheep May Occur

Walter Cook, Wyoming State Veterinarian, reported that the Working Group on Best Management Practices for Domestic Sheep Grazing on Public Land Ranges Shared with Bighorn Sheep met three times via
conference call and shared numerous emails. The group will meet in person on October 28, 2008 at USAHA to continue work on the draft document. The group hopes to present the final document at the 2009 United States Animal Health Association (USAHA) Annual Meeting for publication in the proceedings.

Anthrax in Bison

Dave Hunter, Turner Enterprises, reported on bison and elk mortality due to anthrax in southwestern Montana during the summer of 2008. The first of two outbreaks occurred in an 18,000 acre pasture in which 298 bison died out of a herd of approximately 5,000 bison. Elk mortality totaled 16-20 bulls. Breeding bull bison also were hit particularly hard with 35 percent of them killed in the outbreak. Carcasses were burned in an air curtain incinerator or buried deeply with a back-hoe. A second outbreak subsequently occurred in bison located remotely from the initially affected herd. This outbreak lasted only one day during which 32 bison died. Follow-up information on the anthrax outbreaks will be provided at the 2009 USAHA Annual Meeting.

Elk, Brucellosis, and the Changing Environment

Neil Anderson, Montana Department of Fish, Wildlife, and Parks, reported on changing land ownership in Montana and the changing land use patterns in the Madison Valley near Yellowstone National Park (YNP). Many new landowners limit the elk hunting on their property entirely or restrict hunting to bulls only, resulting in a refuge effect among elk in the area. Consequently, elk movement patterns have changed with the animals arriving in the private land areas from public land earlier, staying later, and largely avoiding the public lands during hunting season when pressure is high. Brucella antibody seroprevalence has increased over the last 20-30 years in elk in this area. The increased seroprevalence and the increased amount of time the elk spend on private land in proximity to cattle have increased the potential risk of brucellosis transmission from elk to cattle.

Bovine Tuberculosis in Minnesota Cattle and Deer

Bill Hartmann, Minnesota State Veterinarian, reported that after three years of surveillance of free ranging white-tailed deer in the area of where infection has been found in cattle herds, 24 out of 4,164 deer have tested positive for bovine tuberculosis (TB). All of these positive deer have been killed within a 164 square mile area. All positive deer were alive in 2005 when the first infected cattle herds were discovered suggesting that deer to deer transmission may not be occurring.

The approach to managing deer in this area is threefold; eliminating deer, banning recreational feeding and baiting and reducing the risk of transmission between cattle and deer. During the winter 2008 deer removal, 1,062 deer were taken out of this area and 6 were found infected with Mycobacterium bovis. This was done by a combination of special hunts, landowner permits, ground sharp shooting and aerial
gunning. Both ground sharp shooting and aerial gunning were effective methods of removing deer. Aerial gunning being the most expensive. Feeding and baiting are both banned from this area and there are significant enforcement efforts in place. A cattle herd buyout is being implemented in this area: 45 of the 68 cattle producers in the area have signed contracts and must have all cattle gone by January 31, 2009. No cattle will be allowed back on the farms until the area is TB free. The remaining farms must construct deer proof fencing around their stored feed and winter feeding areas.

Hemorrhagic Disease in Wild and Captive Cervids

David Stallknecht, Southeastern Cooperative Wildlife Disease Study (SCWDS), presented an update on hemorrhagic disease (HD) in wild ungulates in the U.S. During 2007, there were numerous reports of HD and an unprecedented number of virus isolations (283) were made at SCWDS. Serotypes isolated during 2007 included epizootic hemorrhagic disease virus (EHDV)-1, EHDV-2, and EHDV-6, blue tongue virus (BTV)-10, BTV-11, and BTV-17. Based on reports of disease that were received from state fish and wildlife agencies during the winter and spring of 2008, there were two major outbreaks EHDV-2 in white-tailed deer in the eastern United States and BTV-17 in deer and pronghorn in the western United States. The EHDV-2 outbreak probably represented the most extensive orbivirus outbreak in U.S. history and it affected deer in some areas where HD does not historically occur.

To date in 2008, SCWDS has isolated EHDV-1 (Texas), EHDV-2 (Texas, Indiana), EHDV-6 (Texas, Kansas) and BTV-3 (Arkansas). The BTV-3 isolate was confirmed by National Veterinary Servicess Laboratory (NVSL). This is the third consecutive year that EHDV-6 was isolated and the second report of BTV-3; the first isolation of BTV-3 from white-tailed deer in the U.S. came from a wild deer in Mississippi during 2006. Sequence analyses of the 2006-2008 EHDV-6 isolates suggest that this virus may be derived from an EHDV-6/ EHDV-2 reassortment. The origin of this virus and BTV-3 are currently unknown but their repeated isolation suggests that they are now established in the U.S.

Status of Chronic Wasting Disease (CWD) Final Rule and APHIS-VS Activities Related to CWD

Lee Ann Thomas, APHIS-VS, provided an update on VS actions related to CWD. In FY 2008 APHIS received approximately $17.68 million in appropriated CWD funding, including $1.5 million in congressional earmarks.

The new proposed supplemental rule for CWD is now in the clearance process. It focuses primarily on interstate movement requirements but also addresses a few provisions of the CWD herd certification program. The scheduled publication of this proposed rule is December 2008. The final rule should be published in 2009.
APHIS-VS tested more than 20,500 farmed and captive cervids for CWD in FY 2008 using immunohistochemistry. Rectal biopsy evaluation also continues.

On August 25, 2008, the NVSL confirmed CWD in a 3-year-old doe at a farmed white-tailed deer facility in Kent County, Michigan. This was the first confirmed case of CWD in Michigan. The remaining animals on the property were depopulated by Wildlife Services (WS) on August 26, 2008. The epidemiological investigation of this occurrence is continuing. The second positive herd for 2008 was discovered in Portage County, Wisconsin, and was confirmed on October 9, 2008. This is a captive hunting preserve with about 150 white-tailed deer. The epidemiology is currently under investigation. At this time, in addition to this positive white-tailed deer herd in Wisconsin, four positive elk herds remain in Colorado. VS continues to offer indemnity and cover depopulation, disposal and testing costs for CWD-positive and exposed herds and trace animals.

In FY 2008, $5 million in cooperative agreements were made available to the state wildlife agencies. The tier system for funding state cooperative agreements that was developed in consultation with Association of Fish and Wildlife Agencies (AFWA) remained unchanged from FY 2007. However, more scrutiny has been focused on states that have not fully utilized their funding in past years. As a result, some states are receiving less than the full amount they are eligible for. Forty-eight states are receiving FY 2008 funding and two are extending their FY 2007 agreements. Some additional funds have also been made available to tier 1 states with additional needs. Final reports on the FY 2007 agreements are due 90 days after the agreement period ends. Thus, all are due before December 31, 2008.

VS is working to standardize procedures across all its programs. Templates are being developed for submitting cooperative agreement work plans and budgets. The CWD template is being used as one of the models, but it will probably be modified to some extent.

VS provided $600,000 to support tribal CWD activities in FY 2008. In addition to the ongoing cooperative agreement with the Native American Fish and Wildlife Society, a number of individual tribes will receive CWD assistance.

A workshop to explore the next generation of CWD surveillance strategies in wild cervids was held in Madison, Wisconsin in July, hosted by the United States Geological Survey (USGS), National Wildlife Health Center. This was a follow-up to the initial workshop held in 2002. A report from the workshop is being prepared and will be issued in 2009.

The agriculture appropriations bill for FY 2009 has not yet been passed by Congress. In the House of Representatives, the Agriculture Appropriations Subcommittee has marked up its bill but it has not been acted upon by the full Appropriations Committee and the bill’s provisions
Carnivorous Behavior Patterns in Deer

Harry W. (Pete) Squibb, Senior Wildlife Biologist/Consultant with Wildlife Solutions, and Brad Thurston, reported on a small study they conducted to observe animals visiting carcasses and gut piles in the environment. They reported that during 2006-2007, 6 of 58 (6 percent) volunteers placed trail cameras on gut piles or carcasses to record the animal species that visited them. During 2007-2008, 8 of 42 (67 percent) volunteers placed cameras. During both survey periods a wide variety of birds and mammals were photographed at or near the sites.

Of particular interest was the seemingly high use of these sites by deer. Deer were photographed at 22 of the 36 sites (61 percent) in 2006-07 and 18 of the 28 sites (64 percent) in 2007-08. Activity of deer at these sites varied considerably. Most deer appeared to be interested or inquisitive. Observations and photos indicated three sites with deer actually feeding on carcasses in 2006-07 and one in 2007-08. One was a young deer feeding on a cottontail rabbit carcass set out to attract coyotes. In a series of pictures, the whitetail is clearly shown eating the legs and ears from the cottontail rabbit carcass. In one site deer were clearly observed eating portions of a wild turkey carcass. In a third location, deer were the only animals feeding on a skinned beaver carcass set out to photograph predators. In 2007-08 a whitetail buck was observed on video actively feeding on a gut pile. In the remainder of the sites with deer present it must be noted that deer were usually the first animals to investigate the site after camera placement.

While this is a limited sample of data, the results indicate that deer show more interest in these sites than most wildlife professionals would normally expect. Initial observations from this study seem to indicate gut piles and carcasses of infected animals remaining in the woods could be a source of bovine TB and CWD for deer. This may be especially important in relation to localized deer populations. The results of this small survey and other incidental observations of whitetail deer around gut piles and carcasses have led some biologists and wildlife observers to question whether deer activity at and in the close vicinity of these sites may serve as a possible transmission mode between animals in the wild.
WILDLIFE DISEASES

Due to the large number of mammals and birds known to actually feed on these gut piles and carcasses it is suggested further investigation be done to determine the risk of inter and intra species transmission of these and other potentially serious diseases in the wild.

Current Montana Brucellosis Situation

Marty Zaluski, Montana State Veterinarian, informed the Committee that in May 2007 the first brucellosis infected cattle herd was detected in Carbon County. In May 2008, a second infected herd was detected in Park County resulting in an official down-grade to Class A Brucellosis Status for Montana. December 2009 is the earliest that Class Free Status may be officially granted by APHIS.

The epidemiological investigation of the cases can be viewed at the Montana Department of Livestock Website www.liv.mt.gov. Cattle, bison and elk were investigated as potential sources. All source, contact, trace-out cattle tested negative, no Mexican-origin source was found, and wild, free-ranging elk are regarded as the most likely source.

The Committee also was informed of ongoing activities related to the Inter-agency Bison Management Plan, which is a multi-agency partnership that was formalized by a Record of Decision signed in December, 2000. Signing parties include U.S. Department of Interior, USDA-APHIS, USDA Forest Service, Montana Department of Livestock, and Montana Fish Wildlife and Parks. The two goals of the Plan are to prevent transmission of brucellosis from bison to livestock and to maintain a wild, free ranging bison population.

Wyoming Brucellosis Update

Walter Cook, Wyoming State Veterinarian, reported that the first brucellosis infected herd found was a 650 beef breeding cow herd near Daniel, Wyoming (Sublette County) in June 2008. Two reactors were detected at the local sale barn and a total of 39 reactors were found in the herd which was depopulated by early October 2008. The owner plans to repopulate after cleaning and disinfection (CD) and rest. The ranch is located near an elk feedground.

The second case was a market cattle identified (MCI) Reactor killed in Nebraska that was traced back to a 200 breeding cow herd in Bondurant, Wyoming (Sublette County). To date, half of the herd has tested negative. The other half of the herd is to be tested in early November. As with the other ranch, elk feeding occurred nearby.

Statewide, from October 2007 through September 2008, 87,227 brucellosis tests were conducted. This does not include out of state slaughter surveillance. State-wide testing at sale barns may get reduced in future. Change of ownership/movement testing continues in the area of concern, which is based on elk feedgrounds, wildlife seroprevalence and Enforceability.

Herd plans have been recommended by the Governor's Coordination
REPORT OF THE COMMITTEE

Team and The Program Review Team. The area of concern is the primary focus and herd owners complete a questionnaire and undergo a risk assessment. The primary goal is to reduce the risk of Brucella transmission from wildlife to cattle.

Yellowstone National Park Brucellosis Management Program

Glenn Plumb, Yellowstone National Park (YNP), reported on bison populations, genetics, surveillance and vaccination in YNP. The overall goals of bison management in YNP are to preserve a wild bison population, prevent brucellosis transmission from bison to cattle, and reduce disease prevalence.

The park's bison population has increased since 2000, due to an increase in the northern population; the central population has declined. Annual survival is 83 percent when culling and slaughter are included, and 90 percent of seronegative pregnant cows have a full term pregnancy.

Goals of bison and brucellosis surveillance studies in YNP include:

1. estimate the abundance, demographic rates, and limiting factors for bison.
2. describe migratory and nomadic movements by bison in and out of park.
3. estimate genetic diversity and probabilities of conservation.
4. estimate risks of transmission within and between species and areas.
5. estimate seroprevalence rates, culture rates, and cross-reactive agents.
6. determine rates of recrudescence.
7. determine factors influencing the vulnerability of bison to infection and transmission.
8. estimate the timing and percent of removals.
9. document bison use of zones outside the park and commingling with cattle.
10. estimate the effects of hazing or holding bison at capture pens.
11. determine the strength and duration of the immune response following syringe vaccination.
12. determine the strength and duration of the immune response following remote delivery vaccination.
13. document trends in prevalence and the effects of vaccination, other risk management actions, and ecological conditions on these trends.

Regarding vaccination, the following timetable has been proposed: internal agency review of Draft EIS in Winter 2008; draft EIS released for public comment – Spring 2009; content analysis and revision – Summer 2009; Internal agency review of Final EIS – Autumn 2009, and final EIS and Record of Decision – Winter 2010.
Avian Influenza (AI) Virus Research Studies

Justin Brown, Southeastern Cooperative Wildlife Disease Study (SCWDS), provided a summary on the collaborative research being conducted at SCWDS and the Southeast Poultry Research Laboratory. This research evaluates the influence that different environmental factors have on the ability of AI viruses to remain infective on aquatic habitats utilized by wild aquatic birds. Specifically he discussed the results of experimental trials that determined the effect that pH, salinity, and temperature have on the ability of AI viruses to persist in water using a laboratory-based distilled water model system. Additionally, he also reported the results for similar laboratory-based trials that evaluated the persistence of several Asian lineage H5N1 highly pathogenic avian influenza (HPAI) viruses. The overall goal of these studies was to provide data to improve our understanding of AI transmission within wild aquatic bird populations, and potentially, better evaluate risks associated with movement and local transmission of these viruses from wildlife reservoirs to domestic animals (poultry).

The environmental stability of twelve wild bird-origin AI viruses in water was examined under natural ranges pH (5.8 to 8.6), salinity (0 to 30 parts per thousand (ppt)), and temperature (4 to 37° C) that occur in aquatic bird habitats. The viruses varied in their overall ability to remain infective in water, but consistent trends in response to the three abiotic variables were observed among the AI strains. The majority of AI viruses tested in this study were most stable in water, based on duration of infectivity, at colder temperatures (4° to 17° C), in slightly basic conditions (pH ranging from 7.4 to 8.2), and in fresh to brackish water (salinity ranging from 0 to 20 ppt). These results are consistent with previous laboratory-based trials that have evaluated AI persistence in water.

There is strong experimental and field evidence to suggest that migratory waterfowl can, and have, contributed to the transmission and spread of H5N1 HPAI viruses. A question that remains unresolved is whether these viruses are established in wild aquatic bird populations. A critical factor in evaluating the potential transmission and maintenance of H5N1 HPAI viruses in aquatic bird populations is the environmental stability of these viruses in water, but currently very little data exists on this topic. In order to evaluate the range of environmental fitness among H5N1 HPAI viruses we determined the persistence for fifteen different H5N1 HPAI strains in water under three salinities (0, 15, and 30 ppt), two temperatures (17 and 28° C), and a pH of 7.2, under laboratory conditions. The results of these trials indicate that, similar to the wild bird-origin AI viruses described above, different strains of H5N1 HPAI vary in their stability in water. The H5N1 HPAI viruses exhibited similar trends in response to salinity and temperature as were noted among the wild bird-origin AI viruses.
The results of this research suggest that the natural conditions of aquatic habitats impact the ability of AI viruses to remain infective in different environments. Specifically, pH, temperature, and salinity, at levels normally encountered in nature, can influence the stability of AI viruses in water. In addition to improving our understanding on AI transmission within wild aquatic bird populations, the viral response data presented herein provide general trends in viral persistence that are potentially applicable to improving existing surveillance efforts.


Dr. Scott Wright, USGS National Wildlife Health Center reported that beginning in mid July 2008, there were reports of dead double-crested cormorants in south central Minnesota. The birds were found on islands in lakes surrounded by agricultural areas. The National Wildlife Health Center detected avian paramyxovirus from the birds and the National Veterinary Service Laboratory (NVSL) determined that the birds had virulent Newcastle disease virus. Additional outbreaks also occurred in northern Minnesota at the U.S.-Canada border. Officials in Canada were notified of the die-offs and began testing birds in Canada. There have been other outbreaks in cormorants reported in Connecticut and Missouri. These have been single birds well away from the larger outbreaks and there is not a clear idea how these birds were infected. Other species, white pelicans and ring-billed gulls have also been culture positive in multiple organs; however, there is no histologic evidence of disease. The last large long term die-off also occurred in the Midwest in 1992.

There have been over 61,000 birds tested in the DOI portion of the national AI surveillance program since the beginning of the program in 2006. No highly pathogenic avian influenza H5N1 Asian strain has been detected in North America. There have been many low pathogenicity viruses detected. These viruses have occurred at a prevalence rate of 2.3 percent. Nearly every H serotype and all N serotypes have been detected through virus isolation. At least 5 new species of waterfowl were found with low pathogenicity viruses. Through genetic sequencing of a portion of the viruses there is a higher rate of viruses with Asian lineage than with European lineage that have mixed with North American viruses detected in birds samples in Alaska.

There has been a collaborative effort with USDA to examine the efficiency of molecular tests used for the rapid detection if avian influenza viruses. This has led to a modification of the H7 test. There has also been an examination into the presence of avian influenza viruses in sediments in freshwater lakes in the Southeastern United States. Viruses were detected in the sediments but not water in lakes in Georgia, suggesting that the viruses can persist in water warmer than previously
demonstrated in laboratory experiments.

**National Wild Bird AI Surveillance: APHIS-Wildlife Services (WS)**

Tom Deliberto, APHIS-WS, reported that as part of the government-wide National Strategy for Pandemic Influenza, USDA-APHIS, DOI, and state wildlife agencies provided leadership in conducting surveillance for the early detection of highly pathogenic avian influenza (HPAI) in wild birds. Within APHIS, WS was delegated the responsibility for plan development, implementation, and oversight. WS, in collaboration with State Wildlife Agencies, DOI, and U.S. Department of Health and Human Services (USHHS), and other entities such as the Southeastern Cooperative Wildlife Disease Study (SCWDS), developed An Early Detection System for Highly Pathogenic H5N1 Avian Influenza in Wild Migratory Birds, U.S. Interagency Strategic Plan (U.S. Strategic Plan).

The initiative is divided into two phases. The initial phase addressed early detection activities in Alaska, and in particular, coastal areas that have the most potential for contact among Asian and North American birds. The second phase addresses subsequent HPAI detection activities in four major North American flyways. The plan for wild bird surveillance includes several interrelated components, including: the investigation of morbidity/mortality events, the sampling of live-captured birds, the deployment of sentinel species, environmental sampling; and sampling hunter-harvested birds.

WS developed a rating system designed to place more surveillance activities in locations that have a higher probability of detecting the virus. However, no state was excluded. The rating system was first developed internally using criteria such as migratory bird movements, historic avian influenza prevalence, wetland habitat and linear shoreline and geographic location. After the preliminary rating system was developed, WS sought input from each of the Flyway Councils and the Association of Fish and Wildlife Agencies. This input was incorporated into the WS, HPAI Implementation Plan, finalizing the process to support State Wildlife Agencies in sample collection efforts.

APHIS is collaborating with other federal agencies and state officials conduct surveillance in wild, migratory birds and cross training to improve surveillance strategies. To date, over 150,000 wild birds and 75,000 environmental samples have been tested for HPAI through the APHIS funded program. The DOI and others have tested approximately 50,000 wild birds to date. The current year’s APHIS plan is to collect and analyze 50,000 wild birds and test 25,000 environmental samples through a targeted surveillance approach. Detailed information can be found in WS’ Implementation Plan for HPAI Surveillance in Wild Migratory Birds in the United States. The targeted surveillance approach will provide a better protective measure for the early detection of HPAI by sampling high value species using live-wild bird and hunter-harvest methods. Additionally, environmental fecal sample collection will be
focused in areas used by migratory birds. This targeted approach leads to cost efficiency by collecting smaller sample sizes while maintaining integrity of the science-based approach.

While targeted, surveillance using live wild birds, hunter harvested birds, and environmental sampling is an important component of the surveillance effort. Sampling morbidity/mortality events remains the most important sampling method in the program. It is recommended that all morbidity/mortality events in wild birds be evaluated for HPAI sampling, regardless of the species involved.

In partnership with all 50 State Wildlife Agencies, WS accomplished a majority of sampling during the 2007 fall migration and on wintering grounds of migratory birds, but efforts continued through the 2008 spring migration and on breeding grounds in Alaska. Surveillance activities are being increased during the current 2008 fall migration. Surveillance is conducted in all 4 major flyways - Pacific, Central, Mississippi, and Atlantic; all 50 States, Guam, and Puerto Rico; and other countries. Diagnostic testing of all wild bird samples collected in the U.S. is conducted through 47 National Animal Health Laboratory Network (NAHLN) laboratories and environmental samples are tested at WS, National Wildlife Research Center. Confirmatory testing of all samples is conducted at the NVSL.

Committee Business:

A single draft Resolution on wildlife immunocontraception was tabled until next year when the Committee hopes to be briefed on the status of research and licensing of products.
WILDLIFE DISEASES

PASTEURELLOSIS TRANSMISSION RISKS BETWEEN DOMESTIC AND WILD SHEEP

Michael W. Miller*
Colorado Division of Wildlife
Wildlife Research Center

Donald P. Knowles
Animal Disease Research Unit
USDA–ARS Research Center
Washington State University

Marie S. Bulgin
Caine Veterinary Teaching
University of Idaho


Introduction

Disease has contributed significantly to the decline of bighorn sheep (Ovis canadensis) populations throughout much of western North America, decreasing many native herds to less than 10 percent of their historical size and imperiling some populations and subspecies (Valdez and Krausman 1999). According to historical accounts (e.g., Grinnell 1928; Honess and Frost 1942; Shillinger 1937; Warren 1910), epidemics in some locations coincided with the advent of domestic livestock grazing in bighorn ranges, suggesting that novel pathogens may have been introduced into some bighorn populations beginning in the 1800s.

Native North American wild sheep species—bighorn sheep and thinhorn (Dall’s and Stone’s) sheep (O. dalli)—are very susceptible to pneumonia and particularly to pasteurellosis (Miller 2001). The generic term pasteurellosis is used here for disease (often respiratory) caused by bacteria in the family Pasteurellaceae but now classified in the genera Pasteurella, Mannheimia, or Bibersteinia. In some recent pneumonia epidemics in bighorns, the cause has been attributed to endemic respiratory pathogens or strains of Pasteurellaceae (Rudolph et al. 2007), and in other epidemics the cause has been attributed to Pasteurellaceae strains or other pathogens introduced via interactions with domestic sheep (O. aires; George et al. 2008). This Commentary reviews current knowledge on pneumatic pasteurellosis in domestic and wild sheep, the risks of transmission between these species, and
REPORT OF THE COMMITTEE

approaches for lowering the overall risk of epidemics in wild sheep.

Pneumonic Pasteurellosis in Domestic Sheep

Respiratory disease is a serious problem in domestic sheep that can result in substantial economic losses. Pneumonia in domestic sheep is more common in lambs than in adults, and affected animals often die if not treated.

Pasteurellosis in domestic sheep often is described as a disease complex (Alley, Ionas, and Clarke 1999; Donachie 2007; Gilmour and Gilmour 1989) and generally is thought to result from invasion of the lung by Pasteurellaceae following a compromise of the respiratory tract. The initiating insult can be from respiratory infection by mildly pathogenic agents such as parainfluenza-3 (PI-3) virus, adenoviruses, respiratory syncytial viruses (RSV), Chlamydia pecorum, and Mycoplasma ovipneumoniae, as well as from mechanical irritants such as dust (Alley, Ionas, and Clarke 1999; Brogden, Lehmkuhl, and Cutlip 1998; Donachie 2007) and lungworms. In most instances, these insults alone do not result in significant epidemics with high morbidity or mortality; however, when these and other stressors are compounded by infection with Pasteurellaceae, the result can be increased disease and death.

The effects of psychological, physiological, and physical environmental stressors are believed to be important components of pasteurellosis in many domestic ruminants (Brogden, Lehmkuhl, and Cutlip 1998; Carroll and Forsberg 2007; Donachie 2007; Gilmour and Gilmour 1989). Although the effects of stressors are difficult to measure, some indicators including increased body temperature, heart rate, and plasma cortisol have been correlated with disease (Carroll and Forsberg 2007; Knowles et al. 1995).

Physiological response to stressors (collectively called “stress”) includes suppression of the immune system; consequently, prolonged stress may increase susceptibility to pathogens and to morbidity and mortality. Environmental stressors most commonly associated with pasteurellosis in livestock include heat, cold, wind chill, crowding, mixing with new animals, poor ventilation, handling, and transport (Brogden, Lehmkuhl, and Cutlip 1998; Carroll and Forsberg 2007; Knowles et al. 1995). Other predisposing factors, such as lack of sufficient energy or protein, inadequate colostrum consumption, specific vitamins, or certain minerals, also may compromise immunity further (Carroll and Forsberg 2007).

Pasteurella multocida, Mannheimia haemolytica, and Bibersteinia trehalosi (all formerly in the genus Pasteurella) are the three most commonly isolated bacterial agents from pneumonias that result in high rates of illness, morbidity, and mortality in domestic sheep (Brogden, Lehmkuhl, and Cutlip 1998; Donachie 2007; Gilmour and Gilmour 1989). Early treatment with antibiotics effective against Pasteurellaceae generally stops a pneumonia outbreak, suggesting that these bacteria
are important in the disease process. Pasteurellaceae are common inhabitants of the tonsils and oropharynx of a variety of healthy domestic and wild species (Gilmour, Thompson, and Fraser 1974; Jaworski, Hunter, and Ward 1998). In domestic sheep, Pasteurellaceae are believed to be opportunistic bacteria that colonize the lung after some predisposing insult (Brogden, Lehmkuhl, and Cutlip 1998). Some Pasteurellaceae strains make products (including leukotoxin and endotoxin) that exacerbate disease in the host after colonization of lung tissue (Ackermann and Brogden 2000; Gilmour and Gilmour 1989) and result in increased morbidity and mortality.

The diversity of commensal and disease-associated Pasteurellaceae further complicates the epidemiology and control of pasteurellosis. Serotyping and phenotyping based on variations in fermentation patterns (Angen et al. 1999; Frank 1982; Jaworski, Hunter, and Ward 1998) and gene sequencing (Angen et al. 1999; Jaworski et al. 1993; Kelley et al. 2007) have been used to distinguish among Pasteurellaceae strains. Studies using these approaches have shown that domestic sheep may carry numerous strains of Pasteurellaceae (Jaworski, Hunter, and Ward 1998; Ward et al. 1997).

Most Pasteurellaceae of sheep are obligate bacteria that die rapidly in the environment outside a living host (Dixon et al. 2002). Environmental sources such as water and soil are not thought to be important in maintaining or spreading these bacteria; consequently, transmission is most likely to occur through direct contact among animals. Because many healthy domestic sheep carry strains associated with disease (Jaworski, Hunter, and Ward 1998), transmission of a specific pathogenic Pasteurellaceae strain may not be necessary for a disease outbreak to occur. In some instances, however, mixing individuals from different sources and possibly carrying different strains of Pasteurellaceae seems to precipitate outbreaks (Gilmour and Gilmour 1989).

**Pasteurellosis in Wild Sheep**

As in domestic sheep, Pasteurellaceae commonly are associated with pneumonia epidemics in bighorn sheep (Miller 2001), and pasteurellosis frequently results in both all-age die-offs and persistent high rates of pneumonia in lambs (Cassirer and Sinclair 2007; Monello, Murray, and Cassirer 2001). Thinhorn sheep also are susceptible to pneumonia (Black et al. 1988; Foreyt, Silflow, and Lagerquist 1996; Jenkins et al. 2007), but epidemics have not been reported in free-ranging populations.

Pasteurellaceae alone seem to have a more severe effect on wild sheep than on domestic sheep in experimental situations. Wild sheep experience high morbidity and mortality after being intratracheally or intradermally inoculated with relatively high doses (104 organisms) of field strains or attenuated strains of *M. haemolytica* from domestic...
sheep or cattle (*Bos taurus*), or with *B. trehalosi* strains originating from other wild sheep (Foreyt, Silflow, and Lagerquist 1996; Foreyt, Snipes, and Kasten 1994; Onderka, Rawluk, and Wishart 1988). The resulting pathology from experimental inoculations of wild sheep varied among strains used, but all strains caused some form of pneumonia. The observed differences in susceptibility to experimental and natural pasteurellosis between domestic and wild sheep are thought to result from differences in pulmonary host defense mechanisms and greater vulnerability of phagocytes to leukotoxin that apparently increase overall susceptibility to pasteurellosis (Foreyt, Silflow, and Lagerquist 1996; Silflow, Foreyt, and Leid 1993; Silflow et al. 1989).

*Pasteurellaceae* have been isolated from both healthy and pneumonic wild sheep (Jaworski, Hunter, and Ward 1998; Jenkins et al. 2007; Kelley et al. 2007; Rudolph et al. 2007). Although field investigations often are complicated by delays in detecting cases and by sample availability, two broad epidemic patterns in bighorns have emerged. In some bighorn epidemics, endemic respiratory pathogens including *Pasteurellaceae*, PI-3, RSV, and *M. ovipneumoniae*, as well as lungworms (*Protostrongylus* spp.), with or without other environmental stressors, are believed to have contributed to disease (Rudolph et al. 2007; Spraker et al. 1986). These outbreaks resemble the patterns described in some pasteurellosis epidemics in feedlot lambs (Gilmour and Gilmour 1989). Other epidemics, however, are believed to have been initiated by introductions of novel respiratory pathogens into bighorn populations (Foreyt and Jessup 1982; George et al. 2008). These patterns resemble some pasteurellosis epidemics reported in domestic sheep, particularly feedlot lambs, after transportation and mixing of different groups in confinement settings (Gilmour and Gilmour 1989). Thus, both endemic and introduced pathogens are believed to contribute to contemporary pasteurellosis epidemics in bighorn sheep.

**Risks to Wild Sheep Associated with Domestic Sheep Interactions**

Based on evidence from empirical studies and field observations, interactions between wild sheep and domestic sheep increase the probability of mortality and reduced lamb survival in wild sheep populations, primarily because of respiratory disease (USDA–Forest Service [FS] – 2006). Interactions between wild sheep and domestic goats (*Capra hircus*), although not as widely reported, seem to pose comparable risks (Garde et al. 2005; Jansen et al. 2006). Similarities in social behavior and physiology between wild and domestic sheep (and, to a lesser extent, goats) probably create a natural attraction that fosters intimate contact between these species.

Pneumonia in wild sheep developed after contact with domestic sheep in captive conditions (Black et al. 1988; Callan et al. 1991; Foreyt 1989; Onderka and Wishart 1988). Moreover, relationships between the onset of some pneumonia epidemics in wild sheep and the concurrent
presence of domestic sheep on bighorn ranges have been described (George et al. 2008; Monello, Murray, and Cassirer 2001). Whether introduced *Pasteurellaceae* strains, introduced virulence factors, or other introduced pathogens contribute to precipitating these epidemics remains unclear (Besser et al. 2008; George et al. 2008; Kelley et al. 2007).

Quantifying the risk of interspecies disease transmission between wild sheep and domestic sheep in a natural setting is problematic. Movements of wild sheep may influence the potential for pathogen introductions and transmission from domestic to wild sheep, as may the proximity, duration, movements, management, seasonality, reproductive status, and straying rates of domestic sheep grazing in occupied wild sheep habitats. The increased risk of a pneumonia epidemic in a wild sheep population associated with domestic sheep interaction seems to be the product of the probabilities of multiple events, namely: interactions of sufficient duration and proximity to transmit one or more pathogens; pathogen shedding by the domestic sheep; the ability to transmit an infectious dose to one or more wild sheep; the survival of newly infected wild sheep; and, further shedding and secondary transmission. Seasonal or environmental factors also may somehow modulate the probability of epidemics occurring (Cassirer and Sinclair 2007; George et al. 2008), and the risk attributable to interactions between these species probably is additive and may vary widely among wild sheep populations. Indeed, a common *Pasteurellaceae* strain or other agent directly linking bighorn epidemics to either domestic sheep interactions or to emergence of endemic pathogens has not been demonstrated to date, and thus unequivocal evidence for either process remains elusive. Consequently, the magnitude of such risks may be assessed best on a case-by-case basis (Clifford et al. 2007; Garde et al. 2005). Further work is needed to understand better the magnitude of potential risk to wild sheep arising from interactions with domestic goats, cattle, and other wild ruminant species, as well as potential influences of seasonal and environmental factors on these risks.

**Strategies for Minimizing Risk of Interspecies Disease Transmission and Managing Wild Sheep Health**

Available data suggest that interactions between wild and domestic sheep carry some inherent risk of precipitating pneumonia in wild sheep under range conditions (USDA–FS 2006). Given the limitations of today’s tools, the most practical approaches identified thus far for minimizing this risk involve simply preventing interspecies interactions that could result in respiratory pathogen transmission between wild and domestic sheep (Western Association Fish and Wildlife Agencies [WAFWA] – 2007). Incomplete knowledge about the epidemiology and some details of processes contributing to the risk of interspecies disease transmission, however, remains an obstacle to consensus on acceptable and “best” management approaches.
To achieve effective separation (i.e., separation sufficient to minimize opportunities for pathogen transmission [WAFWA 2007]), herdsmen and wildlife managers can actively discourage wild sheep from approaching or commingling with domestic sheep, and vice versa. Domestic sheep should be monitored closely and herded to prevent straying and should not be left unattended in wild sheep habitats. In some instances, truck transport may be the best means for moving domestic sheep through critical wild sheep habitats. Similarly, wild sheep that have contacted domestic sheep should not be left to commingle with other wild sheep. On common public lands, land management agencies, wildlife agencies, and domestic sheep producers with grazing leases should develop and agree on plans for handling interactions between the species, with emphasis on preventing interactions that could result in respiratory pathogen transmission between domestic and wild sheep. Ideally, similar plans also should be established between private landowners and wildlife managers where wild sheep may stray onto private land.

The risk of interspecies pathogen transmission may be decreased further by ensuring that domestic sheep grazing in wild sheep habitats are healthy and by removing ill sheep of either species. As vaccines and therapeutics for the prevention and control of infection or disease caused by Pasteurellaceae in domestic or wild sheep become available, producers and wildlife managers should seek practical ways to use them. In some instances where these approaches are not effective, one species or the other may need to be given management priority in, or excluded from, a particular range (WAFWA 2007).

Although seemingly simple, the latter approach has several potential consequences, including lack of rangeland available to one or the other species, economic impacts, and limitations on restoration efforts. Not all pasteurellosis epidemics in bighorn sheep can be attributed to contact with domestic sheep (USDA–FS 2006). Because some potentially pathogenic Pasteurellaceae and other pathogens are endemic in some wild sheep populations, wildlife managers should examine the implications of interactions between different herds of wild sheep. In doing so, the benefits of outbreeding and genetic diversity must be weighed against the increased risk of disease transmission (WAFWA 2007). In certain instances, wild sheep may need to be maintained at herd densities that minimize dispersal to help lower the risk of pathogen spread.

Augmenting wild sheep herds with individuals from other herds also poses a risk for moving pathogens. Consequently, wildlife managers should recognize the potential for moving pathogens via translocations and should monitor wild sheep herds routinely for pathogens of concern, using only healthy herds as source stock. Protocols for sampling, testing for transplant, and responding to disease outbreaks should be standardized to the extent possible and reviewed and updated as necessary. Moreover, data should be shared and interagency and
interdisciplinary communications should be encouraged to develop better strategies for improving overall herd health.

Research Needs

Current understanding about causative agents and the factors allowing these agents to lead to pasteurellosis epidemics in wild sheep is incomplete. Previous work, however, provides some clarity for future research directions. Further study of mechanisms underlying the increased susceptibility of wild sheep to respiratory diseases, as compared with domestic sheep and cattle, could aid in developing and refining approaches for improving and maintaining herd health. For developing better disease prevention and control strategies, more information is needed concerning host genetics and immune responses, virulence mechanisms, pathogen transmission dynamics, and the epidemiology of the diseases. The full influence and potential for control or mitigation of other factors such as environmental stressors and nutrition, which seem important in pasteurellosis epidemics in domestic ruminants, also need to be understood better for wild sheep. Developing methods that decrease the occurrence or severity of pneumonia and pasteurellosis in either domestic or wild sheep, including the development and use of vaccines, immunostimulants, or long-acting therapeutic agents, might lead to advances in managing all impacted species. Outcomes of such research could help decrease risks posed by interspecies interactions, or decrease wild sheep susceptibility to pathogens. In developing biologic and therapeutic agents as tools, the research should focus not only on safety and efficacy of the products, but also on the potential for practical use in free-ranging populations.

Conclusions

Although the authors acknowledge that the current understanding about pasteurellosis in wild and domestic sheep is incomplete, respiratory disease clearly is a serious problem in both. Because the onset of some pneumonia epidemics in bighorn sheep has been associated with the presence of domestic sheep on native range, and because other outbreaks seem to have resulted from pathogens already endemic in affected wild sheep herds, accurately quantifying the risk of interspecies disease transmission in range conditions is problematic. Consequently, a broad approach to population health management currently may be the most practical way to decrease the overall likelihood of epidemics in wild sheep populations. Such an approach includes, but does not rely solely on, practices that prevent interactions between wild and domestic sheep that could result in respiratory pathogen transmission. Preventing contact between wild and domestic sheep, better monitoring of exchanges and interactions between wild sheep populations, and managing population and habitat quality all have some value in improving and maintaining the overall health of wild sheep
REPORT OF THE COMMITTEE

populations and preventing pneumonia epidemics. Ongoing and planned research also is likely to provide a better understanding and new tools that may further improve approaches for wild and domestic sheep health management on native ranges.

Literature Cited


Foreyt, W. J. 1989. Fatal Pasteurella haemolytica pneumonia in bighorn
sheep after direct contact with clinically normal domestic sheep. Am
Foreyt, W. J. and D. A. Jessup. 1982. Fatal pneumonia of bighorn sheep
of Dall sheep (Ovis dalli dalli) to pneumonia caused by Pasteurella
following inoculation of healthy bighorn sheep with Pasteurella
Frank, G. H. 1982. Serotypes of Pasteurella haemolytica in sheep in
2005. Examining the Risk of Disease Transmission between Wild
Dall’s Sheep and Mountain Goats and Introduced Domestic Sheep,
Goats and Llamas in the Northwest Territories. The Northwest
Territories Agricultural and Policy Framework and Environment
and Natural Resources Government of the Northwest Territories,
Canada. 139 pp.
Epidemic pasteurellosis in a bighorn sheep population coinciding
with the appearance of a domestic sheep. J Wildl Dis 44:388–403.
223–254. In C. Adlam and J. M. Rutter (eds.). Pasteurella and
Gilmour, N. J. L., D. A. Thompson, and J. Fraser. 1974. The recovery of
Pasteurella haemolytica from the tonsil of adult sheep. Res Vet Sci
17:413–414.
Wyoming Game and Fish Department Bulletin No. 1, Cheyenne. 127
pp.
Jansen, B. D., J. R. Heffelfinger, T. R. Noon, P. R. Krausman, and J. C.
deVos, Jr. 2006. Infectious keratoconjunctivitis in bighorn sheep,
of isolates of Pasteurella from domestic and wild ruminants. J Vet
Use of DNA analysis of Pasteurella haemolytica biotype T isolates
to monitor transmission in bighorn sheep (Ovis canadensis

629


WILDLIFE DISEASES


II.F. OTHER REPORTS

SECTION II
F. OTHER REPORTS

1. 2008 USDA-ARS RESEARCH REVIEW: ADVANCES IN FOOT-AND-MOUTH DISEASE RESEARCH

Gap Analysis of Countermeasures and Research in the Control and Eradication of FMD
Cyril Gay, USDA-ARS, Office of National Programs, Animal Production and Protection

Early Events in FMD Pathogenesis in Cattle
Jonathan Arzt, USDA-ARS, Plum Island Animal Disease Center

Novel Countermeasures for FMD Control
Marvin Grubman, USDA-ARS, Plum Island Animal Disease Center

Joint DHS-ARS Vaccine Development Program
David Brake, DHS-S&T, Plum Island Animal Disease Center

Utilizing functional genomics to understanding FMDV Virus-Host Interactions
Luis Rodriguez, USDA-ARS, Plum Island Animal Disease Center
Foot-and-mouth disease (FMD) is the single most important animal disease affecting the international trade of animals and animal products. Its control is critical to protecting the livestock industries of the United States, as well as protecting the livelihood and income of millions of people in developing countries where FMD continues to be endemic. The World Organization for Animal Health (OIE) and the Food Agriculture Organization (FAO) of the United Nations both support a new strategy for the progressive control of FMD based on risk reduction. This strategy will require effective national veterinary services and disease surveillance. Importantly, a coordinated global research program is needed to provide scientific information and new tools to enable the progressive control and eradication of FMD worldwide. The Global Foot-and-Mouth Disease Research Alliance (GFRA) has established five strategic goals and 18 objectives to support this new strategy (www.ars.usda.gov/gfra/). The USDA Agricultural Research Service (ARS) FMD research program supports the GFRA and allocates expertise and resources to address existing gaps in FMD global surveillance, epidemiology, disease detection, and vaccination. Research needs and priorities fall under the following six categories: 1) Viral Pathogenesis and Immunity; 2) Epidemiology; 3) Diagnostics; 4) Vaccines; 5) Biotherapeutics; and 6) Delivery Methods.
Foot-and-mouth disease (FMD) is the most economically significant disease of food-animal production on the planet. Substantial investments are made by FMD-free nations to prevent introduction of FMD virus (FMDV) and on preparedness to limit the impact and facilitate eradication of the virus in the event of incursion. Though current FMD vaccines are moderately effective, there is great, ongoing effort to improve vaccine efficacy. However, this vaccine development continues in the absence of understanding of many basic aspects of how infection of cattle with FMDV occurs (pathogenesis). To improve vaccine efficacy, the crucial step to understand is initiation of infection (i.e. what are the primary sites of infection?). Numerous pathogenesis studies have been conducted without establishment of a clear consensus on this subject; soft palate, nasal cavity, nasopharynx, and lungs have all been implicated. In an effort to resolve inconsistencies across previous investigations, our laboratory has developed a novel aerosol inoculation method which closely simulates natural infection. By applying this technique with a prospective, time-course study design and extensive tissue sampling, we provide evidence that FMDV infection in cattle initiates in the dorsal nasopharynx and dorsal soft palate at 3–12 hours post infection (hpi). Shortly thereafter (24–48 hpi), extensive quantities of virus accumulate in the lungs. The precise roles of these sites in the transition from local to systemic disease are still under investigation.

These novel findings from the Foreign Animal Disease Research Unit will be discussed in the context of historical perspectives on FMD pathogenesis.
Foot-and-mouth disease (FMD) is a highly contagious disease of cloven-hoofed animals that rapidly replicates and spreads. Disease outbreaks have a significant economic impact on affected countries because of trade restrictions, loss of animals, and decrease in animal productivity. Although the development of an inactivated whole virus vaccine helped eliminate FMD from Western Europe, FMD-free countries, including the U.S., hesitate to use this vaccine in an outbreak situation since it can be difficult to distinguish vaccinated from infected animals, vaccine production requires the use of large amounts of infectious virus grown in expensive high-containment facilities. Furthermore, because of Federal law the U.S. cannot work with FMD virus (FMDV) on the mainland and therefore is dependent on foreign manufacturers for FMD vaccine. Development of vaccines which address the limitations of the current vaccine is ongoing. Furthermore, we advocate a strategy combining vaccination with biotherapeutics as an approach to induce an immediate innate response to control the rapid replication and dissemination of FMDV as well as an adaptive immune response to induce long term protection.

We have developed a vaccine candidate that addresses many of the limitations of the inactivated vaccine and have demonstrated that one inoculation protects cattle and swine as early as 7 days postvaccination. This vaccine is delivered by a replication-defective human adenovirus (Ad5) and contains the capsid and 3C proteinase coding regions of FMDV. Since this vaccine does not contain the complete FMDV genome it is not infectious and therefore can be produced on the U.S. mainland without the need for an expensive, high-containment manufacturing facility. Currently we are engaged in a collaborative research and development program with the U.S. Department of Homeland Security and GenVec, Inc. to produce Ad5 vaccines against the different FMDV serotypes and strains and test these products in cattle for inclusion in the U.S. Veterinary Vaccine stockpile.

The initial host protective response to virus infection is the induction of type I interferon (IFN alpha/beta). In tissue culture studies we have shown that pretreatment of cells with IFN alpha can inhibit the replication of all serotypes of FMDV. To determine if IFN alpha can block FMDV replication in naturally susceptible animals we constructed Ad5 vectors containing IFN alpha genes and demonstrated that delivery of these vectors induced
II.F. OTHER REPORTS

complete protection in swine as early as one day post administration against direct inoculation challenge with FMDV and protection lasted for 3-5 days. However, this approach only delayed and reduced the severity of disease in cattle. To attempt to develop a more potent treatment that would be effective in cattle we have used a combination of type I and type II IFNs, which in cell culture can act synergistically, at lower doses, to inhibit FMDV replication, and demonstrated complete protection in swine. Nevertheless, this strategy still was not effective in cattle. We are currently examining the mechanism of IFN induced protection against FMD to identify the IFN induced host genes which inhibit FMDV replication. We believe that a comprehensive understanding of the host’s innate immune response to virus infection will enable us to develop an improved biotherapeutic approach to rapidly control FMD.
The overarching goal of the DHS S&T-USDA ARS FMD molecular vaccine program is to obtain USDA-CVB veterinary biological licenses for a series of FMD monovalent vaccine products that can be subsequently produced for the USDA APHIS Emergency Management National Veterinary Stockpile. The first vaccine candidate is in full development for a conditional license and incorporates the USDA CVB manufacturing, clinical and regulatory requirements for vaccine purity, potency, safety and efficacy.

The FMD molecular vaccine target product profile for includes prevention of FMDV shed and transmission, single dose administration, rapid onset of protection, and negative marker to enable differentiation of infected from vaccinated animals. DHS has developed a deep product pipeline of serotype and subtype-specific vaccines for the highest threat FMDV strains. The first series of products are being developed for cattle and post-licensing activities will focus on efficacy in other domestic livestock and wildlife species. In addition, future U.S. mainland non-challenge seroconversion studies and field studies in FMDV enzootic regions will enable further FMD molecular vaccine product characterization.

Production of the protective FMDV immunogen, empty viral capsids (EVCs), is enabled through the use of a human adenovirus replication-deficient viral vector co-expressing FMDV structural proteins and the viral protease required for capsid processing. EVC-like structures have been observed by physiochemical and immunological techniques. Following vaccine vector construction, vaccine candidates are initially screened in vitro for the expression and correct processing of FMDV capsid proteins. Positive in vitro results trigger a series of cattle clinical trials designed to characterize vaccine safety, efficacy, protective dose, and prevention of FMDV shed and transmission to naïve or other FMDV vaccinated recipients.

DHS S&T also maintains funding collaborations with USDA ARS
II.F. OTHER REPORTS

FMDV scientists in order to address key basic research gaps, rationally extend and improve the FMDV molecular vaccine platform technology, and provide enabling capabilities critical to the long-term, FMDV biological countermeasure program.
Foot-and-mouth disease virus (FMDV) is a highly contagious virus that causes devastating disease of great economic consequence. A member of the Picornaviridae family (genus Aphtovirus), FMDV has an 8,500 nucleotide positive stranded RNA genome organized in a single open reading frame and non-coding regions at the 3' and 5' termini. The function and specific role in viral pathogenesis of the different regions of the viral genome remain largely undefined. One of the main aims of the our pathogenesis research at the Foreign Animal Disease Research Unit is to understand the function of the different genomic regions on FMDV and the role they play in determining viral pathogenesis including interaction with the host, transmission and persistence.

We have developed a series of tools to study the FMDV genomic function as well as the host functional genomics and molecular interactions. Pivotal components of our program are FMDV infectious cDNA clones, relevant inoculation models including an aerosolization infection method in cattle, a whole genome bovine microarray and a specialized pathology laboratory. In this presentation we will show relevant examples of the use of these tools resulting in the elucidation of the role of specific FMDV genomic regions on virulence in a relevant host. These genomic regions include parts of the 5'UTR, the leader protease and 3'UTR regions. Details on the role of these regions in viral pathogenesis will be discussed. The combination of pathogenesis studies in relevant hosts and functional genomics allows the identification of virulence determinants in FMDV. The exploration of the viral genome for virulence determinants will generate useful knowledge that could be used to develop more effective control measures against FMD.
II.F. OTHER REPORTS

2. 4th Annual Applied Animal and Public Health Research and Extension Conference
   American Association of Extension Veterinarians

Management Practices Associated with Beef Quality Assurance/Master Beef Producer Certification Among Cattle Producers
F. Hopkins, A. Green, C. Lane, D. Edmisson, L. R. Carpenter, J. Dunn

A programmed approach to BVD eradication in the Upper Peninsula of Michigan beef and dairy herds
B. Bartlett, M. Brunner, L. Harms, S. Bolin, V. Cortese, D. Grotelueschen, D. Grooms

Montana’s BVD-PI Biosecurity Project
C. Peck*, Mo Harbac, J. Paterson

Review of pooled testing strategies and applying them to detect Bovine Viral Diarrhea Virus persistent infected calves and Tritrichomonas foetus infected bulls
J. A. Kennedy

Durability of Disposable Overboots Under Simulated Field Conditions
Kendra Miller*, C. Zadina, J. Traub-Dargatz, D. Dargatz

Survey of Virginia and Maryland Dairy Practitioners on the Treatment of Metritis and a Literature Review
J. F. Currin

Epidemiological study of the risk factors that affect Mortality due to Columnaris on a commercial catfish farm
F. L. Cunningham, R. W. Wills

Educating and Training Future Scientists in Biodefense
H. Simmons, B. Norby, T. Powdril
Introduction

Beef quality assurance (BQA) training and Master Beef Producer (MBP) certification help inform producers regarding current recommended practices in cattle management and husbandry. As of 2008, Tennessee ranks ninth in the U.S. in beef cow inventory. We conducted a mail-out survey to compare knowledge, attitudes, and practices related to beef cattle management and antimicrobial use among Tennessee beef cattle producers. The impacts of BQA training and MBP certification were assessed.

Methods

Data were collected as part of a Tennessee Team on Antimicrobial Resistance (TTAR) mail-out survey distributed by USDA's National Agricultural Statistics Service (NASS). TTAR is a coalition including members from the Tennessee Department of Health, Tennessee Department of Agriculture, University of Tennessee (UT) College of Veterinary Medicine, Tennessee Veterinary Medical Association, UT Extension Service, and the Tennessee Cattlemen’s Association. In November 2007, surveys were mailed to a stratified random sample of 3,000 Tennessee beef producers, with a second mailing for nonrespondents in February 2008. The data collection period for responses was November 1, 2007–April 11, 2008. Producers were asked about BQA training and MBP certification, biosecurity, antimicrobial use and record-keeping practices, and interests related to agricultural education. Odds ratios were calculated to determine association of BQA training or MBP certification with certain management practices, including antimicrobial-associated practices.
Results

One thousand forty-two (35%) of 3,000 producers responded. Of those with cattle (82%), 76% were cow-calf only, 20% had multiple operation types (cow-calf plus either backgrounder or feeder), and about 3% of operations were backgrounders or feeders without a cow-calf component. Thirty-five percent of producers had completed BQA training or were certified MBP. Producers who had completed BQA training or were MBP certified were more likely to test for diseases before admitting new animals to the herd (OR=1.7, CI:1.1-2.7), quarantine new purchases (OR=2.7, CI:2.0-3.7), and separate sick cows from healthy cows (OR=2.2, CI:1.5-3.4). These producers were also more likely to use written instructions for treating disease (OR=2.4, CI:1.7-3.3), keep records of antimicrobial purchases (OR=2.3, CI:1.7-3.0) and antimicrobial use (OR=2.4, CI:1.7-3.2), and to observe withdrawal times (OR=4.4, CI:2.6-7.4). They were also more likely to have used an injectable or oral antibiotic within the past year (OR=3.1, CI: 2.3-4.3). There were no differences in producers’ use of mass antimicrobial treatment, use of antimicrobials as growth promoters, or treatment with antimicrobials at doses higher than the label instructs.

Conclusions

In Tennessee, about three-quarters of beef operations are cow-calf only. Tennessee beef cattle producers who have had BQA training or are MBP certified are more likely to be in compliance with or knowledgeable of certain best management practices, including practices related to judicious use of antimicrobials. BQA and MBP programs are useful mechanisms to promote judicious antimicrobial use practices among cattle producers.
Abstract

Bovine viral diarrhea virus (BVDV) causes severe economic and productivity losses in cattle operations. Costs occur throughout the cattle industry and include reproductive failure, respiratory disease and immune suppression related losses that occur in dairies, beef cow/calf operations, feedlots and other cattle enterprises. Because of the recognized deleterious effects, many countries have implemented BVDV eradication programs. In the US, recent efforts initiated by the Academy of Veterinary Consultants, National Cattlemen’s Beef Association and American Association of Bovine Practitioners have highlighted the importance of BVDV and the need for comprehensive control programs. Many producers have controlled BVDV in their herds, but a state, regional or national eradication program has not been initiated or demonstrated in the US. The objective of this multidisciplinary project is to initiate a regional voluntary BVDV eradication program in the Upper Peninsula (UP) of MI. The purpose is to identify benefits and obstacles of such a program and demonstrate a feasible model that may be adopted by other parts of the US. The eradication program revolves around 1) education, 2) identifying and eliminating persistently infected carriers of BVDV, 3) biosecurity and 4) vaccination to reduce the risk of persistent infection with BVDV. Implementation of these strategies will be integral in eliminating the virus from the UP. Given the voluntary nature of this program, a key to
the success of this program will be engagement of stakeholders including producers, veterinarians, and agribusinesses. The program was launched in the fall of 2007 starting with a series of educational meetings at multiple locations across the UP. Subsequently, a county-by-county approach is being taken to efficiently utilize resources. Within each county, individual cattle producers are being contacted, provided educational material on BVDV and then individual herd plans are being developed which consist of BVDV testing, biosecurity and vaccination. To date (July 17, 2008), 161 (out of an estimated 500 herds in the UP) herds have signed up for the program. In the first five counties that have been focused on, 80% of herds have agreed to participate. Testing has occurred in 110 herds and BVDV has been found in 3 herds (2.5%). One stakeholder driven spill over effect has been the adoption of mandatory BVDV testing for biosecurity of cattle participating in the Upper Peninsula State Fair and several county fairs. Our benchmark goal is to have tested for and controlled BVDV in 80% of the beef and dairy herds and 95% of the cattle in the UP by 2012 and demonstrated that a program consisting of biosecurity and vaccination can maintain BVDV free status. Working with producers, we hope to capitalize on this low risk BVDV status in increasing marketing opportunities for both beef and dairy producers while at the same time realizing better herd health and performance.
Abstract

The Montana BVD-PI Herd Biosecurity Project provides technical and financial assistance to beef producers who want to establish biosecurity programs to prevent transmission of the bovine viral diarrhea virus (BVDv) from persistently infected (PI) animals to cattle breeding herds. The project was designed to: 1) gauge the incidence of BVDv-PI in Montana; 2) demonstrate overall livestock biosecurity practices for any disease of concern; 3) demonstrate innovative disease screening/diagnostic techniques; 4) investigate the economics of BVD-PI elimination on a herd-by-herd basis and; 5) develop templates for BVDv exposure risk at the ranch level.

Cattle herds can be screened at a relatively minimal cost through reverse transcriptase polymerase chain reaction (RT-PCR) using pooled animal tissue samples. This sensitive and specific diagnostic tool (Kennedy JAVMA, Vol 229, No. 9, Nov. 2006) coupled with animal identification permits the removal of BVDv-PI animals from cattle populations.

For the calendar years 2006 and 2007 combined, 145,195 head of cattle from 468 ranching and feedlot operations were screened for BVDv-PI status in Montana. It's anticipated that an additional 50,000 head representing another 250 operations will be screened by year-end 2008. In years 2006 and 2007 combined, participants found 134 BVDv-PI positive (0.09%) cattle from 37 (7.9%) operations enrolled in the program.

A 24-question survey was mailed to the 2007 participants with 75% responding. Ninety percent of the respondents took part in the program to enable them to gauge the prevalence of BVDv-PI in their herd, while 16% did it based on past herd health issues. Seventy four percent stated that they did not suspect their herd to be at risk for BVDv infection. Ninety percent responded they had vaccinated their cows/heifers for BVDv in 2007 and 87% of the producers vaccinated their calves – 75% with a modified live vaccine. Seventy four percent plan to incorporate BVDv screening as a normal part of their herd biosecurity program. To date, 100% of the participating producers who encountered at least one (1) BVDv-PI animal in their first year of screening and who participated the next year (25) found zero (0) BVDv-PI animals in the second year.

Biosecurity practices that will reduce the risk of BVDv transmission in cattle breeding herds and reduce the risk of creating PI animals include: 1) increasing host resistance to transient disease infection via vaccination; 2) periodic whole-herd BVDv screening to help assess BVDv-PI status of individual animals within cattle populations, identify those animals
II.F. OTHER REPORTS

and remove them from a population and; 3) sound animal management practices governing livestock movement and handling, mixing and sorting, identification, record keeping and documentation.

This project demonstrates that applied ranch-based biosecurity measures (1, 2 and 3 above) can for practical purposes eliminate BVDv from cattle breeding herds. Montana Beef Quality Assurance (BQA) is using this project as a template for the larger Montana Livestock Biosecurity Project that combines biosecurity educational programs with the development of formal herd biosecurity plans for any livestock disease of concern.
Abstract

Application of pooled sample strategies as a method to screen populations for disease has been practiced in a variety of forms for many years. Human medicine has applied pooled testing to diagnose syphilis and human immunodeficiency virus. In veterinary medicine pooled strategies have been applied to detect Bovine Viral Diarrhea Virus (BVDV), Tritrichomonas foetus (T. foetus), porcine reproductive and respiratory stress (PRRS) virus, Mycobacterium paratuberculosis subspecies avium and Salmonella enteritidis contamination of eggshells. The high sensitivity and specificity of polymerase chain reaction (PCR) make it an appealing tool to detect the presence of any etiological agent capable of providing nucleic acid for the PCR reaction, including protoza, viruses, and bacteria. By applying pooled testing strategies the diagnostician is able to take advantage of the high sensitivity and specificity of expensive diagnostic tests while minimizing diagnostic costs. Pooled testing strategies are of great value when the etiological agent is still viable within the population such as the carrier animal or the persistently infected animal. Colorado State University Veterinary Diagnostic Laboratory, Rocky Ford Branch, has implemented two applications of a pooled testing strategy one for BVDV the other for Tritrichomonas foetus. Results for BVDV testing identified 205 positive pools out of a total of 4039 pools tested between July 00 and July 008. The 09 pools were composed of 65,88 animals; individual tests of the positive pools by antigen capture ELISA identified 513 positive individuals yielding an apparent prevalence of 0.19%. The application of pooled testing to T. foetus has also shown considerable promise when placed in pools of 5 or less 70 pools have been tested with 103 pools being identified between April 2007 and July 2008. The 70 pools represent 8,567 bulls and from the 103 positive pools 143 positive individual PCR positives were identified. The application of pooled testing strategies offer effective and affordable diagnostic testing that may be applied when diseases of low prevalence are suspected.
II.F. OTHER REPORTS

DURABILITY OF DISPOSABLE OVERBOOTS UNDER SIMULATED FIELD CONDITIONS

Kendra Miller*, Chad Zadina, Josie Traub-Dargatz, David Dargatz
Animal Population Health Institute
College of Veterinary Medicine and Biomedical Science,
Colorado State University

Problem
Ambulatory clinicians are often called to handle infectious and contagious equine cases. To achieve biocontainment in these situations veterinarians should wear protective garments. Durability of protective clothing in the veterinary setting has not been adequately evaluated, making selection of optimal products difficult.

Objectives
The objective of this study was to evaluate the durability of four different similarly priced disposable overboots when worn under simulated field conditions.

Materials/Methods
Four different disposable overboots were selected for the study. A walking course was designed that covered three surfaces—gravel, cement and rubber stall matting totaling 265 feet. Ten third year professional veterinary students participated. The order in which boots were worn was randomized and each participant wore each type of boot three times. Large or extra large boots were provided based on participants shoe size. After walking the course, the porosity of the boots was measured by pouring two liters of water into the boot and measuring the amount of water that leaked into a collection container in one minute. Participants also selected their preferred boot.

Results
The porosity by boot type differed significantly (P<0.05). The mean volume of water recovered by boot type was 209mL(blue), 58mL(clear), 0mL(heavy yellow), and 1mL(light yellow). Among the 4 types of boots the number with no leakage were 5 of 60, and 10 of 60 for clear boots. None of the 60 heavy yellow boots leaked and only 1 60 light yellow boots leaked

Conclusions
Porosity was different across boot types. Based on this study veterinarians can make a more informed decision in selection of overboots.
a. Clear boot (Continental Plastic), blue boot (Jorgensen), heavy yellow boot (Lab Safety Co.), light yellow boot (Onguard Industries)
Metritis is one of the most common diseases of dairy cows. Cases of metritis fall into 2 categories, toxic (systemic) puperal metritis and acute (non-systemic) puperal metritis. Treatment of metritis by dairy practitioners varies greatly. To gain a better understanding of the current practices in treatment of metritis in dairy cows a questionnaire on the treatment of 3 cases of metritis was mailed out to dairy practitioners.

A questionnaire was mailed out on the treatment of 3 cases of metritis to 65 dairy practitioners. The questionnaire consisted of 3 separate cases of metritis. Case 1 was a case of acute puperal metritis, case 2 was a mild case of toxic puperal metritis, and case 3 was a severe case of toxic puperal metritis.

40 practitioners returned surveys. Survey results for treatments for each case were divided into 5 categories. The categories were systemic antibiotics, intrauterine therapy, uterine evacuants, NSAIDS, and fluid therapy. Systemic Antibiotics were used by 15 of the practitioners in case 1. In case 2 80% of the respondents used systemic antibiotics. For case 3 the case of severe toxic puperal metritis 98% of respondents used systemic metritis. Intrauterine therapy was used 25% of the time in case 1, 35% of the time in case 2, and 30% of the time for case 3. Uterine evacuants were the most commonly used therapy overall. For all cases 70% of practitioners used uterine evacuants. NSAID use in case 1 was 5%. Usage of NSAIDS climbed to 28% in case 2 and 75% in case 3. Fluid therapy followed the same trend with 5% usage in case 1, 63% in case 2 and 80% in case 3.

Treatment of metritis in dairy cows varied greatly between practitioners. Case 1 was picked to be representative of a typical case of acute puperal (non-systemic) metritis. 15% of practitioners used systemic antibiotics to treat this case. There is no evidence that treatment of these cows with systemic antibiotics is beneficial. Antibiotic usage in these cases should be carefully evaluated. Uterine evacuants were commonly used as a treatment for metritis across all cases. Review of the literature did not reveal any evidence that uterine evacuants were beneficial before day 8 postpartum. In spite of the fact that ECP had been removed from the market estrogens were still a common drug used to treat metritis. Given the fact that no product containing estrogens for use in cattle exists and the lack of a single study showing the efficacy of using estrogens to treat metritis, these products should not be used in lactating dairy cows. Intrauterine therapy of dairy cows for the treatment of metritis has long been a controversial topic among bovine practitioners.
Study results of treatment of metritis with IU therapy have been mixed. A recent study from Israel involving over 2000 cows showed an improvement in conception rate and milk production from the administration of IU oxytetracycline to cows with metritis (Goshen 2006). There are numerous studies that support the use of systemic antibiotics in the treatment of metritis (Chenault et al, Cho Zhou et al, Smith et al). Oxytetracycline, penicillin and ceftiofur all come in formulations that have different carriers, concentrations, and pharmacokinetics that vary greatly between products and route of administration. Understanding these differences is important in selecting and dosing them for treatment of metritis. Anti-inflammatory therapy has not been well studied as an adjunctive therapy in treatment of metritis. Flunixin was the most commonly used compound. Flunixin is only labeled to be administered IV and has a 36 hour milk withdrawal. More research needs to be done on the efficacy of NSAIDS in the treatment of toxic pupeal metritis. Care should be taken when using these products to ensure that violative residues do not occur in the milk or meat. Treatment of metritis should be based on correct diagnosis and current research.
**II.F. OTHER REPORTS**

**EPIDEMIOLOGY OF *NEOSPORA CANINUM* IN A MISSISSIPPI BEEF CATTLE HERD**

J.E. Huston, C.L. Huston, J. Carter  
Mississippi State University College of Veterinary Medicine

L.R. Ballweber  
Colorado State University College of Veterinary Medicine

J.D. Anderson  
Mississippi State University Department of Agricultural Economics

**Abstract**

*N. caninum*, a protozoan parasite, is associated with decreased reproductive performance and economic losses in dairy cattle with little known about the effects in beef cattle. The purpose of this study was to characterize the effects of neosporosis on a herd of beef cattle in Mississippi. A beef herd with a history of neosporosis was monitored for four years. Blood samples were collected annually from all animals at weaning. Production records analyzed included: culling rate, calving interval, calf birth weight (BW), 205d adjusted weaning weight (ADJWW), 365d adjusted yearling weight (ADJYW), frame score (FS), final weight at harvest, gain, feed efficiency (FE), carcass weight, percentage choice and above (%CH), calculated yield grade and rib eye area. The serologic status was determined using a commercial bovine ELISA test kit for *N. caninum*. Seropositive cows had calves with heavier ADJWW (236.8 ± 10.4 vs. 217.7 ± 2.2 kg, p=.0007). Seropositive calves had heavier ADJWW (235 ± 11.2 vs. 217.7 ± 2.2 kg, p=.0094), heavier ADJYW (311.4 ± 14.5 vs. 290 ± 2.9 kg, p=.0740) and reduced FE (2.8 ± .25 vs. 2.6 ± .03 kg consumed/kg gain p=.0196). A related investigation was performed to estimate the statewide prevalence of the parasite in Mississippi cattle. Potential replacements from a livestock market disease prevalence study were determined to have a seroprevalence rate of 16.8%. The findings from these two studies emphasize the importance of continued research on the effects of the parasite in beef breeding herds.
Introduction

Infectious diseases in farm raised catfish cost producers millions of dollars in direct fish losses each year. Diseases also decreases profitability by increasing treatment costs, reducing feed consumption, increasing feed conversion ratios and causing harvesting delays. Progress in the area of disease control is limited. Epidemiological studies are needed to understand the pathogenesis of the major disease entities the relationships between management practices and other risk factors associated with disease outbreaks. Bacterial disease outbreaks may increase during periods of increased fish stress. Extreme temperatures, overstocking, harvesting, poor water quality and low oxygen may all contribute to fish stress levels.

Materials and methods

The objective of this study was to use a newly developed Catfish Database for epidemiological studies to 1) determine the risk factors associated with catfish production at the farm and pond level and 2) determine the interactions between disease and these risk factors. This study concentrated on disease interactions in Columnaris outbreaks. A large intergraded commercial producer shared production records which were Excel based spreadsheets linked together. All data was converted, assigned a permanent ID and entered into an Access Database. Analysis was completed using SAS Proc Glimmix to account for repeated measures by disease event day and the cluster affect by site (farm). Columnaris was chosen as the first disease of interest as it accounted for 18.33% of the farm recorded mortalities over the four year study period.

Results

Glimmix analysis yielded thirteen variables that had P values of < 0.05. Multivariate results yielded four variables in the final model. Disease to Harvest Interval (DisHarvIntrvl) had an OR of 0.97 (0.94, 0.99) with a P value of <0.0001. Feed fed for the 7 days prior to a mortality event on a per acre foot basis (F0_7perVol) had an OR of 0.1 (0.09, 0.1) and a P value of 0.01. Pond Size in acres had an OR of 1.12 (1.02,1.23) with a P value of < 0.0001 and Ammonia levels 1 days prior to a mortality event had an OR of 2.63 (1.96,3.52) with a P value of 0.02.
Discussion/Conclusion

Larger pond size was associated with Columnaris mortality events. Reduced feed consumption for a 7 day period prior to a mortality event adjusted on a per acre foot basis (volume) was associated Columnaris mortality events. Ponds that had mortality due to Columnaris had shorter intervals from disease break to harvest. Elevated Ammonia levels measured 21 days prior to a recorded Columnaris mortality event were associated with positive pond disease status.

This is not to say that pond size or reduced feed consumption cause Columnaris outbreaks but may affect some of the parameters yet to be analyzed that contribute to fish stress levels. Some limitations to the data set that should be noted include that was a retrospective study and the data was collected for management purposes and not research. Most disease outbreaks have multiple disease etiologies but each outbreak was attributed to a single cause. Observed losses in catfish made up only a small proportion of the actual losses. Our work showed some commonly recorded production variables (feed consumption, pond size and ammonia levels) are associated with Columnaris disease outbreaks and if monitored could help identify “at risk” ponds prior to disease outbreaks.
Various reports have anticipated shortages within the veterinary and medical workforce, particularly in respect to biodefense for foreign animal and zoonotic diseases. The National Center for Foreign Animal and Zoonotic Disease Defense (FAZD Center) is a Department of Homeland Security (DHS) funded Center of Excellence who has provided foreign animal disease and zoonotic disease (FAD-ZD) related career development scholarships to undergraduate students and fellowships to highly qualified veterinarians from private practice and veterinary doctoral degree programs (Texas A&M University and University of California at Davis).

The initial aim of the career development program was to: a) expand the number of trained veterinarians in areas consistent with the biodefense needs of DHS and other federal and state agencies and b) enhance the nation's capacity to prepare and respond to FAD-ZD threats by rapidly expanding the number of postgraduate research scientists with novel specialized training in biodefense and public health disciplines. The multidisciplinary program focused on the DHS objectives of disease prevention, detection, response, and recovery while bridging the foreign animal and zoonotic disease curriculum to policy- and biodefense-specific training.

Approximately 100 students have or are currently supported in full or in part by the FAZD Center to study and conduct research pertaining to topics of importance in biodefense since the program's inception. Disciplines involved range from molecular biology to agricultural economics. Experience-based internships (Lawrence Livermore National Laboratories (LLNL), and United States Department of Agriculture (USDA), have provided students with valuable knowledge, skills, and abilities pertaining to FAD-ZD related topics. This program has combined educators, students, and stakeholders from multiple disciplines to help meet the critical needs in workforce shortages related to biodefense; both for foreign animal and zoonotic diseases.

Currently, changing demographics, social infrastructure, and community dynamics within the United States has prompted the FAZD Center to focus on training individuals from minority serving institutions.
II.F. OTHER REPORTS

The goal of the program is to promote leadership and training in science literacy and biodefense among students from minority serving institutions in order to: a) build community-based bridges among underserved and low socio-economic areas related to FAD-ZD outreach, b) provide scientifically trained individuals whose future aspirations are to work with minority communities in the United States, and c) increase minority student recruitment and retention into both higher education, and ultimately into meaningful positions in the public and private sectors. Specifically, the project’s design requires scholars and fellows to deliver science education and outreach programs to minority communities. The opportunity to create community-based bridges between Scholars or Fellows and underserved communities is paramount. The ability to provide student leadership skills, in conjunction with, FAD-ZD educational opportunities to work with underserved communities will aid in future outreach advancements for public and/or animal health.
III. Organizational Matters
A. Bylaws of USAHA
B. USAHA Administrative Policies
C. Previous Meetings
D. USAHA Medal of Distinction Award Winners
III.A. BY-LAWS OF USAHA

A.

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
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.
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.
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
III.A. BY-LAWS OF USAHA

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,
III.A. BY-LAWS OF USAHA

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
III.A. BY-LAWS OF USAHA

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. At any meeting of the Board of Directors, the President Elect (Chairman of
III.A. BY-LAWS OF USAHA

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.

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 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 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
III.A. BY-LAWS OF USAHA

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.

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
III.A. BY-LAWS OF USAHA

taxation under Section 501 (c) (5) of the Internal Revenue Code of 1986, as amended, or any successor provision.
III.B. ADMINISTRATIVE POLICIES

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 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 10% 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
III.B. ADMINISTRATIVE POLICIES

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.
III.B. ADMINISTRATIVE POLICIES

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 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>Meeting</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sept. 27-28, 1897 †</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>2</td>
<td>Oct. 11-12, 1898</td>
<td>Omaha, NE</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Mr. Taylor Riddie, KS</td>
</tr>
<tr>
<td>3</td>
<td>Oct. 11-12, 1899 † †</td>
<td>Chicago, IL</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Mr. Mortimer Levering, Lafayette, IN</td>
</tr>
<tr>
<td>4</td>
<td>Oct. 2-3, 1900</td>
<td>Louisville, KY</td>
<td>*Mr. C.P. Johnston, Springfield, IL</td>
<td>*Dr. E.T. Eisenman, Louisville, KY</td>
</tr>
<tr>
<td>5</td>
<td>Oct. 8-9, 1901</td>
<td>Buffalo, NY</td>
<td>*Dr. E.P. Niles, VA</td>
<td>*Dr. E.T. Eisenman, Louisville, KY</td>
</tr>
<tr>
<td>6</td>
<td>Sept. 23-24, 1902</td>
<td>Wichita, KS</td>
<td>*Mr. W.H. Dunn, TN</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>7</td>
<td>Sept. 22-23, 1903</td>
<td>Denver, CO</td>
<td>*Mr. E. Bolton, Woodward, OK</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>8</td>
<td>Aug. 23-24, 1904</td>
<td>St. Louis, MO</td>
<td>*Dr. J.C. Norton, AZ</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
</tr>
<tr>
<td>9</td>
<td>Aug. 15-16, 1905</td>
<td>Guthrie, OK</td>
<td>*Mr. Wm. P. Smith, Monticello, IL</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>10</td>
<td>Aug. 15-16, 1906</td>
<td>Springfield, IL</td>
<td>*Mr. M. M. Hankins, Quanah, TX</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>11</td>
<td>Sept. 16-17, 1907</td>
<td>Richmond, VA</td>
<td>*Dr. D. F. Luckey, Columbia, MD</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>12</td>
<td>Sept. 14-16, 1908</td>
<td>Washington, DC</td>
<td>*Dr. Charles G. Lamb, CO</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
</tr>
<tr>
<td>13</td>
<td>Sept. 13-15, 1909 ‡</td>
<td>Chicago, IL</td>
<td>*Dr. W. H. Dalrymple, Baton Rouge, LA</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
</tr>
<tr>
<td>14</td>
<td>Dec. 5-7, 1910</td>
<td>Chicago, IL</td>
<td>*Dr. C. E. Cotton, St. Paul, MN</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>15</td>
<td>Dec. 5-6, 1911</td>
<td>Chicago, IL</td>
<td>*Dr. John F. Devine, Goshen, NY</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>16</td>
<td>Dec. 3-5, 1912</td>
<td>Chicago, IL</td>
<td>*Dr. Macyck P. Ravener, Madison, IL</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>17</td>
<td>Dec. 2-4, 1913</td>
<td>Chicago, IL</td>
<td>*Dr. Peter F. Bahnsen, Atlanta, GA</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>18</td>
<td>Feb. 16-18, 1914</td>
<td>Chicago, IL</td>
<td>*Dr. S.H. Ward, St. Paul, MN</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>19</td>
<td>Dec. 2-3, 1915</td>
<td>Chicago, IL</td>
<td>*Dr. J. L. Gibson, Des Moines, IA</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>20</td>
<td>Dec. 5-7, 1916</td>
<td>Chicago, IL</td>
<td>*Dr. O. E. Dyson, Springfield, IL</td>
<td>*Mr. J. J. Ferguson, Chicago, IL</td>
</tr>
<tr>
<td>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary/Executive</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>-----------------</td>
<td>------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>21</td>
<td>Dec. 3-5, 1917</td>
<td>Chicago, IL</td>
<td>*Dr. J. G. Wills, Albany NY</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>22</td>
<td>Dec. 2-4, 1918</td>
<td>Chicago, IL</td>
<td>*Dr. M. Jacob, Knoxville, TX</td>
<td>*Dr. S. H. Ward, St. Paul, MN</td>
</tr>
<tr>
<td>23</td>
<td>Dec. 1-3, 1919</td>
<td>Chicago, IL</td>
<td>*Dr. G. W. Dumphy, Lansing, MI</td>
<td>*Dr. D. M. Cambpell, Chicago, IL</td>
</tr>
<tr>
<td>24</td>
<td>Nov. 29-Dec. 1, 1920</td>
<td>Chicago, IL</td>
<td>*Dr. S. F. Musselman, Frankfort, KY</td>
<td>*Dr. D. M. Cambpell, Chicago, IL</td>
</tr>
<tr>
<td>25</td>
<td>Nov. 28-30, 1921</td>
<td>Chicago, IL</td>
<td>*Dr. W. F. Crewe, Bismarck, MD</td>
<td>*Dr. Theo. Burnett, Columbus, OH</td>
</tr>
<tr>
<td>26</td>
<td>Dec. 6-8, 1922</td>
<td>Chicago, IL</td>
<td>*Dr. T. E. M. Munce, Harrisburg, PA</td>
<td>*Dr. Theo. Burnett, Columbus, OH</td>
</tr>
<tr>
<td>27</td>
<td>Dec. 5-7, 1923</td>
<td>Chicago, IL</td>
<td>*Dr. W.J. Butler, Henena, MT</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>28</td>
<td>Dec. 3-5, 1924</td>
<td>Chicago, IL</td>
<td>*Dr. J. G. Ferneyhough, Richmond, VA</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>29</td>
<td>Dec. 2-4, 1925</td>
<td>Chicago, IL</td>
<td>*Dr. J. H. McNeil, Trenton, NJ</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>30</td>
<td>Dec. 1-3, 1926</td>
<td>Chicago, IL</td>
<td>*Dr. John R. Mohler, Washington, DC</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>31</td>
<td>Nov. 30-Dec. 2, 1927</td>
<td>Chicago, IL</td>
<td>*Dr. L. Van Es, Lincoln, NE</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>32</td>
<td>Dec. 5-7, 1928</td>
<td>Chicago, IL</td>
<td>*Dr. C. A. Cary, Auburn, AL</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>33</td>
<td>Dec. 4-6, 1929</td>
<td>Chicago, IL</td>
<td>*Dr. Chas. O. Lamb, Denver, CO</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>34</td>
<td>Dec. 3-5, 1930</td>
<td>Chicago, IL</td>
<td>*Dr. A. E. Wright, Washington, DC</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>35</td>
<td>Dec. 2-4, 1931</td>
<td>Chicago, IL</td>
<td>*Dr. J. W. Connaway, Columbia, MD</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>36</td>
<td>Nov. 30-Dec. 2, 1932</td>
<td>Chicago, IL</td>
<td>*Dr. Peter Malcolm, Des Moines, IA</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>37</td>
<td>Dec. 6-8, 1933</td>
<td>Chicago, IL</td>
<td>*E. T. Faulder, Albany, NY</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>38</td>
<td>Dec. 5-7, 1934</td>
<td>Chicago, IL</td>
<td>*Dr. T. E. Robinson, Providence, RI</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>39</td>
<td>Dec. 4-6, 1935</td>
<td>Chicago, IL</td>
<td>*Dr. Edward Records, Reno, NV</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>40</td>
<td>Dec. 2-4, 1936</td>
<td>Chicago, IL</td>
<td>*Dr. Walter Wisnicky, Madison, WI</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary/Executive</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-----------------</td>
<td>------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>41</td>
<td>Dec. 1-3, 1937</td>
<td>Chicago, IL</td>
<td>*Dr. R. W. Smith, Concord, NH</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>42</td>
<td>Nov. 30-Dec. 2, 1938</td>
<td>Chicago, IL</td>
<td>*Dr. D. E. Westmoreland, Frankfort, KY</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>43</td>
<td>Dec. 6-8, 1939</td>
<td>Chicago, IL</td>
<td>*Dr. J. L. Axby, Indianapolis, IN</td>
<td>*Dr. O.E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>44</td>
<td>Dec. 4-6, 1940</td>
<td>Chicago, IL</td>
<td>*Dr. H. D. Port, Cheyenne, WY</td>
<td>*Dr. Mark Welsh, College Park MD</td>
</tr>
<tr>
<td>45</td>
<td>Dec. 3-5, 1941</td>
<td>Chicago, IL</td>
<td>*Dr. E. A. Crossman, Boston, MA</td>
<td>*Dr. Mark Welsh, College Park MD</td>
</tr>
<tr>
<td>46</td>
<td>Dec. 2-4, 1942</td>
<td>Chicago, IL</td>
<td>*Dr. I. S. McAdory, Auburn, AL</td>
<td>*Dr. Mark Welsh, College Park MD</td>
</tr>
<tr>
<td>47</td>
<td>Dec. 1-3, 1943</td>
<td>Chicago, IL</td>
<td>*Dr. W. H. Hendricks, Salt Lake City, UT</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>48</td>
<td>Dec. 6-8, 1944</td>
<td>Chicago, IL</td>
<td>*Dr. J. M. Sutton, Atlanta, GA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>49</td>
<td>Dec. 5-7, 1945</td>
<td>Chicago, IL</td>
<td>*Dr. C. U. Duckwork, Sacramento, CA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>50</td>
<td>Dec. 4-6, 1946</td>
<td>Chicago, IL</td>
<td>*Dr. William Moore, Raleigh, NC</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>51</td>
<td>Dec. 3-5, 1947</td>
<td>Chicago, IL</td>
<td>*Dr. Will J. Miller, Topeka, KS</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>52</td>
<td>Oct. 13-15, 1948</td>
<td>Denver, CO</td>
<td>*Dr. Jean V. Knapp, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>53</td>
<td>Oct. 12-14, 1949</td>
<td>Columbus, OH</td>
<td>*Dr. T. O. Brandenburg, Bismarck, ND</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>54</td>
<td>Nov. 1-3, 1950</td>
<td>Phoenix, Az</td>
<td>*Dr. C. P. Bishop, Harrisburg, PA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</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>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>56</td>
<td>Oct. 29-31, 1952</td>
<td>Louisville, KY</td>
<td>*Dr. Ralph L. West, St. Paul, MN</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>57</td>
<td>Sept. 23-25, 1953</td>
<td>Atlantic City, NJ</td>
<td>*Dr. T. Childs, Ottawa, Canada</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>58</td>
<td>Nov. 10-12, 1954</td>
<td>Omaha, NE</td>
<td>*Dr. T. C. Green, Charleston, WV</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</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>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>60</td>
<td>Nov. 28-30, 1956</td>
<td>Chicago, IL</td>
<td>*Dr. A. L. Brueckner, Baltimore, MD</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary/Executive</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>------------------</td>
<td>------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>61</td>
<td>Nov. 13-15, 1957</td>
<td>St. Louis, MO</td>
<td>*Dr. G. H. Good, Cheyenne, WY</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>62</td>
<td>Nov. 4-6, 1958</td>
<td>Miami Beach, FL</td>
<td>*Dr. John G. Milligan, Montgomery, AL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>63</td>
<td>Nov. 15-18, 1959</td>
<td>San Francisco, CA</td>
<td>*Mr. F. G. Buzzell, Augusta, ME</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>64</td>
<td>Oct. 17-21, 1960</td>
<td>Charleston, WV</td>
<td>*Dr. J. R. Hay, Chicago, IL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>65</td>
<td>Oct. 30-Nov. 3, 1961</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. P. Schneider, Boise, ID</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>66</td>
<td>Oct. 30-Nov. 2, 1962</td>
<td>Washington, DC</td>
<td>*Dr. W. L. Bendix, Richmond, VA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>67</td>
<td>Oct. 15-18, 1963</td>
<td>Albuquerque, NM</td>
<td>*Dr. T. J. Grennan, Jr. Providence, RI</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>69</td>
<td>Oct. 25-29, 1965</td>
<td>Lansing, MI</td>
<td>*Dr. J. W. Safford, Helena, MT</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>70</td>
<td>Oct. 10-14, 1966</td>
<td>Buffalo, NY</td>
<td>Dr. C. L. Campbell, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>71</td>
<td>Oct. 16-20, 1967</td>
<td>Phoenix, AZ</td>
<td>*Dr. Grant S. Kaley, Albany, NY</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>72</td>
<td>Oct. 6-11, 1958</td>
<td>New Orleans, IA</td>
<td>*Dr. John F. Quinn, Lansing, MI</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>73</td>
<td>Oct. 12-19, 1969</td>
<td>Milwaukee, WI</td>
<td>*Dr. John L. Oharra, Reno, NV</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>74</td>
<td>Oct. 18-23, 1970</td>
<td>Philadelphia, PA</td>
<td>*Dr. Frank B. Oharra, Baton Rouge, LA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>75</td>
<td>Oct. 24-29, 1971</td>
<td>Oklahoma City, OK</td>
<td>*Dr. M.D. Mitchell, Pierre, SD</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>76</td>
<td>Nov. 5-10, 1972</td>
<td>Miami Beach, FL</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>77</td>
<td>Oct. 14-19, 1973</td>
<td>St. Louis, MO</td>
<td>*Dr. W. C. Tobin, Denver, CO</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>78</td>
<td>Oct. 13-18, 1974</td>
<td>Roanoke, VA</td>
<td>*Mr. O. H. Timm, Dixon, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>79</td>
<td>Nov. 2-7, 1975</td>
<td>Portland, OR</td>
<td>*Dr. J. E. Andrews, GA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>80</td>
<td>Nov. 7-12, 1976</td>
<td>Miami Beach, FL</td>
<td>*Dr. H. E. Goldstein, Columbus, OH</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary/Executive</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>------------------</td>
<td>--------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>81</td>
<td>Oct. 16-21, 1977</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. E. Janawicz, Montpelier, VT</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>82</td>
<td>Oct. 21-Nov. 3, 1978</td>
<td>Buffalo, NY</td>
<td>**Dr. L. E. Bartell, Sacramento, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>83</td>
<td>Oct. 28-Nov. 2, 1979</td>
<td>San Diego, CA</td>
<td>*Dr. T. F. Zweigart, Raleigh, NC</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>84</td>
<td>Nov. 2-7, 1980</td>
<td>Louisville, KY</td>
<td>*Mr. B. W. Hawkins, Ontario, OR</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>85</td>
<td>Oct. 11-16, 1981</td>
<td>St. Louis, MO</td>
<td>*Dr. L. W. Hinchman, Indianapolis, IN</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>86</td>
<td>Nov. 7-12, 1982</td>
<td>Nashville, TN</td>
<td>Dr. G. B. Rea Salem, OR</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>87</td>
<td>Oct. 15-21, 1983</td>
<td>Las Vegas, NV</td>
<td>Dr. J. R. Ragan, Nashville, TN</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>88</td>
<td>Oct. 21-26, 1984</td>
<td>Fort Worth, TX</td>
<td>*Mr. J. O. Pearce, Jr. Okeechobee, FL</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>89</td>
<td>Oct. 27-Nov. 1, 1985</td>
<td>Milwaukee, WI</td>
<td>*Dr. David U. Walker, Montpelier, VT</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>90</td>
<td>Oct. 14-19, 1986</td>
<td>Louisville, KY</td>
<td>*Dr. N. W. Kruse, Lincoln, NE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>91</td>
<td>Oct. 25-30, 1987</td>
<td>Salt Lake City, UT</td>
<td>*Dr. J. F. Hudelson, Denver, Co</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>92</td>
<td>Oct. 16-21, 1988</td>
<td>Little Rock, AR</td>
<td>*Dr. J. A. Cobb, Atlanta, GA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>93</td>
<td>Oct. 28-Nov. 3, 1989</td>
<td>Las Vegas, NV</td>
<td>Mr. P. E. Bradshaw, Griggsville, IL</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>94</td>
<td>Oct. 6-12, 1990</td>
<td>Denver, CO</td>
<td>Dr. M. A. Van Buskirk, Harrisburg, PA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>95</td>
<td>Oct. 26-Nov. 1, 1991</td>
<td>San Diego, CA</td>
<td>*Dr. P. L. Smith, Sacramento, CA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>96</td>
<td>Oct. 31-Nov. 6, 1992</td>
<td>Louisville, KY</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>97</td>
<td>Oct. 23-29, 1993</td>
<td>Las Vegas, NV</td>
<td>Dr. T. J. Hagerty, St. Paul, MN</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>98</td>
<td>Oct. 29-Nov. 4, 1994</td>
<td>Grand Rapids, MI</td>
<td>Mr. J. B. Finley, Jr., Encinal, TX</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>99</td>
<td>Oct. 28-Nov. 3, 1995</td>
<td>Reno, NV</td>
<td>Dr. H. Wesley Towers, Dover, DE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>100</td>
<td>Oct. 12-18, 1996</td>
<td>Little Rock, AR</td>
<td>Dr. M. R. Marshall, Salt Lake City, UT</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>Meeting</td>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary/Executive</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>------------------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>101</td>
<td>Oct. 17-24, 1997</td>
<td>Louisville, KY</td>
<td>Dr. Larry L. Williams, Lincoln NE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>102</td>
<td>Oct. 3-9, 1998</td>
<td>Minneapolis, MN</td>
<td>Dr. Jones W. Bryan, Columbia, SC</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>103</td>
<td>Oct. 7-14, 1999</td>
<td>San Diego, CA</td>
<td>Dr. Richard H. McCapes, Davis, CA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>104</td>
<td>Oct. 19-26, 2000</td>
<td>Birmingham, AL</td>
<td>Dr. Ernest W. Zirkle, Trenton, NJ</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>105</td>
<td>Nov. 1-8, 2001</td>
<td>Hershey, PA</td>
<td>Dr. Bob R. Hillman, Boise, ID</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>106</td>
<td>Oct. 1-24, 2002</td>
<td>St. Louis, MO</td>
<td>Dr. Maxwell Lea, Jr., Baton Rouge, LA</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>107</td>
<td>Oct. 9-16, 2003</td>
<td>San Diego, CA</td>
<td>Mr. Bob Frost, Lincoln, CA</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>108</td>
<td>Oct. 21-27, 2004</td>
<td>Greensboro, NC</td>
<td>Dr. Donald Lein, Ithaca, NY</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>109</td>
<td>Nov. 3-9, 2005</td>
<td>Hershey, PA</td>
<td>Dr. Richard D. Willer, Phoenix, AZ</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>110</td>
<td>Oct. 12-18, 2006</td>
<td>Minneapolis, MN</td>
<td>Dr. Bret D. Marsh, Indianapolis, IN</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>111</td>
<td>Oct. 18-24, 2007</td>
<td>Reno, NV</td>
<td>Dr. Lee M. Myers, Atlanta, GA</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>112</td>
<td>Oct. 23-29, 2008</td>
<td>Greensboro, NC</td>
<td>Mr. James W. Leafstedt, Alcester, SD</td>
<td>§ Mr. B. D. Richey, St. Joseph, MO</td>
</tr>
</tbody>
</table>

**Key**

* Deceased
** Resigned Dec. 12, 1977
† Reprinted in the 54th Annual Proceedings
†† Reprinted in the 66th Annual Proceedings
‡ Last meeting of the Interstate Association of Livestock Sanitary Boards
§ USAHA hired an Executive Director, in lieu of the Secretary
III.D. MEDAL OF DISTINCTION

D. 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

112th Annual Meeting, Greensboro, North Carolina - 2008
Dr. John C. Shook, Mechanicsburg, Pennsylvania
### IV.A. GLOSSARY OF ACRONYMS

**Glossary of Commonly Used Acronyms**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAHSC</td>
<td>Aquatic Animal Health Standards Commission</td>
</tr>
<tr>
<td>AAVCT</td>
<td>American Academy of Veterinary and Comparative Toxicology</td>
</tr>
<tr>
<td>AAVLD</td>
<td>American Association of Veterinary Laboratory Diagnosticians</td>
</tr>
<tr>
<td>ABADRL</td>
<td>Arthropod-Borne Animal Disease Research Laboratory</td>
</tr>
<tr>
<td>ABSL</td>
<td>Animal Biosafety Levels</td>
</tr>
<tr>
<td>AC</td>
<td>Animal Care (USDA-APHIS)</td>
</tr>
<tr>
<td>ACE</td>
<td>Antigen Capture ELISA</td>
</tr>
<tr>
<td>ACVIM</td>
<td>American College of Veterinary Internal Medicine</td>
</tr>
<tr>
<td>AF</td>
<td>Accredited Free</td>
</tr>
<tr>
<td>AFIA</td>
<td>American Feed Industry Association</td>
</tr>
<tr>
<td>AFS</td>
<td>American Fisheries Society</td>
</tr>
<tr>
<td>AFWA</td>
<td>Association of Fish and Wildlife Agencies</td>
</tr>
<tr>
<td>AHISC</td>
<td>Animal Health Information Systems Committee</td>
</tr>
<tr>
<td>AHP</td>
<td>Animal Health and Production Division</td>
</tr>
<tr>
<td>AHPA</td>
<td>Animal Health Protection Act</td>
</tr>
<tr>
<td>AHSM</td>
<td>Animal Health Surveillance and Management</td>
</tr>
<tr>
<td>AICAP</td>
<td>Avian Influenza Coordinated Agricultural Program</td>
</tr>
<tr>
<td>AI-CMC</td>
<td>Avian Influenza Crisis Management Center</td>
</tr>
<tr>
<td>ANV</td>
<td>Avian nephritis virus</td>
</tr>
<tr>
<td>APHIS</td>
<td>Animal and Plant Health Inspection Service</td>
</tr>
<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>
</tr>
<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>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CAHFS</td>
<td>California Animal Health and Food Safety Lab</td>
</tr>
<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>
</tr>
<tr>
<td>CNS</td>
<td>Central Nervous System</td>
</tr>
<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>
</tr>
<tr>
<td>COOL</td>
<td>Country of Origin Labeling</td>
</tr>
<tr>
<td>COSDA</td>
<td>Communications Officers for State Department of Agriculture</td>
</tr>
<tr>
<td>CPA</td>
<td>Mexico - United States Commission on the Eradication of Foot-and-Mouth Disease and Other Foreign Animal Diseases</td>
</tr>
<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>
</tr>
<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>
</tr>
<tr>
<td>CVI</td>
<td>Certificate of Veterinary Inspection</td>
</tr>
<tr>
<td>CVM</td>
<td>Center for Veterinary Medicine (FDA)</td>
</tr>
<tr>
<td>CWD</td>
<td>Chronic wasting disease</td>
</tr>
<tr>
<td>DAL</td>
<td>District at Large</td>
</tr>
<tr>
<td>DBE</td>
<td>Designated Brucellosis Epidemiologist</td>
</tr>
<tr>
<td>DHHS</td>
<td>Department of Health and Human Services</td>
</tr>
<tr>
<td>DHIA</td>
<td>Dairy Herd Improvement Association</td>
</tr>
<tr>
<td>DHS</td>
<td>Department of Homeland Security</td>
</tr>
<tr>
<td>DIVA</td>
<td>Differentiating Infected from Vaccinated Animals</td>
</tr>
</tbody>
</table>
## IV.A. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DJC</td>
<td>Designated Johne’s Disease Coordinator</td>
</tr>
<tr>
<td>DNR</td>
<td>Department of Natural Resources</td>
</tr>
<tr>
<td>DOI</td>
<td>Department of the Interior</td>
</tr>
<tr>
<td>DS</td>
<td>Diplomatic security</td>
</tr>
<tr>
<td>DVM</td>
<td>Doctor of Veterinary Medicine</td>
</tr>
<tr>
<td>EC</td>
<td>Executive Committee (USAHA)</td>
</tr>
<tr>
<td>EDEN</td>
<td>Extension Disaster Education Network</td>
</tr>
<tr>
<td>EHD</td>
<td>Epizootic Hemorrhagic Disease</td>
</tr>
<tr>
<td>EHDV</td>
<td>Epizootic Hemorrhagic Disease Virus</td>
</tr>
<tr>
<td>EIA</td>
<td>Equine infectious anemia</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>ELISA</td>
<td>Enzyme Linked Immunosorbent Assay</td>
</tr>
<tr>
<td>EM</td>
<td>Electron microspray</td>
</tr>
<tr>
<td>END</td>
<td>Exotic Newcastle disease</td>
</tr>
<tr>
<td>ESF</td>
<td>Emergency Support Function</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FAD</td>
<td>Foreign Animal Diseases</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
</tr>
<tr>
<td>FAS</td>
<td>Foreign Agricultural Service (USDA)</td>
</tr>
<tr>
<td>FAV</td>
<td>Food, Agriculture and Veterinary Defense</td>
</tr>
<tr>
<td>FD&amp;C</td>
<td>Food, Drug and Cosmetic Act</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
</tr>
<tr>
<td>FEMA</td>
<td>Federal Emergency Management Agency (DHS)</td>
</tr>
<tr>
<td>FERN</td>
<td>Food Emergency Response Network</td>
</tr>
<tr>
<td>FHS</td>
<td>Fish Health Section</td>
</tr>
<tr>
<td>FMD</td>
<td>Foot-and-mouth disease</td>
</tr>
<tr>
<td>FPA</td>
<td>Flurescent polarization assay</td>
</tr>
<tr>
<td>FPD</td>
<td>Foreign poultry diseases</td>
</tr>
<tr>
<td>FSIS</td>
<td>Food Safety and Inspection Service</td>
</tr>
<tr>
<td>FWD-IRN</td>
<td>Food and Waterborne Diseases Integrated Research Network</td>
</tr>
<tr>
<td>FWS</td>
<td>Fish and Wildlife Services</td>
</tr>
<tr>
<td>FY</td>
<td>Fiscal Year</td>
</tr>
<tr>
<td>GAP</td>
<td>Good aquaculture practice</td>
</tr>
<tr>
<td>GCC</td>
<td>Government Coordinating Council</td>
</tr>
<tr>
<td>GDB</td>
<td>Generic Database</td>
</tr>
<tr>
<td>GFRA</td>
<td>Global FMD Research Alliance</td>
</tr>
<tr>
<td>GIEFA</td>
<td>InterHemispheric Group for the Eradication of FMD</td>
</tr>
<tr>
<td>GTNP</td>
<td>Grand Teton National Park</td>
</tr>
<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>
</tr>
<tr>
<td>HEYM</td>
<td>Herrold’s egg yolk medium</td>
</tr>
<tr>
<td>HD</td>
<td>Hemorrhagic disease</td>
</tr>
<tr>
<td>HPAI</td>
<td>Highly pathogenic avian influenza</td>
</tr>
</tbody>
</table>
IV.A. GLOSSARY OF ACRONYMS

HSIN  Homeland Security Information System
IAI   Integrated Agricultural Intelligence
IBH   Inclusion body hepatitis
IBMP  Interagency Bison Management Plan
ICS   Incident Command System
IFAH  International Federation for Animal Health
IHC   Immunohistochemistry
ILRI  International Livestock Research Institute
IMT   Incident Management Teams
IS    International Services (USDA)
ISO   International Standards Organization
IT    Information technology
ITRCB International Technical Regulatory Capacity Building
JEI   Johnne’s Education Initiative
JPPD  Johnin purified protein derivative
LBMS  Live Bird Marketing System
LC/MS Liquid Chromatography/Mass Spectroscopy
LPAI  Low Pathogenic avian influenza
LPNAI Low Pathogenic notifiable avian influenza
MA    Modified Accredited
MAA   Modified Accredited Advanced
MAC   Multi-agency coordination committee
MAP   Mycobacterium avium paratuberculosis
MAZ   Modified Accredited Zone
MCI   Market cattle identification
MDOL  Montana Department of Livestock
MDR   Multi-drug resistant
MIM   Mobile Information Management
MOU   Memorandum of Understanding
MST   Microbial Source Tracking
MUMS  Minor Use/Minor Species
NAA   National Aquaculture Association
NADC  National Animal Disease Center
NAHLN National Animal Health Laboratory Network
NAHMS National Animal Health Monitoring System
NAHRS National Animal Health Reporting System
NAHSS National Animal Health Surveillance System
NAIS  National Animal Identification System
NARMS National Anti-Microbial Resistance Monitoring System
NCAHEM National Center for Animal Health and Emergency Management
NCBA  National Cattlemen’s Beef Association
NCFAD National Centre for Foreign Animal Disease
NCIE  National Center for Import and Export
NDV   Newcastle disease virus
NER   National Elk Refuge Bison
### IV.A. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFSMS</td>
<td>National Feral Swine Mapping System</td>
</tr>
<tr>
<td>NIH</td>
<td>National Institute of Health</td>
</tr>
<tr>
<td>NJDDHP</td>
<td>National Johne’s Disease Demonstration Herd Project</td>
</tr>
<tr>
<td>NJWG</td>
<td>National Johne’s Working Group</td>
</tr>
<tr>
<td>NOAA</td>
<td>National Oceanic Atmospheric Administration</td>
</tr>
<tr>
<td>NPB</td>
<td>National Pork Board</td>
</tr>
<tr>
<td>NPD</td>
<td>National Preparedness Directorate</td>
</tr>
<tr>
<td>NPIP</td>
<td>National Poultry Improvement Plan</td>
</tr>
<tr>
<td>NPS</td>
<td>National Park Service</td>
</tr>
<tr>
<td>NRF</td>
<td>National Response Framework</td>
</tr>
<tr>
<td>NRI</td>
<td>National Research Initiative’s</td>
</tr>
<tr>
<td>NSTC</td>
<td>National Science and Technology Council</td>
</tr>
<tr>
<td>NSU</td>
<td>National Surveillance Unit (USDA)</td>
</tr>
<tr>
<td>NVAP</td>
<td>National Veterinary Accreditation Program</td>
</tr>
<tr>
<td>NVS</td>
<td>National Veterinary Stockpile (USDA)</td>
</tr>
<tr>
<td>NVSL</td>
<td>National Veterinary Services Laboratories</td>
</tr>
<tr>
<td>NYSCHAP</td>
<td>New York State Cattle Health Assurance Program</td>
</tr>
<tr>
<td>OCVI</td>
<td>Online Certificate of Veterinary Inspections System</td>
</tr>
<tr>
<td>OD</td>
<td>Optical density</td>
</tr>
<tr>
<td>OHA</td>
<td>Office of Health Affairs (DHS)</td>
</tr>
<tr>
<td>OIE</td>
<td>World Animal Health Organization</td>
</tr>
<tr>
<td>OM</td>
<td>Osteomyelitis</td>
</tr>
<tr>
<td>ORST</td>
<td>Outbreak Response and Surveillance Team</td>
</tr>
<tr>
<td>OSTP</td>
<td>Office of Science and Technology Policy</td>
</tr>
<tr>
<td>PADOH</td>
<td>Pennsylvania Department of Health</td>
</tr>
<tr>
<td>PC</td>
<td>Pre-Conditioning</td>
</tr>
<tr>
<td>PBS</td>
<td>phosphate buffered saline</td>
</tr>
<tr>
<td>PCR</td>
<td>Polymerase Chain Reaction</td>
</tr>
<tr>
<td>PCV 2</td>
<td>Porcine circovirus 2</td>
</tr>
<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>PIIPWG</td>
<td>The 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>
</tbody>
</table>

686
IV.A. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<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>
</tr>
<tr>
<td>SAGARPA</td>
<td>Secretary of Agriculture, Ranching, Rural Development, Fisheries and Food Supply (Mexico)</td>
</tr>
<tr>
<td>SB</td>
<td>Brucella suis (swine brucellosis)</td>
</tr>
<tr>
<td>SCWDS</td>
<td>Southeastern Cooperative Wildlife Disease Study</td>
</tr>
<tr>
<td>SENASICA</td>
<td>National Services of Animal and Plant Health, Quality and Food Safety (Mexico)</td>
</tr>
<tr>
<td>SEPRL</td>
<td>Southeastern Poultry Research Laboratory (ARS)</td>
</tr>
<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 Outbreak 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 encephalopathy</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>
<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>
</tr>
<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 Hemorrhagic 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>
</tr>
<tr>
<td>VLT</td>
<td>Vaccinal laryngotracheitis</td>
</tr>
<tr>
<td>VS</td>
<td>Veterinary Services (USDA)</td>
</tr>
<tr>
<td>VSPS</td>
<td>Veterinary Service Process Streamlining</td>
</tr>
<tr>
<td>WAFWA</td>
<td>Western Association of Fish and Wildlife Agencies</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
### IV.A. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS</td>
<td>Wildlife Services (USDA)</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>
</tr>
</tbody>
</table>