PROCEEDINGS

ONE HUNDRED AND TWENTIETH ANNUAL MEETING

OF THE

UNITED STATES ANIMAL HEALTH ASSOCIATION

SHERATON GREENSBORO HOTEL
GREENSBORO, NORTH CAROLINA
OCTOBER 13 – 19, 2016
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Special Thanks to all Committee Chairs and Presenters for contributions to these proceedings.
ABOUT USAHA

USAHA’S VISION AND MISSION...

The United States Animal Health Association (USAHA) is the leading forum for animal health issues in the United States, promoting active participation from industry, academia, and government. USAHA provides a national venue for stakeholders to identify the most effective methods to protect and improve animal health and welfare and public health.

The United States Animal Health Association develops and promotes sound animal health solutions for the public good.

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Oregon
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South Carolina
South Dakota
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Virginia
Washington
West Virginia
Wisconsin
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USDA, APHIS, Veterinary Services
USDA, Agriculture Research Service
USDA, National Institute of Food and Agriculture
USDA, APHIS, Wildlife Services
USDHHS, Centers for Disease Control and Prevention

USDHHS, Science and Technology Directorate
USDI, US Fish and Wildlife Service
USDI, National Park Service
USDI, USGS, National Wildlife Health Center
USDOE, Lawrence Livermore National Laboratory

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Navajo Nation

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Canada
Mexico
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Allied Industry Organizations (38)

Alpaca Owners Association
American Association of Avian Pathologists
American Association of Bovine Veterinarians
American Association of Equine Practitioners
American Association of Small Ruminant Practitioners
American Association of Swine Veterinarians
American Association of Veterinary Laboratory Diagnosticians
American Association of Wildlife Veterinarians
American Association of Zoo Veterinarians
American Cervid Alliance
American Dairy Goat Association
American Association of Equine Practitioners
American Farm Bureau Federation
American Goat Federation
American Horse Council
American Sheep Industry Association
American Veterinary Medical Association
Association of American Veterinary Medical Colleges
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Battelle Memorial Institute
Exotic Wildlife Association
Livestock Exporters Association, USA
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North Central: L. Neuder, P. Brennan
South: L. O. Lollis; E. Jensen
West: W. Sauble; H.M. Richards

Individual Members: 871
Life Members: 114
Student Members: 174
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I. 2016 Officers and Directors

A. Officers

2015-2016 Executive Committee

Front row (from left): Bruce King, UT, Immediate Past President; David Schmitt, IA, President; Boyd Parr, SC, President-Elect. Back row (from left): Marty Zaluski, MT, Third Vice President; Kristin Haas, VT, Second Vice President; Barbara Determan, IA, First Vice President; Annette Jones, CA, Treasurer.
### USAHA Board of Directors, 2016

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<td>American Assoc. of Veterinary Laboratory Diagnosticians</td>
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<td>Robert Gerlach</td>
<td>Alaska Dept. of Environmental Cons.</td>
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<td>Alpaca Owners &amp; Breeders Assoc.</td>
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<td>Laurie Seale</td>
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I.B. USAHA BOARD OF DIRECTORS

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<td>Scott Marshall</td>
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<td>Enrique Sanchez Cruz</td>
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<td>Dustin Oedekoven</td>
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<td>Boyd Parr</td>
<td>South Carolina Livestock &amp; Poultry/Clemson University</td>
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<td>Andy Schwartz</td>
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<td>Douglas Meckes</td>
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<td>Samantha Gibbs</td>
<td>US Fish &amp; Wildlife Service</td>
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<td>Jonathan Sleeman</td>
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<td>Barry Pittman</td>
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<td>James Logan</td>
<td>Wyoming Livestock Board</td>
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C. 2016 USAHA Committees

- USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
- USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
- COMMITTEE ON ANIMAL WELFARE
- USAHA/AAVLD COMMITTEE ON AQUACULTURE
- COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
- COMMITTEE ON BRUCELLOSIS
- COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
- USAHA/AAVLD COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
- USAHA/AAVLD COMMITTEE ON ENVIRONMENT AND TOXICOLOGY
- USAHA/AAVLD COMMITTEE ON FOOD AND FEED SAFETY
- COMMITTEE ON FOREIGN AND EMERGING DISEASES
- COMMITTEE ON GOVERNMENT RELATIONS
- COMMITTEE ON IMPORT, EXPORT, AND INTERNATIONAL STANDARDS
- COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON, AND CAMELIDS
- COMMITTEE ON INFECTIOUS DISEASES OF HORSES
- COMMITTEE ON JOHNE'S DISEASE
- COMMITTEE ON LIVESTOCK IDENTIFICATION
- USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY
- COMMITTEE ON NOMINATIONS AND RESOLUTIONS
- COMMITTEE ON PARASITIC AND VECTOR BORNE DISEASES
- COMMITTEE ON PHARMACEUTICALS
- COMMITTEE ON PROGRAM
- COMMITTEE ON PUBLIC HEALTH AND RABIES
- COMMITTEE ON SALMONELLA
- COMMITTEE ON SCRAPIE
- COMMITTEE ON SHEEP AND GOATS
I. C. USAHA COMMITTEES

- COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
- COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
- COMMITTEE ON TUBERCULOSIS
- COMMITTEE ON WILDLIFE DISEASES

Rosters of each committee as of the 2016 Annual Meeting are included within each report.

A current listing for committee rosters can be found on the USAHA web site, listed under each committee page respectively.
II. 2016 Annual Meeting Proceedings
A. USAHA/AAVLD President’s Reception and Dinner
B. USAHA/AAVLD Plenary Session
C. USAHA Scientific Posters, Papers and Abstracts
D. USAHA Membership Meetings
E. Committee Reports
F. Other Reports
A. USAHA/AAVLD President’s Reception and Dinner

INVOCATION
Barbara Determan

MEMORIAL SERVICE
Boyd Parr

Colleagues, let us take a moment this evening to humbly pause in our busy lives to remember those that have served with us over the years, but will not be with us this evening because of their passing. Let us keep in mind that life is fragile, but also enjoy the memories, contributions and fellowship that we share that are no longer with us. We wish for strength to their families and friends, and that we carry forward their dedication in the work we do here.

Please take a moment and reflect on these individuals as I read their names:

David Bartlett, Wisconsin, USAHA Member
Neal Black, Minnesota, USAHA Member
Mark Engle, Missouri, USAHA Member
Don Notter, Kentucky, USAHA Member

Let us humbly pause for silent prayer in remembrance of these deceased members. Amen.

MEMORIAL PRESENTATION
Ernie Zirkle

In memory of Dr. Donald Notter, a memorial scholarship fund has been set up by a group of former state veterinarians, known as the Grits Mafia. In its first year, the scholarship was presented by Dr. Ernie Zirkle on behalf of the group to Andy Xin, Virginia-Maryland College of Veterinary Medicine. Dr. Notter's wife Donna and other family were in attendance for the presentation.
North Carolina's agricultural industry, including food, fiber and forestry, contributes $84 billion to the state's economy, accounts for more than 17 percent of the state's income, and employs 17 percent of the work force.

North Carolina is one of the most diversified agriculture states in the nation. The state's 50,200 farmers grow over 80 different commodities, utilizing 8.4 million of the state's 31 million acres to furnish consumers a dependable and affordable supply of food and fiber.

North Carolina produces more tobacco and sweet potatoes than any other state and ranks second in Christmas tree cash receipts and the production of hogs and turkeys. The state ranks seventh nationally in farm profits with a net farm income of over $2.8 billion. Net income per farm in the state is over $57,000.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

PRESIDENT’S DINNER SPONSOR’S RECOGNITION

Special Thanks to our 2017 President’s Dinner Supporters

Jill Greene, Thermo Fisher Scientific

Steve Parker, Merial

SPECIAL RECOGNITION
David Schmitt

Dr. David Schmitt, on behalf of the Executive Committee recognized Ben Richey, USAHA Executive Director, for 10 years of service to the association.
Good evening everyone. Welcome to the 120th USAHA annual meeting, welcome to the 59th AAVLD annual meeting, and welcome to Greensboro. We are glad you’re here. Again, over 1,000 people are registered, which is a tribute to the hard work of several people and your interest and involvement in the many committees.

I need to begin my remarks by thanking a lot of people for a lot of help this past year. First of all, I must thank and recognize my wife Connie and the rest of my family for their support and patience. The USAHA Executive committee—these individuals have devoted a great amount of time and energy to the organization this year. Along with this our USAHA staff, Ben Richey and Kelly Janicek, a big thank you for another year of hard work and for keeping things running smoothly. In addition, thank you to the North Central USAHA for their trust and nominating me.

Next, I must extend a special thanks to my boss, Bill Northey, Secretary of the Iowa Department of Agriculture and Land Stewardship. He has enthusiastically approved and supported my involvement in the activities of USAHA for the past five years and especially this year. My thanks, too, to my staff at home who have gone way beyond their responsibilities to help me.

Last, but certainly not least, thanks to all of you—committee chairs, USAHA members, AAVLD, our Federal partners, state veterinarians, the animal agriculture industries, university colleagues and researchers, our student guests, and our many outstanding sponsors.

I have had the opportunity to meet many great individuals throughout my years of serving you on the Executive Committee. I am fortunate enough to have attended all four regional animal health association meetings this year,
the NIAA annual meeting, and the USAHA Government Relations Committee meeting. For all of these great opportunities, I am most grateful.

This again has been a busy year with findings of Highly Pathogenic Avian Influenza, Seneca virus, and most recently the finding of New World Screwworm. Of course, tuberculosis, brucellosis, and scrapie, to name a few of the old stand-bys, are still around. We can't afford to quit on our efforts just because we near a point of eradication. I truly believe collectively and with new scientific advances, technologies and diagnostics we can complete eradication of impacting diseases, as we have conquered other diseases in the past.

We have had a lot of "opportunities" this year. Opportunities to do what everyone here tonight do and that is to take care of the health of the animals of this country so that the citizens of the United States can continue to have the best, safest, and the reasonably cost food in the world, produced in safe and healthy surroundings and to help insure the health of the people of this nation.

We all have done a lot in our own arena to advance many common goals. Change is inevitable and we must welcome and embrace new science and technologies. It is essential to continue our ongoing work to ready ourselves in preparation for emergencies—accidental, intentional, and natural disasters. We have an established nationwide diagnostic laboratory network and there is continued progress on completion of the National Bio and Agro-Defense Facility. Above all, however, I see our ability and the commitment of our USAHA to work together. In the face of fewer people, less money and more work, working together is a must. Actually, that is why we are all here—to work together.

Again, my sincerest thanks to all of you for allowing me to serve you, for all that you have done for USAHA, and thank you for being here.
AAVLD PRESIDENT’S ADDRESS
Tom Baldwin

Dr. Thomas Baldwin assists the UVDL (Utah Veterinary Diagnostic Laboratory) in providing state-of-the-art, validated, timely, quality-controlled, veterinary laboratory-based tests to animal owners, veterinarians and regulatory officials. By so doing, the UVDL will safeguard agricultural animal health in the greater Intermountain area, provide veterinary medical laboratory assays necessary to permit interstate and international transportation of live animals and protect the public from zoonotic disease.

Dr. Baldwin teaches, General Pathology and the respiratory pathology component of, Systemic Pathology. His teaching philosophy is to do it well.

In 1985, Tom Baldwin received a B.S. in veterinary science from Washington State University, Pullman, followed by a D.V.M. from the same institution in 1988. In 1992, he completed a combined veterinary pathology residency/PhD program in veterinary pathology at Louisiana State University, Baton Rouge. In 1994, Dr. Baldwin earned his board certification from the American College of Veterinary Pathologists and is a diplomate in that college. He spent the next nine years as a diagnostic veterinary pathologist at the Washington Disease Diagnostic Laboratory. Dr. Baldwin is currently the director of the Utah Veterinary Diagnostic Laboratory (UVDL) and an Associate Professor in the Animal, Dairy and Veterinary Sciences department. He teaches General Pathology in USU School of Veterinary Medicine.
RECOGNITION OF 2016 SPONSORS

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Each year, USDA’s Animal and Plant Health Inspection Service (APHIS) presents an Administrator’s Award at the United States Animal Health Association (USAHA) and American Association of Laboratory Diagnosticians (AAVLD) annual meeting. The award goes to a USAHA or AAVLD member whose individual work has had longstanding and significant impacts on U.S. animal health. The 2016 winner is Dr. Annette Jones, the California state veterinarian.

APHIS’ success in protecting U.S. animal health has long hinged on partnerships across Federal and State government, industry, and academia. These successes often depend on people like Dr. Jones who step up to lead and to collaborate across organizations. Dr. Jones has proven time and again in her 15 years of public service to be an invaluable partner to APHIS, and to be someone who consistently goes above and beyond when it comes to promoting U.S. animal health and productivity.

Dr. Jones’ accomplishments in public service include: directing the state and federal partnership to eradicate an outbreak of exotic Newcastle disease; successfully directing the response to detections of avian influenza; and consistently demonstrating an ability to work cooperatively with other government agencies, the public, and industry in emergency animal disease planning efforts at the local, state, and federal levels.
II. A. USAHA/AAVLD PRESIDENT'S RECEPTION AND DINNER

Dr. Jones began her career at CDFA in 2001, was named director of the agency’s Division of Animal Health and Food Safety Services in 2004, and was named State Veterinarian in 2010.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

AAVLD Distinguished Service Award

Dr. Donald Lein

The Distinguished Service Award honors those members who have generously volunteered their time, energy, and professionalism to substantially enrich and advance AAVLD and diagnostic medicine. Dr. Donald Lein, recipient of this year’s Distinguished Service Award is the former Director of the New York State Animal Disease Diagnostic Laboratory at Cornell University, a position he had held since 1987. In 1998 the Diagnostic Laboratory was combined with the Division of Epidemiology and Ambulatory Clinic to become the new Department of Population Medicine and Diagnostic Science. Don is a native New Yorker, born and raised on a dairy/livestock farm in Lancaster, New York. He received his DVM from Cornell University in 1957 and was a partner in a group mixed private practice in Machias, New York for eight years. The practice was mainly dairy and equine, but also had a substantial lake resort small animal hospital practice. Don returned to Cornell University in 1965 as a Senior Research Associate working on reproductive problems and reproductive research under Dr. Kenneth McEntee. In 1969, he entered a resident/graduate program at the University of Connecticut in the field of Pathology. He received his PhD degree in 1974 and became a Diplomate of the American College of Veterinary Pathologists in 1975. In 1974, Don returned to Cornell University as Associate Professor and Director of the Theriogenology Section of the Department of Clinical Sciences with a joint appointment in the Department of Pathology. He became Associate Director of the present Diagnostic Laboratory in 1980 and developed a field service/extension/outreach program and an endocrinology service.
II. A. USAHA/AAVLD PRESIDENT'S RECEPTION AND DINNER

AAVLD E.P. Pope Award

The American Association of Veterinary Laboratory Diagnosticians’ (AAVLD) E. P. Pope Award is the highest honor given by the association in recognition of an individual who has made noteworthy and significant contributions to advance the recognition of the specialty of veterinary diagnostic laboratory medicine.

Adaska was honored for his contributions as “a consummate diagnostician, a scientist, a teacher, an advocate, a trainer and mentor, and a huge supporter of the AAVLD.” He was recognized for: service oriented approach; thoughtful, professional, and effective advocate activities in support of the AAVLD; instrumental oversight of the association’s finances during a time of significant change and leadership transitions; and his successful advocacy efforts related to an initiative for the National Animal Health Laboratory Network. Adaska has also served on a number of AAVLD committees, most recently as the Secretary/Treasurer on the Association’s Executive Committee.

As newly appointed chief of the California Animal Health and Food Safety Laboratory System’s (CAHFS) Tulare Branch, Adaska has served veterinarians, dairy farmers, and animal health stakeholders for more than 20 years. The Tulare facility is one of four laboratories within CAHFS, headquartered at UC Davis and operated for the state by the School of Veterinary Medicine to protect animal health and performance, and safeguard public health and the food supply.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

USAHA Federal Partnership Award

Dr. David Schmitt and Dr. Angela Pelzel-McCluskey

In 2011, USAHA established an award to recognize our federal partners who may work closely with USAHA members on a regular basis. The USAHA Federal Partnership Award is designated for the recognition of a federal employee that has demonstrated commendable service to the betterment of animal health in the United States. Candidates can be employed at any level of an Official Federal Agency Member of USAHA. The candidate should exemplify partnership with states and industry stakeholders through leadership, expertise and/or other accomplishments. The recipient need not be a member of USAHA, but have a positive impact on animal health related to the work of USAHA.

This year’s honoree is Dr. Angela Pelzel-McCluskey

Angela Pelzel-McCluskey, DVM, currently serves as the equine epidemiologist for USDA-APHIS-Veterinary Services. A graduate of Texas A&M University, she worked in a private equine practice in Texas and Colorado, before joining the ranks of public practice in 2004.

Dr. Pelzel-McCluskey is recognized tonight for her exemplary service to the equine industry on behalf of USDA-APHIS-Veterinary Services. Her undaunted efforts dealing with equine diseases in the U.S. have been of great value at state, regional and national levels. She has lead numerous outbreak responses in her relatively short tenure with USDA, and has contributed to countless others.

Angela is known for her practical and realistic approach to equine health, and serves an invaluable role as a partner in working with states on outbreaks and preparedness in the industry. She is always willing to have an open dialogue with stakeholders, and her passion is evident in the work she does.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

USAHA Medal of Distinction Award

Dr. David Schmitt and Mr. Jim Leafstedt

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.

Tonight, our honoree is a true example of a leader. Jim Leafstedt is an accomplished fourth generation pork producer from Alcester, South Dakota. Throughout his career as a highly successful farmer, Jim was consistently active in issues that impacted his livelihood. Jim’s operation was an early victim afflicted with the Pseudorabies, and this experience instilled in him a commitment to improving swine health in the U.S. This commitment over several decades ultimately led to him joining the USAHA Executive Committee to represent the swine industry for the USAHA District at Large, becoming President of USAHA in 2007-2008. As president, Jim was revered as a calm yet deliberate leader. His business acumen proved a valuable asset for USAHA. His combined animal health and board experience was very timely for USAHA, as the leadership was transitioning its staff, office and vision for the organization moving forward. From his efforts in Pseudorabies eradication to leadership in state and national organizations, Jim is known as a consensus builder. He is honest, but fair, and not afraid to press for tough decisions to move his cause in the right direction.

Jim’s resume is a full one. Nationally, he served as a member of the National Pork Board Swine Health Committee, is a former Vice Chairman of the National Institute of Animal Agriculture (NIAA) Swine Health Committee, and served extensively on the USAHA Committee on Pseudorabies. Within South Dakota, Jim has served on the Pork Producers Council Ex-Officio
Board as a representative of the Animal Industry Board and is a past Chairman of the Animal Industry Board, served on the SDPPC Swine Health Advisory Committee and as the Vice Chairman of the Production Profitability Committee. Locally, Jim has been involved with the State Bank of Alcester Board, South Lincoln County Rural Water Board, and the Union County Farm Mutual Board.

Jim and his beloved wife Melva, who passed in 2013, have two grown children, Charlotte and Jonathan. His son-in-law Steve continues the family operation in South Dakota. We are pleased that Jim is able to join us tonight for this special honor. Thank you, Jim, for your long-standing commitment to this organization, and this industry.
National Assembly Award
Susan Keller, President

Mr. Paul Rodgers

Dr. Paul Rodgers, Deputy Director of Policy for the American Sheep Industry Association, was presented the 2016 National Assembly Award. Paul Rodgers has been involved in the livestock industry his entire life and has been a driving force in the sheep industry with special emphasis on regulatory affairs/issues, including animal health, for over 30 years. He has worked closely with many state veterinarians and USDA-APHIS throughout his career and has influenced many very positive policies for all of U.S. animal agriculture.

Paul Rodgers has had a 30-year career with the sheep industry at the national level with the American Sheep Producers Council and the American Sheep Industry Association. His contributions to the industry include the Sheep Industry Development Handbook for which he has overseen several updates with thousands of copies produced for sheep producers and university sheep course work. Without Paul’s efforts new editions of this comprehensive work would not be available.

In 1999-2000 Rodgers led the development and implementation of the national scrapie eradication program (NSEP) for the U.S. sheep industry working closely with USDA-APHIS and the states. The NSEP is the most aggressive program in the world to attack this sheep disease. As part of the eradication effort, the U.S. sheep industry included a national animal ID component again putting America’s industry at the forefront nationally and internationally.

Rodgers was critical to the development of the lamb industry adjustment plan approved by the International Trade Commission in 1999 which led to
dramatic changes and new programming for sheep producers. He also oversaw the development and implementation of the Lamb Risk Protection Program, the only risk management tool available for sheep producers and feeders.

Paul also contributes to the industry on a day-to-day basis by reviewing and commenting on the many USDA-APHIS, FDA, and other government regulations that affect animal agriculture, and in the development of brochures and videos that promote healthy sheep production. His foresight, encouragement and fiscal efforts have brought the industry numerous valuable tools such as an updated NRC Nutrient Requirements of Small Ruminants as well as pharmaceutical products, such as CIDRs (Controlled Internal Drug Release). These resources help to foster the health and productivity of the industry.

Paul is a long time active member of USAHA, serving on many committees, and represents the ASI on the USAHA Board of Directors.
II. B. USAHA/AAVLD Plenary Session

Drs. Boyd Parr; Pat Halbur Co-chairs

Initial Remarks from Moderator - Max Armstrong

Economic Challenges and Opportunities Facing U.S. Animal Agriculture - David Kohl

Challenges and Opportunities for U.S. Animal Agriculture: Meeting the demands of global and domestic markets while fighting burdensome regulation - Dale Moore

Experiences with Precision Livestock Farming in Europe - Daniel Berckmans

Precision Breeding to Advance Animal Health and Welfare - Randall Prather
INITIAL REMARKS FROM MODERATOR
Max Armstrong
Farm Progress America

Biography: Max Armstrong, The Voice of American Agriculture, anchors the Penton Agriculture broadcast group that includes television, radio, enhanced Web content, custom video, and custom programming. Millions of farmers, ranchers and consumers have viewed Max’s TV programs and heard his radio broadcasts during his more than 30 years of industry experience. He is one of the most widely recognized and highly regarded agricultural journalists in America. You can hear him on radio stations throughout the country with weekday broadcasts of his ag perspectives on “Farm Progress America” programs and his wit, wisdom and observations in “Max Armstrong’s Midwest Digest” segments; and weekly co-hosting the “Saturday Morning Show” on the legendary radio powerhouse, WGN radio. He is co-founder and co-host of “This Week in AgriBusiness,” broadcast on the popular RFD-TV satellite and cable channel that is carried on more than 120 additional local television stations throughout the nation’s best ag areas. Max and Orion Samuelson host this highly regarded weekly ag business and news program 52 times each year. In pursuit of the news of agriculture, Max has originated broadcasts from every U.S. state and more than 30 nations. His work has earned dozens of honors from agriculture groups, trade associations and professional organizations. From his boyhood of growing up on a farm near Owensville, Indiana, to his years in Chicago radio and television, Max’s background and experience have developed to give him the perspectives and industry access to produce his insightful broadcasts. He maintains close ties with agriculture and proudly displays his boyhood 1953 Farmall Super H tractor at parades, fairs and festivals.
ECONOMIC CHALLENGES AND OPPORTUNITIES FACING U.S. ANIMAL AGRICULTURE

David Kohl
Department of Agricultural and Applied Economics, Virginia Polytechnic Institute and State University

Biography: David Kohl received his M.S. and Ph.D. degrees in Agricultural Economics from Cornell University. For 25 years, Kohl was Professor of Agricultural Finance and Small Business Management and Entrepreneurship in the Department of Agricultural and Applied Economics at Virginia Tech, Blacksburg, Virginia. He was on special leave with the Royal Bank of Canada working on advanced initiatives for two years, and also assisted in the launch of the successful entrepreneurship program at Cornell University. Kohl is Professor Emeritus in the Agricultural and Applied Economics Department at Virginia Tech. Kohl has traveled almost 9 million miles throughout his professional career! He has conducted more than 6,000 workshops and seminars for agricultural groups such as bankers, Farm Credit, FSA, and regulators, as well as producer and agribusiness groups. He has published four books and over 1,500 articles on financial and business-related topics in journals, extension, and other popular publications. Kohl regularly writes for Corn and Soybean Digest, and other ag lending publications. He has received 11 major teaching awards while teaching over 10,000 students, and 18 major Extension and Public Service awards from Virginia Tech, Cornell University, and state and national organizations. Kohl is a two-time recipient of the prestigious American Agricultural Economics Association’s Outstanding Teaching Award. Kohl is one of only five professors in the nearly 100-year history of the Association to receive the award twice. He received the Governor’s award for his distinguished service to Virginia agriculture, the youngest recipient to receive this award. Kohl was recognized as one of 30 leaders who are the brains behind innovative business management and economic information that agriculture uses today. He also has been named one of seven economists and bankers who challenge the status quo. Kohl has addressed the American Bankers Agricultural Conference for more than 35 consecutive years, and has appeared before numerous state bankers’ schools and conferences throughout the U.S., Canada, Mexico, and the world. He has also been one of the top-rated instructors at the LSU and Colorado Graduate Schools of Banking, and is Chancellor of Farm Credit University, which has trained over 2,000 lenders using an online and face-to-face educational approach. As facilitator of the United States Farm Financial Standards Task Force and member of the Canadian Agricultural Financial Standards Task Force, Dr. Kohl was one of the leaders in establishing guidelines for the standardized reporting and analysis of agricultural producers’ financial information on a national and international basis. The Kohl Agribusiness Centre has been established in the College of Agriculture and Life Sciences at Virginia Tech in honor of his long-term commitment to practical teaching, research, and extension. Kohl is currently President of AgriVisions, LLC, a
knowledge-based consulting business providing cutting-edge programs to leading agricultural organizations worldwide. He is also a business coach and part owner of Homestead Creamery, a value added dairy business in the Blue Ridge Mountains. On a more personal note, Dave enjoys playing basketball and likes most sports, farms, dogs, and covered bridges; he dislikes lazy students, administrative bureaucracies, and paperwork!
II. B. USAHA/AAVLD PLENARY SESSION

CHALLENGES AND OPPORTUNITIES FOR U.S. ANIMAL AGRICULTURE: MEETING THE DEMANDS OF GLOBAL AND DOMESTIC MARKETS WHILE FIGHTING BURDENSOME REGULATION

Dale Moore
American Farm Bureau Federation

Biography: Dale is the Executive Director for Public Policy at American Farm Bureau Federation. Dale joined AFBF in November 2011 as deputy executive director for Public Policy and as manager of the agriculture and trade policy team. Dale brings 30 years of experience in public policy and communications to Farm Bureau. In 2001, Dale was appointed by President Bush as USDA’s chief of staff and served all four individuals appointed as Secretary of Agriculture by the President (Ann M. Veneman, Mike Johanns, Chuck Conner (acting) and Ed Schafer). He also provided transition assistance to President Obama’s agricultural advisors. He also spent over a dozen years on Capitol Hill, working in various positions for the House Agriculture Committee and in the personal office of (now) Senator Pat Roberts (KS) when he served in the House of Representatives. Just prior to joining Farm Bureau, he worked for Policy Directions Inc. as a lobbyist, providing strategic planning and representation for a variety of agricultural and food industry clients. Dale has also worked for two livestock associations. He was executive director for legislative affairs of the National Cattlemen’s Beef Association in the late ’90’s, and in the early “80’s as the communication director for the Kansas Pork Producers Council. He also has worked as a writer and photographer for Blue Cross and Blue Shield. Dale received a bachelor of science degree in animal science from Fort Hays State University (Hays, Kansas) and grew up in southwest Kansas on a livestock, hay and grain farm. He and his wife, Faith, have two grown sons and are the proud grandparents of three grandkids.
EXPERIENCES WITH PRECISION LIVESTOCK FARMING IN EUROPE

Daniel Berckmans
Division M3-BIORES, Department of Biosystems, Heverlee, Belgium

The worldwide demand for meat and animal products might increase by 40% in the next 20 years. A question is how to achieve high-quality, sustainable and safe meat production that can meet this demand. At the same time, livestock production is currently facing serious problems such as animal health in relation to food safety and human health. Europe wants improved animal welfare and has made a significant investment in it. At the same time, the environmental impact of the livestock sector is far from being solved. Finally, we must ask how the farmer, who is the central stakeholder in this process, will make a living from more sustainable livestock production. One tool that might provide real opportunities and solutions to make farmers more competitive is Precision Livestock Farming (PLF). PLF systems aim to offer a real-time monitoring and managing system for the farmer. This is fundamentally different from all approaches that aim to offer a monitoring tool without improving the life of the animal under consideration on that moment in the process. The idea of PLF is to provide a real-time warning when something goes wrong so that immediate action can be taken by the farmer. Continuous, fully automated monitoring and improvement of animal health, welfare, yields and the environmental impact will become possible. In this paper, several examples are given of PLF systems that are operational today in about 60 compartments all over Europe for fattening pigs and broilers. We give details of which variables these systems measure in real time in a fully automated way. Moreover, we show how in the running EU-PLF project we analyze how these data can generate added value for the farmer. PLF systems can replace the ears and the eyes of the farmer and work 24 hours a day and 7 days a week. The challenge now is to show how the farmer gets an advantage from these systems as we start to see in the EU-PLF project. Collaboration between “animal people” (physiologists, veterinarians, ethologists, etc.) and technical people is needed to make these systems become real support systems for farmers.

Biography: Professor Daniel Berckmans, Department of Biosystems, Division M3-BIORES: Measure, Model and Manage Bio responses, KU Leuven, Kasteelpark Arenberg 30, 3001 Heverlee, Belgium. Daniel.Berckmans@biw.kuleuven.be. Daniel Berckmans obtained a Masters in Bio-engineering and received his PhD (1986) in Agricultural Sciences from Katholieke Universiteit Leuven, Belgium. Since 1998, he is Full Professor at the K.U. Leuven and Head of the Division M3-Biores (Measure, Model and Manage Bio-responses). Daniel Berckmans is also Coordinator of the European Committee for Precision Livestock Farming (since 2003). During the last 20 years, the research group M3-Biores, under the guidance of Daniel Berckmans, expanded and for the last 15 years continuously counts more than 20 researchers who prepare their PhD. The main field of research consists of real time signal analysis of humans, animals and plants including bio-
environmental monitoring and management. The focus of the research team lies on the development of real time algorithms to monitor and control Complex, Individual and Time varying Dynamic (CITD) living organisms. The group is doing research and pioneering with the approach of Precision Livestock Farming since 1991. The team has over 230 journal publications, 14 patents and generated 15 products in collaboration with industry, including stress monitoring in race car driving, lameness detection in dairy cows and a pig cough monitor.
Genetic selection and breeding programs have resulted in remarkable improvements in almost every aspect of production. Improvements have been achieved for litter size and feed efficiency, and there have been improvements in carcass quality, etc. Unfortunately, in many cases the genes responsible for the traits are known, but breeding and selection programs have not addressed concerns. Since the genome provides the blueprints for making the cell and the animal, if we alter the blueprints, then we will alter the animal. At a simplistic level the genome is composed of individual genes. These genes code for proteins. Proteins are the tools, and parts of the tools, that makeup and comprise the cell. An analogy may be a hammer; which is composed of two parts, the handle and the head. In this analogy, each may be coded for by a different gene; one for the hammer and one for the handle. The two proteins/parts must self-assemble and fit together or they cannot function. Similarly, the head has at least two functions, 1.) To hammer nails, and 2.) To pull nails. New technologies have recently been introduced that permit quick and efficient editing of the genome. Altering individual genes/blueprints in the genome will result in altering individual proteins. To continue the hammer analogy, we could change the blueprints genome and make the handle longer/shorter, and/or fatter/thinner. Similarly, we could make the head larger/smaller and the prongs longer/shorter. Such changes could be brought about by, for example, adding a longer coding region that adds additional amino acids; thus making the protein longer. Alternatively, the gene encoding the handle could be disrupted so that a functional handle is not made, and then you could neither drive nails, nor pull them out; this would be a knockout. In some cases, a knockout can be made by changing a single base (letter) of the genome. The pig genome contains some 3,000,000,000 bases (letters). Alternatively, longer sequences of a gene can be moved between breeds of cattle, or even between species. One area of application of genome editing is resistance to disease; e.g. porcine reproductive and respiratory syndrome virus (PRRSV) and African Swine Fever virus (ASFV). For PRRSV the protein that the virus uses to infect the cell has been identified and knocked out. Pigs that have this gene knocked out are resistant to North American and European strains of PRRSV. A genetic element from warthogs that confers resistance to ASFV has been introduced into domestic pigs; it remains to be seen if they are resistant to ASFV. Genetic editing has been applied to other areas of production agriculture. The genetic sequence responsible for the polled trait in Angus has been identified and introduced into Holsteins; thus making them polled. There are other diseases, and areas of production that could be more efficient, and opportunities to improve other traits, e.g. carcass quality growth, sex ratio. Genetic modification technology has also been used to create models of human diseases like cystic fibrosis, pharmaceutical factories, regenerative medicine and to create pig organs that can be transferred to
humans. The most limiting factor to genetic modifications in pigs is our imagination.

Biography: Dr. Randall Prather is a Curators’ Professor and Distinguished Professor of Reproductive Biotechnology at the University of Missouri, where he also serves as Associate Leader of the Food for the 21st Century Reproductive Biology Cluster. He earned his BS and MS from Kansas State University, and PhD and Postdoc from the University of Wisconsin-Madison. Since 2003, Dr. Prather has also provided leadership for UMC’s National Swine Research and Resource Center as its Co-Director. Under his leadership the center has produced over 1,000 cloned pigs representing wild types and over 40 different genetic modifications. Dr. Prather’s research has focused on the early mammalian embryo. His group has been a leader in developing pig models for human diseases such as cystic fibrosis and advancing the potential for using genetically engineered pigs for human organ transplantation. In 2015, he led a team of researchers that utilized gene editing to produce pigs resistant to porcine reproductive and respiratory syndrome virus which costs the global swine industry over $800 million per year.
II. C. USAHA Joint Scientific Session Papers, Abstracts, and Posters

1. Papers and Abstracts

A comparison of modeling approaches for estimating within-flock disease transmission parameters for the 2015 H5N2 highly pathogenic avian influenza virus outbreak in the United States - Amos Ssematimba, Sasidhar Malladi, Todd Weaver, Peter Bonney, Kelly Patyk, David Halvorson, Carol Cardona.

A qualitative risk assessment of likelihood of introduction of Brucella serotypes into Egypt from Sudan via illegal camel trade - El Bably M. A., Asmaa N. Mohammed.


Assessment of ELISA discrepant Equine Infectious Anemia (EIA) samples submitted to the National Veterinary Services Laboratories - Tiffany Palmer, Kevin Lake, Tracy L. Sturgill.

Detection of Foot and Mouth Disease virus serotypes and persistence of infection induced antibody against FMD in naturally infected cattle - Laila Akhter.

Epidemiology and management of endemic CWD in farmed elk through antemortem rectal biopsy testing - Sara Wyckoff, Davin Henderson, Dan Love, Ed Kline, Aaron Lehmkuhl, Bruce V. Thomsen, Nicholas James Haley.


Nutritional steatitis in salmonids from the Western United States - Danielle Darracq Nelson, Bethany Frances Balmer, Kevin R. Snekvik.
II. C. JOINT SCIENTIFIC SESSIONS

Paint ball toxicosis: A case review - Dwayne Edward Schrunk, Steve M. Ensley, Laura Vander Stelt.

Ribonucleic acid (RNA) decay and the estimation of the postmortem interval (PMI) in horses - Nanny Wenzlow.

Serological and molecular detection of Senecavirus A associated with an outbreak of swine idiopathic vesicular disease and neonatal mortality - Luis Gabriel Gimenez-Lirola, Christopher Rademacher, Daniel Correia-Lima-Linhares, Karen Harmon, Marisa Rotolo, Yaxuan Sun, Dave Baum, Jeff Zimmerman, Pablo E. Pineyro.

Survey of inhibitor resistance in qPCR/qRT-PCR master mixes - Derek Grillo, Sarah Read, Sharon Matheny, Richard Conrad.

2. POSTERS


Current situation assessment of biosecurity measures in small scale broiler poultry farms and backyards in Egypt - Asmaa Nady Mohamed, Hassan E. A. Helal.

Detection of Toxoplasma gondii and Neospora caninum in ruminant abortions by real-time PCR - Feng (Julie) Sun, Gabriel Gomez, Megan Schroeder, Andres de la Concha-Bermejillo, R. Jay Hoffman, Guy Sheppard, Terry Hensley, Pamela J. Ferro.

Field trial using a combined treatment of garlic and organic spray based formula for fly control and animal’s defensive behaviour alleviation in cattle farms - Asmaa Nady Mohamed, Naglaa M. Abdel Azeem, Gehan K. Abdel Latef.

Modeling condemnation cases in cattle slaughter plants in California - Sara Amirpour Haredasht, Tadaishi Yatabe, Beatriz Martinez-Lopez.

II. C. 1 ABSTRACTS

The benchtop and field validation of a novel qPCR assay for the detection of *Brucella abortus* field strain and vaccine strains - Noah Hull, Suelee Robbe-Austerman, Jon Miller, William Laegreid, David Berry, Christine Quance, Christine Casey, Brant Schumaker.
II.  C.  1. ABSTRACTS

A COMPARISON OF MODELING APPROACHES FOR ESTIMATING WITHIN-FLOCK DISEASE TRANSMISSION PARAMETERS FOR THE 2015 H5N2 HIGHLY PATHOGENIC AVIAN INFLUENZA VIRUS OUTBREAK IN THE UNITED STATES

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Developing mitigation measures to minimize the devastating effects of highly pathogenic avian influenza (HPAI) epizootics requires a better understanding of within-flock HPAI virus transmission dynamics. Within-flock transmission parameters inform a wide range of quantitative models including those used in risk assessment for the design and evaluation of active surveillance protocols, and between-premises disease spread models used to evaluate HPAI outbreak control strategies. The within-flock model components are used to predict outcomes such as the disease mortality and the number of infectious birds over time which are used in further analysis. However, transmission characteristics may vary between outbreaks, depending on the poultry species, the HPAI virus strain, and flock management practices. This variability makes extrapolations from past outbreaks less reliable. In this study, daily mortality data from the 2015 H5N2 HPAI virus epizootic in the United States is used to estimate the within-flock transmission rate parameter (β) in turkeys and the basic reproduction number (R0) obtained from the product of the estimated transmission parameter and the deterministic (fixed) bird infectious period. We first use back-calculation from mortality data in combination with Generalized Linear Model-based epidemic modeling techniques and then compare the results from this approach to those obtained from forward simulation and curve fitting approaches. The back-calculation process followed a Susceptible-Exposed-Infectious-Recovered (SEIR) epidemic model formulation and involved correcting the recorded mortality data for normal daily mortality and subsequently assuming that the remaining mortality was HPAI-induced. Birds that succumbed to infection were assumed to have been infected five days earlier with a one-day latent period and a four-day infectious period. The latent and infectious periods were estimated from inoculation studies using the Eurasian/American HPAI H5N2 virus turkey field isolate. We validated these methods by comparing our results with output from simulated outbreaks with known transmission parameters. Finally, we illustrate the application of our parameter estimates in an evaluation of pre-movement active surveillance testing protocol options for moving turkeys to processing.
Brucellosis is considered endemic in animals and humans in most parts of Egypt leading to an estimated yearly economic loss of 60 million Egyptian pounds. Several studies have attempted to determine the incidence of brucellosis in ruminants and humans in Egypt leading to a high variability of estimates depending on the analyzed host species, geographic localization, and the serological technique used. A qualitative risk assessment to determine the likelihood and consequences that the Brucella serotypes are introduced into Egypt from Sudan via illegal camel trade at southern Egyptian boundary in 2016. The OIE recommended methodology (OIE, 2004) for qualitative risk assessments has been adopted. Camel brucellosis was recorded in Egypt by many authors with variable incidence ranged from 7.9% to 10.92%. B. melitensis biovar 3 is the most commonly isolated species from animals in Egypt, B. abortus biovar 1 was reported in Egypt. A pilot study revealed high genetic heterogeneity of Brucella spp. isolates recovered from domestic ruminants in different governorates of Egypt suggesting a complex underlying epidemiological situation in Egypt. In Sudan, the overall seroprevalence of brucellosis in camels (milk and serum samples) was 37.5%. Brucella abortus biovar 6 was isolated from two camels and three cows. From this qualitative risk assessment, it can be concluded that; the risk of introduction of endemic Brucella serotypes or / new serotypes into Egypt via illegal camel trade is high and the consequence of introduction including socio-economic and public health impacts are high moreover, study revealed a major gap in epidemiological data, diagnostics and misconceptions surrounding brucellosis. There is a need for implementing a plan for control of animal movement at Egypt boundaries and increasing public awareness in the prevention methods of brucellosis.

**Keywords.** Camel, Brucellosis, risk assessment, Egypt, prevalence, Sudan, endemicity, control.
II. C. JOINT SCIENTIFIC SESSIONS

AGRICULTURAL ANIMAL POPULATION DATABASE AND CASE STUDY FOR THE DTRA BSVE

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Shawn S. Jackson¹, Erin T. Lauer¹, Eric Hess², Margaret A. Rush¹
¹Gryphon Scientific, MD
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The Defense Threat Reduction Agency’s (DTRA) Chemical and Biological Technologies Directorate (CB) is tasked with safeguarding the United States from chemical and biological threats. In support of this mission, DTRA CB is developing a Biosurveillance Ecosystem (BSVE) that aims to accelerate ‘detect – identify – respond’ capabilities for biological threats. Since more than 60% of all emerging infectious disease events are characterized as zoonoses, as are many established diseases of public health concern, any comprehensive system for biosurveillance for human disease should include capabilities for monitoring animal populations and disease trends to inform both potential zoonotic and emerging disease surveillance. Recognizing the importance of animal species in the transmission of many human diseases, Gryphon Scientific and SES, Inc. have initiated a project to bring agricultural animal population and production practice data into the BSVE and to perform a case study to explore the utility of these data to inform BSVE surveillance. In addition to informing zoonotic disease prediction, the collected animal population data have the potential to be a useful decision support tool for State Animal Health Officials (SAHOs) in planning for and responding to animal disease outbreaks. We have developed a methodology to estimate seasonal, county-level commercial animal populations using data from the United States Department of Agriculture (USDA) Census of Agriculture (CoA) and USDA surveys. Additionally, we have re-classified data from the CoA to estimate the frequency of specific production types (such as feedlots, dairies, or cow-calf operations). Drawing upon USDA Animal and Plant Health Inspection Service (APHIS) National Animal Health Monitoring System (NAHMS) reports, animal population data have been augmented with production practice data describing the frequency of human-animal contact and general biosecurity characterizations for each production or farm type. These data are informative for their relevance to disease spread and their ability to help human-health specialists understand the specific risk characteristics of each type of production. Using historical human and animal disease incidence data, we are performing a case study to test the utility of these animal population and production practice data for predicting outbreaks in human populations of the zoonotic diseases brucellosis, novel influenza A virus, and Q fever. We are developing hypotheses to identify predictors of human zoonotic disease and testing them using simple and multivariate regression with the aim of pinpointing those data in both the existing BSVE and our animal population and production practice database that are most useful for predicting human zoonotic disease. These data can then be incorporated into the BSVE as a
data source for analysts or other developers interested in building predictive epidemiological models. Approved for public release, distribution is unlimited.
II. C. JOINT SCIENTIFIC SESSIONS

ASSESSMENT OF ELISA DISCREPANT EQUINE INFECTIOUS ANEMIA (EIA) SAMPLES SUBMITTED TO THE NATIONAL VETERINARY SERVICES LABORATORIES

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In 2015, there were approximately 1.3 million equine infectious anemia (EIA) tests performed in the United States. The majority of these tests are routine, for transport or surveillance purposes. A small percentage test positive on any one of the four commercially available enzyme-linked immunosorbent assays (ELISA). A discrepant sample is forwarded to the National Veterinary Services Laboratories (NVSL) for confirmatory testing. A discrepant sample typically includes a positive or equivocal result on ELISA but negative on any other test. An equivocal result is a result that is questionable or ambiguous. NVSL tests the sample by all commercially available ELISAs and by agar gel immunodiffusion (AGID). The NVSL algorithm indicates that when a sample is positive or equivocal on two or more ELISAs and negative on AGID, a Western blot (WB) is performed. For calendar year 2015, NVSL received 252 discrepant samples that resulted in a negative EIA status of the horse following confirmatory testing. Of those, 22 were positive on ELISA kit “A”, 35 were positive with three equivocal on ELISA kit “B”, 102 were positive with six equivocal on ELISA kit “C”, and 33 were positive with two equivocal on ELISA kit “D”. Fifty-six of the 252 samples tested positive on two or more ELISAs. For these 56 samples, WB was performed. Ninety-three of the 252 samples were negative on all tests performed. While ELISA tests are highly sensitive, they are not specific enough to eliminate false positive reactions observed during routine EIA testing, thus requiring additional testing to verify the EIA status of the animal. Testing of each sample by all commercially available tests allows identification of potential performance issues with the test kits.
II. C. 1. ABSTRACTS

DETECTION OF FOOT AND MOUTH DISEASE VIRUS SEROTYPES AND PERSISTENCE OF INFECTION INDUCED ANTIBODY AGAINST FMD IN NATURALLY INFECTED CATTLE

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Background: Foot and mouth disease virus (FMDV) is endemic in Bangladesh and causes huge loss declining productivity of cattle. To efficiently control the disease in endemic countries like Bangladesh, vaccination of animal is the most conventional and effective way. Naturally infected animals develop some innate antibody against the disease and it persists for a time period. For an effective vaccination program, it is essential to know how long the natural immunity persists and protect the animal against circulating FMD serotypes.

Objective: The proposed study was conducted for identification and serotyping of Foot and Mouth Disease virus from clinically infected cattle and detection of persistence of antibody induced by infection in their serum.

Methodology: FMD infection was confirmed by differentiation of infected and vaccinated animals (DIVA) enzyme-linked immunosorbent assay (ELISA) with sera samples and uniplex one-step RT-PCR with clinical samples using universal primer pair 1F and 1R. After initial confirmation of FMD virus, multiplex RT-PCR (mRT-PCR) was employed using serotype specific primers (P38:P40:P74-77:P110) to confirm the FMD virus serotypes. The serological responses of cattle to natural FMD infection were measured with collected sera samples by performing the Liquid Phase Blocking ELISA.

Result: All twenty-five samples showed positive result by DIVA ELISA for FMDV infection whereas RT-PCR of clinical samples with universal primer pair (1F, 1R) revealed sixteen samples positive for FMDV. Out of the 16 FMD positive samples, 7 samples (43.75%) were positive for FMD O type followed by 5 samples (31.25%) positive for FMD A type, and 2 samples (12.5%) were positive for FMD Asia-1 type. There were two cases (12.5%) of mixed infection with synchronized presence of O and Asia-1 serotype. The antibody evoked by natural FMD infection was evaluated by LPB ELISA. The antibody titers arose at high level (PI value>80) at the first week of infection and reached at its peak (PI value >90) on the 70-75 days post infection (dpi) for serotypes A, O and Asia 1. After that a steep fall was observed for all serotypes. But the antibodies remained above the protective level (PI value >50) up to 140 -145 dpi for all three serotypes. The protective antibody titer was recorded against only that serotype with which the animal was infected only.

Conclusion: Three serotypes of FMD virus O, A and Asia 1 were circulating in the study area and type O was dominating among these serotypes followed by A and Asia 1. There was also occurrence of mixed
infection with serotype O and Asia 1. Antibody induced by natural FMD infection remains at protective level (according to test interpretation, PI value >50) up to 145 days post infection (dpi). The protective antibody titers were serotype specific.
II. C. 1. ABSTRACTS

EPIDEMIOLOGY AND MANAGEMENT OF ENDEMIC CWD IN FARMED ELK THROUGH ANTEMORTEM RECTAL BIOPSY TESTING
Sara Wyckoff¹, Davin Henderson², Dan Love⁴, Ed Kline⁴, Aaron Lehmkuhl³, Bruce V. Thomsen³, Nicholas James Haley¹
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Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy (TSE) affecting members of the cervid family which has been reported in 24 states and two Canadian provinces, as well as the Republic of South Korea and most recently Norway. The disease has been found with increasing frequency in both farmed and free ranging cervids – transmitting freely and frequently within both groups. Management has historically involved depopulation in the case of farmed animals and herd reduction in the case of wild deer and elk, the latter with limited success. In CWD endemic areas, where prevalence rates in farmed deer and elk mirror those found in wild cervids, the appropriateness of alternative management strategies for farmed animals has not been examined. We sought to evaluate the practicality and sustainability of managing CWD in a closed elk herd, where CWD prevalence rates approach 20%, using a test and cull strategy relying on rectal biopsies and conventional and experimental diagnostic approaches. We have correlated our findings with genetic background, pregnancy status and progesterone levels, sex, and age to further our understanding of the epidemiology of CWD. We will continue to monitor these correlations over the length of the study to identify the effects of our strategy on CWD prevalence, herd genetics, and reproductive success. This project represents a unique opportunity to collect valuable information on CWD diagnostics, epidemiology, and resistance.
The obvious advantage of next-generation sequencing (NGS) technology is that the hypothesis-free metagenomics strategy enables NGS to simultaneously detect the presence of multiple microorganisms in samples and identify uncharacterized pathogens directly from clinical samples without prior knowledge. However, identifying ‘a viral needle in a metagenomics haystack’ extensively relies on bioinformatics to tackle the huge amounts of sequence data involved. Here we describe a Kraken algorithm-based bioinformatics analysis pipeline to identify mixed infections in swine. We performed metagenomics sequencing on 217 PEDV-positive swine fecal swab samples and found that 52 samples (24.00%) were PEDV positive only. The presence of diverse ribonucleic acid (RNA) viruses along with PEDV such as deltacoronavirus (8.8%), astrovirus (53.9%), enterovirus G (32.7%), sapovirus (12.9%), kobuvirus (28.5%), posavirus (32.3%), pasivirus (6.9%), and sapelovirus (31.8%) was successfully identified. Among them, whole genome sequences of porcine sapelovirus type 1 (PSV-1), also known as sapelovirus A, present in U.S. swine had not been previously reported. In the current study, the entire genome of a U.S. PSV-1 strain was determined and characterized. This U.S. PSV-1 strain (USA/IA33375/2015) had a genome of 7,565 nucleotides in length; it had 87.8%-83.9% nucleotide identities at the whole genome level compared to the other seven global PSV-1 strains (1 from United Kingdom, 3 from China, and 3 from South Korea) with whole genome sequences available in GenBank thus far. Phylogenetic analysis based on whole genome sequences revealed that global PSV-1 isolates formed two clusters and the PSV-1 USA/IA33375/2015 strain together with Korean (GenBank Accession numbers: KJ821021, KJ821020, KJ821019) and Chinese (GenBank Accession numbers: JX286666, HQ875059, KF539414) PSV-1 strains formed a separate cluster from UK PSV-1 V13 strain (GenBank Accession number: AF406813). Partial or complete genome sequences of some viruses such as kobuvirus and posavirus present in the PEDV-positive samples were also determined and sequence analysis data will be presented. In summary, we have established a NGS-based metagenomics pipeline to successfully identify multiple pathogens present in clinical samples. This provides a powerful and cost-effective tool to determine the prevalence rate of each pathogen or co-infected microorganisms in animals.
II. C. 1. ABSTRACTS

NUTRITIONAL STEATITIS IN SALMONIDS FROM THE WESTERN UNITED STATES

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Nutritional steatitis occurs in many species when diets are deficient in active antioxidants and/or when diets contain excessive oxidized lipids. Both antioxidants and polyunsaturated lipids in feeds are highly labile when exposed to oxygen, heat, or ultraviolet light during transport or storage. With prolonged storage of feeds and supplements, such nutrient damage is inevitable. In animals ingesting excessive oxidized lipids and/or deficient antioxidants such as vitamin E, free radical cell membrane damage causes degeneration and necrosis in multiple tissues, particularly adipose tissue. Reportedly affected species include farmed salmonids, catfish, mink, cats, pigs, poultry, and wild fish-eating birds. This retrospective study of diagnostic cases seen at the Washington Animal Disease Diagnostic Laboratory during 2014 and 2015 includes farmed juvenile Spring Chinook salmon and rainbow trout juveniles and adults from Colorado, Arizona, and Idaho. Some cases revealed clear evidence of excessive heat during feed storage. One case involved wild Coho salmon fingerlings from Washington State in association with a prolonged heat wave and elevated water temperatures. The histological changes included sterile granulomatous steatitis with intralesional acicular clefts, and commonly affected sites included the dorsal fat pads and coelomic adipose tissue. Grossly, the skin can darken, the swim bladder may appear thickened, and cachexia is often observed. It is likely that younger, faster growing fish have increased susceptibility over adults, and associated debilitation can lead to opportunistic infections. Preventative measures such as avoiding excessive heat and light when transporting and storing feeds and avoiding feeding expired feeds are critical for preventing this debilitating disease.
PAINT BALL TOXICOSIS: A CASE REVIEW
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²Orange City Vet Clinic, IA

The Iowa State University Veterinary Diagnostic Laboratory received stomach content from a German Short Hair for toxicological analysis on the 31st of August 2015. Owners returned to their residence to find the dog seizing and covered in bright pink vomitus. Treatment was given unsuccessfully and the dog was eventually humanely euthanized. The dog was not known to have been exposed to any potential toxins, however it had been outside for a brief time in the morning. The submitting veterinarian requested testing for ethylene glycol as the initial testing option. A negative result for ethylene glycol resulted in testing for anticoagulant rodenticides. This analysis was also negative. The pink color of the stomach content prompted screening for strychnine by gas chromatography mass spectrometry (GC/MS), which although negative for strychnine indicated the presence of multiple poly ethylene glycol compounds. With this information, the owners went through their home again and found that the dog had gotten into and consumed a large portion of a box of paint balls.
RIBONUCLEIC ACID (RNA) DECAY AND THE ESTIMATION OF THE POSTMORTEM INTERVAL (PMI) IN HORSES
Nanny Wenzlow
Infectious Diseases and Pathology, University of Florida

The goal of this study was to investigate the RNA decay in equine tissues in order to determine the feasibility of this data for the aid in estimating the PMI in horses and to determine the morphological changes of autolysis in the same equine tissues during the first 72 hours after death. Currently, no field applied methods exist to accurately estimate the PMI in animal or humans. The PMI determination capability would be of central importance for forensic investigations of suspicious death in horses. The hypothesis investigated is that RNA degrades in a predictable and step-wise fashion in post-mortem tissues and provides a decay profile for the estimation of the PMI in horses.

**Material and Methods:** Brain, liver, and skeletal muscle from 12 freshly euthanized horses, were held at 22°C and 8°C. The RNA decay was assessed at T0h, T1h, T2h, T4h, T6h, T12h, T24h, T36h, T48h, T60h, and T72h. The RNA degradation was determined by microfluidic analysis and the decay of the mRNA (cDNA) of β-actin, histone and β-tubulin was assessed by conventional PCR.

**Results:** In liver tissue, RIN (RNA integrity number) and 28S showed the most predictable decay rate over time with significant differences for temperature. Muscle RIN and 28S were the most stable and brain showed the most unpredictable decay rates and was the only tissue affected by the storage time. The decay of β-actin mRNA (cDNA) was the most representative in all tissues and the most predictable in liver.

**Conclusion:** Horse liver tissue showed the most predictable decay rate over 72h after death by both methods. Results for horse liver RIN or 28S taken together with results from conventional PCR for liver β- grouped into a clinical index could estimate the PMI in horses.
II. C. JOINT SCIENTIFIC SESSIONS

SEROLOGICAL AND MOLECULAR DETECTION OF SENECAVIRUS A ASSOCIATED WITH AN OUTBREAK OF SWINE IDIOPATHIC VESICULAR DISEASE AND NEONATAL MORTALITY

Luis Gabriel Gimenez-Lirola¹, Christopher Rademacher², Daniel Correia-Lima-Linhares², Karen Harmon², Marisa Rotolo², Yaxuan Sun²,³, Dave Baum², Jeff Zimmerman¹, Pablo E. Pineyro²

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³Statistics, Iowa State University

We performed a longitudinal field study in a swine breeding herd that presented with an outbreak of vesicular disease (VD) associated with an increase in neonatal mortality. Initially, a USDA Foreign Animal Disease (FAD) investigation confirmed the presence of Senecavirus A (SVA) and ruled out the presence of exotic agents that produce vesicular lesions, e.g., foot-and-mouth disease virus and others. Subsequently, serum samples, tonsil swabs, and feces were collected from sows (n = 22) and their piglets (n = 33) beginning one week after the onset of the clinical outbreak and weekly for six weeks. The presence of SVA RNA was evaluated in all specimens collected by RT-qPCR targeting a conserved region of the 5' untranslated region (5'UTR). The serological response (IgG) to SVA was evaluated by weekly testing sow and piglet serum samples on a SVA VP1 recombinant protein (rVP1) indirect ELISA. The rVP1 ELISA detected seroconversion against SVA in both clinically affected and nonclinically affected sows at early stages of the outbreak, as well as maternal SVA antibodies in offspring. Overall, the absence of vesicles (gross lesions) in SVA-infected animals and the variability of RT-qPCR results among specimen type demonstrated that a diagnostic algorithm based on the combination of clinical observations, RT-qPCR in multiple diagnostic specimens, and serology is essential to ensure an accurate diagnosis of SVA.
SURVEY OF INHIBITOR RESISTANCE IN QPCR/QRTPCR MASTER MIXES
Derek Grillo, Sarah Read, Sharon Matheny, Richard Conrad
Thermo Fisher Scientific

qPCR/qRT-PCR are the most sensitive high-throughput technologies for the diagnosis of infections in food animals. A common reason for false negatives is molecular inhibitors in the biological sample. Inhibition is mitigated by chemical characteristics of the reaction mastermix. Consequently, animal health (AH) customers are vigilant about the performance of mastermixes. To address this need, we conducted a performance study of ten mastermixes in the Thermo Fisher portfolio alongside ten of our leading competitors. We extracted five common biological sample types encountered by our customers. Into each extract, we spiked a dilution series of positive control and assay to detect a porcine virus (for qRT-PCR) or a bovine bacterium (for qPCR). Mastermix performance was measured by detection sensitivity. For both qPCR and qRT-PCR, PathID brand mastermixes performed the best overall out of the Thermo Fisher products and equal to or better than external competitors. However, the most interesting results were individual performance by sample type; for example, a mastermix that is superior for blood samples is not necessarily one to use for saliva samples. This study directly benefits our customers by providing guidelines for mastermix use for specific sample types, as well as for overall performance.
II. C. 2. POSTERS
II. C. 2. POSTERS

AVIAN INFLUENZA VIRUS INACTIVATION BY ENVIRONMENTAL FACTORS AND DISINFECTANTS: PREMISES TREATMENT DURING THE 2014-2015 HSNX OUTBREAK IN THE UNITED STATES

Randall Lynn Levings¹, Emergency Management Response System Team², Mia Kim Torchetti³

¹Science, Technology and Analysis Services, USDA-APHIS-Veterinary Services
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³Avian Viruses, Diagnostic Virology Laboratory, NVSL, STAS, VS-APHIS-USDA

Avian influenza virus can contaminate natural and agricultural environments due to fecal and oronasal shedding by infected animals. It can then persist, (for up to months in cool water), which is believed to contribute to its transmission and maintenance in wild waterfowl. Such persistence is facilitated by the presence of organic materials, particularly those high in protein, and contradicts the view that enveloped viruses are 'sensitive' to inactivants. Laboratory and field studies of influenza virus' sensitivity to environmental factors such as heat, desiccation, pH and radiation help with assessing the risk of contaminated materials and environments to uninfected birds or other animals. The materials likely contaminated are varied (e.g., water, cloth, wood, concrete, feces, litter, eggs and carcasses). Materials influence the virus' persistence and availability to inactivant or to the host, and so can challenge the external validity of controlled studies. Manipulation and monitoring of environmental factors offers promise for ensuring the reduction or inactivation of influenza contamination without use of chemical disinfectants. During the 2014-2015 highly pathogenic avian influenza outbreak in the United States, dry cleaning and subsequent heating of the affected facility (100-120 °F for seven days) as well as extended fallow periods were used as alternatives to traditional methods (wet disinfectants or fumigation) of cleaning and disinfection (C&D). Post-C&D environmental samples were tested by polymerase chain reaction (PCR) to detect viral ribonucleic acid (RNA) and by virus isolation to detect viable virus. Tests were performed by the National Veterinary Services Laboratories (NVSL) and by National Animal Health Laboratory Network (NAHLN) laboratories. The Emergency Management Response System (EMRS) was used to collect, store, and analyze outbreak information. It was recently queried to analyze treatments of premises vs. test results, and analysis as of June 10, 2016 is noted here. Of the 232 infected and dangerous contact premises in 15 states undergoing C&D, the numbers of premises receiving each treatment were: 189 wet disinfectant; 26 heat; 15 extended fallow period; and 2 a combination of methods. Viral RNA was detected in 145 post-C&D samples from 8 different premises (of >5400 total samples for the 232 premises), in multiple treatment groups. Samples from which RNA was detected included egg belt, feeders, waterers, footwear and
II. C. JOINT SCIENTIFIC SESSIONS

manure belts/pits. If viable virus was recovered after C&D, additional treatments were performed. Further studies are needed to evaluate sampling approaches, identify environmental samples to target by production system, and to determine whether such samples might be useful as flock monitoring tools in addition to pre-clean and post-C&D assessment. The wide variation in production systems (layout, equipment, and materials) and in mitigation strategies will necessitate a review of testing, sampling and strategies to determine what improvements would be valuable.
A cross-sectional study was designed to assess the current situation of biosecurity measures in small scale commercial poultry farms and backyards (Sector III and IV). A total of \(n=50\) small commercial poultry farms and backyards were selected from each Giza, Beni-Suef and Fayoum province. A structured pre-tested questionnaire survey and observation were used for collecting data on risk indicators, bio-security measures and poultry health practices in both examined sectors. The respondents were farm owners, farm managers, veterinarians and workers. The results showed that the number of broiler birds reared per cycle of small commercial farms was from \(n= 6000-20000\) compared with \(n=30-150\) birds in backyards, Small scale broiler farms had a higher level of biosecurity than the backyards. 89% of the farms practiced all in all out system when compared with 22.1 % of the backyards which had less secure boundaries; 31% of farms did not have fence when compared with 69% of the broiler farms. Only 6.1% of broiler farms had used disinfectants at gate. On the other hand, health practices in side small scale broiler farms were followed by veterinarian (74.3%). Mortality rate/cycle was (10%) in almost broiler farms. Newcastle, IB, Gumboro, marek’s and HPAI-vaccination against H5N2 and H9N2 (100%) compared with no vaccination program held in backyards. The percentages of parasitic infestation (3.1%) in broiler farms compared with (30.4%) in backyards. Disinfections of farms in between cycles represented 86.5% by using virkon’s, iodine and phenol meanwhile, in backyards, disinfection didn’t apply. In broiler farms, landfills were used for carcasses disposal. In conclusion, the majority of the small scale broiler farms and all most backyards were far from the implementation of biosecurity measures. Many farm workers don’t know how to maintain and improve biosecurity to protect the poultry and themselves from diseases risks. Biosecurity situation needs a combined effort from stakeholders, small breeders of hobby bird to improve biosecurity level for these sectors.
Protozoal-associated abortions in ruminants often times represent a diagnostic challenge using conventional methods alone. *Toxoplasma* and *Neospora* are the most common and important protozoal pathogens associated with ruminant abortion and are characterized by their ability to produce lifelong infection of the dam and, thereby, representing a viable risk for in-utero infection of the fetus and placenta during pregnancy. Microscopically, these organisms are not commonly identified on tissue sections and the pathological changes they produce are often obscured by autolytic changes, however, identification of these organisms is very important in managing the diseases in a herd. The objective of the present study was to utilize a Taqman® real-time PCR (qPCR) assay, for the detection of *Toxoplasma gondii* and *Neospora caninum* DNA in fresh tissue and formalin-fixed, paraffin-embedded sections from clinical samples submitted to the Texas A&M Veterinary Medical Laboratory Diagnosis (TVMDL) from 2011 to 2016. A qPCR assay targeting a gene fragment of *T. gondii* and *N. caninum*, respectively, was evaluated and shown to be sensitive and specific for the detection of *T. gondii* and *N. caninum* in clinical samples. This assay, coupled with histologic evaluation, provides a method for identifying *T. gondii* and *N. caninum* as causative agents of ruminant abortion.
FIELD TRIAL USING A COMBINED TREATMENT OF GARLIC AND ORGANIC SPRAY BASED FORMULA FOR FLY CONTROL AND ANIMAL’S DEFENSIVE BEHAVIOUR ALLEVIATION IN CATTLE FARMS
Asmaa Nady Mohamed, Naglaa M. Abdel Azeem, Gehan K. Abdel Latef
Department of Hygiene, Management and Zoonoses, Faculty of Veterinary Medicine Beni-Suef University, Egypt

Background: The global problem of fly resistance to conventional insecticides has resulted in renewed interest in organic pesticides as alternative management tools for flies’ control. The present study aimed to determine flies’ activity in cattle environment and evaluate the efficacy and persistent of a combined treatment of garlic based formula, pour-on and organic spray on the suppression of fly population on animals and their environment respectively.

Materials and Methods: A cross sectional study was carried out in a cattle farm during the period from February to May, 2015. The daily average of microclimatic factors (ambient temperature (°C), relative humidity (%) and airspeed (knots/hr.) were measured and recorded. Monitoring of flies’ count pre- and post-treatment was done on both animals using (visual observation, photographic tool) whereas, six similar sites were selected on the animal’s body (the neck, shoulder, backline, abdomen, limbs and tail), which are particularly attractive to flies and in their environment, flies were collected using (sticky cards). The effectiveness of tested formulae was determined by calculating the percentage reduction in flies’ attack rate and animal’s defensive behaviour.

Results: The highest population of flies’ activity on both dairy cows and their environment was recorded in April and May months (260.0±5.28, 253.0±4.30, 457.0±7.14, 485.0±7.32) respectively. Calves barn, stall corner and animal stall appeared as predilection sites for flies’ activity (503.33±7.4, 473.0±5.3 and 383.66±4.81 respectively). The percentage reduction in average flies’ count was significantly (P< 0.05) on both calves, beef cattle and their environment (31.1, 42.6, 43.2 and 47.9 % respectively). Animal’s defensive behaviour decreased post-treatment especially for tail flicks (26.3, 23.5, 11.1 and 11.6% respectively) and skin twitching (81.6, 72.5, 90.8 and 65.1%).

Conclusions: a combined treatment of garlic based formula pour-on animals with organic spray on their environment are effective at time interval once/week in knocking down flies’ population, its impacts on public health and alleviate animal’s defensive behaviour.
The cattle industry is the largest segment of U.S. agriculture. In 2015, the U.S. commercially slaughtered 28.74 million head with a total carcass weight of 23.69 billion pounds [1]. Based on data from USDA in 2015, 141,450 carcasses were condemned in the U.S., approximately 0.5% of the total cattle carcasses produced. Beef price in 2015 was $6.29/lb resulting in a cost of about $0.81 billion (0.5% x 23.69 billion lb x $6.29/lb) to U.S. producers. California (CA) has one of the most important cattle industries in the U.S. A total of 21.3% of all condemnation cases from 2005-2015 in slaughter plants in U.S. occurred in CA (USDA), which corresponds to approximately to $1.38 billion (307,966 head condemned x 714 lb/carcass x $6.29/lb) over the ten years and $0.18 billion in 2015. First aim was to calculate the slope of the reported condemnation reasons in CA and the U.S. from 2005-2015 based on a smoothed random walk [2]. Second, to identify cattle condemnation cases that showing seasonality by fitting an auto regression spectrum model to the data, for which the model order was identified by the Akaike Information Criteria. Third, to evaluate if dynamic harmonic regression (DHR) model [2] can predict the number of those condemned cases that have seasonal component three months ahead from 2012-2015 to inform cattle producers and related stakeholders to prevent/ minimize carcasses condemnation in CA. A USDA/FSIS database with detailed information on condemnation cases in the U.S. from 2004 to 2015. The information corresponds to a total of 684 slaughter plants in the U.S. (29 in CA). The majority of the condemned reasons in U.S. and CA have a slope of zero which indicate no changes in the number of reported cases. Others, such as the number of condemnations due to Epithelioma, Malignant Lymphoma, Pericarditis and Emaciation in both CA and the U.S. are decreasing (slope<0) from 2005-2015 but the decrease in the number of cases in the U.S. is steeper than in CA. The number of condemnations due to Icterus, Pneumonia, Abscess/Pyemia, miscellaneous Inflammatory Diseases, Septicemia and Peritonitis shows clear evidence of increase (slope>0). Based on the Auto-Regressive spectrum results four condemnation cases are showing seasonal components in CA, which are Abscess/Pyemia, Emaciation, Epithelioma and Malignant Lymphoma. The DHR model could predict the number of Abscess/Pyemia, Emaciation, Epithelioma and Malignant Lymphoma cases 3 month ahead with mean relative prediction error of 23%, 32%, 28% and 13% respectively. These methods can be used in real-time to identify emerging reasons for condemnation cases and inform educational, syndromic and risk-based surveillance programs.

II. C. 2. POSTERS

II. C. JOINT SCIENTIFIC SESSIONS

MYCOTOXIN AND METAL CONTAMINANTS IN PEANUT BUTTER ON THE UGANDAN MARKET
Dwayne Edward Schrunk¹, Paula Martin Imerman¹, Elisiane Camana¹, Wilson Kiiza Rumbeiha¹, Steve M. Ensley¹, Sylvia Baluka², Richard Zigudde²
¹Toxicology and Nutrition, Iowa State University
²Biosecurity, Ecosystem and Public Health, Makerere University, Uganda

Peanuts are a common human food in Uganda and are also used as animal feed ingredients globally. Peanut butter is a common food product worldwide. There are concerns about the safety of peanuts and peanut products in Uganda as well as globally. In particular, peanut contamination with mycotoxins, especially aflatoxins, is a longstanding issue. Peanuts from Uganda were responsible for hepatotoxicity in turkeys in 1950’s in the U.K. Trace and heavy metal contamination of peanut butter is also a food safety concern in Uganda, mainly because of the questionable quality of locally fabricated grinding machines. The objective of this study was to investigate mycotoxin and elemental concentrations in peanuts and peanut products purchased from various markets within Uganda and compare those with U.S. products. Our hypothesis was that peanut products from Ugandan markets contain higher mycotoxin and elemental contaminants than those from the U.S. products. A total of 38 peanut product samples were collected from four markets and two homesteads in Kampala, Uganda. The U.S. peanut butter samples were purchased from local retail stores in Ames, Iowa. Samples were analyzed for 13 mycotoxins and for 26 elements following routine Iowa State University Veterinary Diagnostic Laboratory procedures. Mycotoxins were analyzed by LC/MS/MS, while the elements were analyzed by both ICP/MS and ICP-OES. Inorganic results showed some differences in concentration of between market, homestead, and U.S. samples. Most differences in concentration for the element were statistically significant, Ag, Al, Fe, Mn, Ni, S, and Zn concentrations were elevated in the Ugandan market samples. However, none of the metallic element contamination was at a concentration considered to be a food safety issue. Mycotoxin analysis, however, showed that 82% of peanut product samples from Ugandan markets contained aflatoxin residues, while 55% of the samples had concentrations above the 20ppb United States regulatory limit. These results indicate that aflatoxins are still a major public health and animal food safety issue.

Keywords: mycotoxin, aflatoxin, heavy metal, peanut
Brucella abortus is the etiologic agent of brucellosis. In the United States, the sole remaining reservoir is the Greater Yellowstone Area, encompassing parts of Wyoming, Idaho, and Montana. Current diagnostics are not ideal for eradication efforts. Serology is plagued by false positive tests due to cross-reacting organisms. Furthermore, serology merely indicates exposure to Brucella spp., not necessarily current infection. Meanwhile bacterial culture can take up to ten days, is labor and space intensive, and presents a high risk to personnel, as brucellosis is the most commonly laboratory acquired infection worldwide. Representing the most robust \textit{in-silico} analysis to date, 95 whole genome sequences of all known biovariants of \textit{B. abortus} in the United States were obtained from United States Department of Agriculture – National Veterinary Services Laboratory. Novel primer-primer and primer-probe targets containing informative single nucleotide polymorphisms were identified. Forty-seven candidate sets were screened with nine candidates moving on to full validation. No one set was able to differentiate field strain from both vaccine strains (RB51 and S19). A validation box was assembled containing tissues from 99 bison and 37 cattle that were all sero-positive for \textit{B. abortus}. The primer-primer and primer-probe sets were validated on the known culture-positive tissues from the 99 bison and 37 cattle samples from the Designated Surveillance Areas of Wyoming and Montana and experimentally infected animals at United States Department of Agriculture – National Animal Disease Center. Additionally, we have tested our samples on culture-negative tissues from bison and cattle. Specificity was confirmed by National Center for Biotechnology Information (NCBI) Basic Local Alignment Search Tool (BLAST) and showed that primers and probes were specific to \textit{B. abortus} only. This assay shows promise toward replacing culture as the “gold-standard” for the definitive diagnosis of \textit{B. abortus}. Development of an ante-mortem qPCR for brucellosis in multiple species using these primer sets is underway.
II. D. USAHA Membership Meetings
II. D. USAHA MEMBERSHIP MEETINGS

USAHA MEMBERSHIP LUNCHEON AND MEETING
MONDAY, OCTOBER 17, 2016
David Schmitt, Presiding

The First Membership Meeting was called to order by Dr. David Schmitt. Special thanks was given to Merial for their support of the luncheon.

Treasurer's Report
Annette Jones, Treasurer

The United States Animal Health Association (USAHA) continues to operate on a sound financial basis. We finished the 2015-16 fiscal year with a $5,132 net income. Considering that the USAHA management team controls a $450,000 budget, they did another excellent job of managing those revenues and costs throughout the year.

During fiscal year 2015-16, the Association earned $31,870 in investment income which is about $10,000 more than last year. The Association’s net worth on June 30, 2016 was $1,209,019. USAHA continues the policy of maintaining two years’ expenses in reserve held in secure investments like CD’s, and invests the excess in securities with potentially higher anticipated returns than CD’s. The intent continues to be to use any excess reserve or interest income to enhance member services while implementing the organization’s strategic plan.

The audit committee met Sunday October 16, 2016, reviewed the fiscal year 2016 Statement of Financial Position and found that all financial affairs of the Association are in order.
The Executive Committee this past year has continued work regarding our strategic plan, approved in 2015. I want to sincerely thank all the members of the Executive Committee for their work in getting to this point, and clearly much of the heavy lifting lies ahead. Our primary focus up through this point is in relation to committees, and implementing a framework for evaluating and evolving committees within the organization. This will be sent before the Board of Directors at this meeting, and also thanks to our committee leaders for their input in this process.

Throughout the year we’ve continued working in other areas. We co-hosted with NIAA the 2016 Equine Forum, which was very well attended and successful. Another event is planned for January 2017. Our Committee on Government Relations met again last March, a great opportunity for our organization to learn from and educate leaders in Washington. The InterstateLivestock.com project continues to grow, now representing all states and several species. We encourage many of you to use and help promote this great resource. Finally, as Dr. Jones reported, we continue to be a strong and soundly operating association. I have thoroughly enjoyed my time as president, and thank each of you for your support this year and in the future.
II. D. USAHA MEMBERSHIP MEETINGS

Report of the Committee on Nominations
Stephen Crawford

The action of the Report of the Committee on Nominations will take place at 2:05 p.m. on October 19, 2016, during the Membership Meeting. The 2016-2017 Nominations are:

2016-2017 OFFICER NOMINATIONS

PRESIDENT....................................................... Boyd H. Parr, Columbia, SC
PRESIDENT-ELECT.............................................. Barbara C. Determan, Early, IA
FIRST VICE-PRESIDENT................................. Kristin M. Haas, Montpelier, VT
SECOND VICE-PRESIDENT............................... Martin A. Zaluski, Helena, MT
THIRD VICE-PRESIDENT................................. Paul J. McGraw, Madison, WI
TREASURER.................................................... Annette M. Jones, Sacramento, CA

DISTRICT DELEGATES

NORTHEAST........ Guy Hohenhaus, Maryland; Belinda Thompson, New York
NORTH CENTRAL.............. Louis Neuder, Michigan; Paul Brennan, Indiana
SOUTH................................. L. “Gene” Lollis, Florida; Eric Jensen, Alabama
WEST................................. Bill Sauble, New Mexico; H. M. Richards, Ill, Hawaii

Committee Chair Recognition
The following committee chair was recognized for her service:
- Dr. Peregrine Wolff, Captive Wildlife and Alternative Livestock.

With no further business, the First Membership Meeting was adjourned.
II. D. USAHA MEMBERSHIP MEETINGS

USAHA MEMBERSHIP MEETING
WEDNESDAY, OCTOBER 19, 2016
David Schmitt, Presiding

The Second Membership Meeting was called to order by Dr. David Schmitt.

Report of the Action of the Committee on Nominations
Stephen Crawford

2016-2017 OFFICER NOMINATIONS

PRESIDENT.................................................. Boyd H. Parr, Columbia, SC
PRESIDENT-ELECT................................. Barbara C. Determan, Early, IA
FIRST VICE-PRESIDENT ....................... Kristin M. Haas, Montpelier, VT
SECOND VICE-PRESIDENT ..................... Martin A. Zaluski, Helena, MT
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SOUTH......................... L. “Gene” Lollis, Florida; Eric Jensen, Alabama
WEST......................... Bill Sauble, New Mexico; H. M. Richards, III, Hawaii

Passing the Presidential Gavel
David Schmitt

Immediate Past President David Schmitt presented incoming President Boyd Parr with his president’s gavel.
II. D. USAHA MEMBERSHIP MEETINGS

Recognition of Immediate Past President
Stephen Crawford

Stephen Crawford presented David Schmitt with the Past President’s plaque, recognizing him for his dedicated leadership and service to USAHA.

Executive Director’s Report
Benjamin D. Richey

Another great week coming to an end. I am pleased to report that we are on par in attendance again this year, we have crossed the 1,200 attendee mark, which is excellent to have continued strength and participation in this meeting.

Our committees continue to work very hard, thanks to excellent leadership of our chairs. This isn’t possible without their expertise and efforts to put together such a top-notch program. Thanks to each of them for this. And particularly a few committees that were without their original chair this year, a number of folks stepped up to carry the workload – a testament to the commitment of our members.

We couldn’t pull this off with the help of a lot of people.

Kelly has continued to do an impressive job, in keeping track with all the registrations, questions and a list of other duties to keep our process efficient.

I want to thank Jackie and Rhonda, who have assumed our meeting planning duties for this year since Linda’s retirement. It’s been a good model to work with a single source along with AAVLD.

I also want to recognize Kim, as many of you know that she is a very important part of the workroom, as the gatekeeper for resolutions and reports, assisting Dr. Crawford and the resolutions committee through their
important work. I would like to mention a little interesting fact – Kim’s been at this longer than I have. Kim is very humble about her work, but she deserves a round of applause, as this is her 15th year assisting USAHA with the meeting. I don’t have a mower for you, but we are grateful for your service.

Dr. Doug Meckes and his staff, particularly Cathy that has been with us the entire time, has been a great asset, with plenty of capable help. You’ve been a great host --- thank you North Carolina.

This year has been a great one with the executive committee, which continues to have a great dynamic.

I want to thank Dr. Schmitt for his leadership. His calm, unwavering approach to just about everything keeps an even keel, and appreciate all he’s done on top of his day job for the association. I look forward to the coming year with Dr. Parr at the helm.

Lastly, I want to thank all of you as members for your support, kind words, and input over the past week. We continue to look to do things better, and provide the services you need from USAHA. As always, Kelly and I are available back in St. Joseph if you ever need anything.

Thank you.
II. D. USAHA MEMBERSHIP MEETINGS

Report of the Committee on Nominations and Resolutions*
Stephen K. Crawford

The Report of the Committee on Resolutions is approved by consent calendar. Chair Crawford reported a total of 45 resolutions submitted by Committees for 2016. Crawford read through each resolution as reviewed by the Committee. The following resolutions were recommended to be combined by the Committee:

- 4, 21 and 26
- 6, 13, 29, 34, and 42 (see action below)
- 7, 9, 11, and 24
- 12 and 14
- 15 and 45
- 16, 23, and 40
- 17 and 41
- 22 and 37
- 31 and 39

It was moved and seconded to combine these resolutions, and approved by the membership.

The following resolutions were held for review, with action indicated:

- Resolution 8 – Approved
- Resolutions 6, 13, 29, 34 and 42 were all held. Resolution 6 was Amended to Match 13, combining 6, 13, 29, 34 and 42.
- Resolution 32 – Approved
- Resolution 43 - Approved

All other resolutions were approved by consent calendar by the Membership.

With no further business, the Membership Meeting was adjourned.

*The detailed report of the Committee on Nominations and Resolutions is included in these proceedings, Section E.
II. E. COMMITTEE REPORTS
REPORT OF THE USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
Co-Chairs: Heather Simmons, TX
Charlotte Krugler, SC

Sara Ahola, CO; Bruce Akey, TX; Kelli Almes, KS; Jamee Amundson, IA; Gary Anderson, KS; Marianne Ash, IN; James Averill, MI; Lyndon Badcoe, WA; Deanna Baldwin, MD; Karen Beck, NC; Tammy Beckham, KS; Lisa Becton, IA; Danelle Bickett-Weddle, IA; Patricia Blanchard, CA; Fred Bourgeois, LA; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; Gary Brickler, CA; Charlie Broadaus, VA; William Brown, KS; Minden Buswell, WA; Bruce Carter, IA; Gregory Christy, FL; Matt Cochran, TX; Dustin Cox, NM; Stephen Crawford, NH; Tarrie Crnic, KS; Wendy Cuevas-Espelid, GA; Marie Culhane, MN; Susan Culp, TX; Glenda Davis, AZ; Ignacio dela Cruz, MP; Leah Dorman, OH; Brandon Doss, AR; Thomas Easley, MO; Cheryl Eia, IL; Brigid Elchos, MS; Dee Ellis, TX; Larry Elsken, IA; François Elvinger, NY; Kent Fowler, CA; Mallory Gaines, CO; Susan Gale, AZ; Tam Garland, TX; Cyril Gay, MD; Robert Gerlach, AK; Michael Gilsdorf, MD; Linda Glaser, MN; Patricia Godwin, KY; Timothy Goldsmith, MN; Alicia Gorczyca-Southernland, OK; Larry Granger, CO; Kristin Haas, VT; Rod Hall, OK; Timothy Hanosh, NM; Charles Hatcher, TN; Greg Hawkins, TX; Burke Healey, CO; Carl Heckendorf, CO; Julie Helm, SC; Kristi Henderson, IL; Melinda Hergett, TX; Linda Hickam, MO; Rick Hill, IA; Heather Hirst, DE; Donald Hoenig, ME; Guy Hohenhaus, MD; Dennis Hughes, NE; Pamela Hullinger, CA; David Hunter, MT; Carla Huston, MS; Russell Iselt, TX; Beth Johnson, KY; Annette Jones, CA; Jamie Jonker, VA; Subhashinie Kariyawasam, PA; Darlene Konkle, WI; Charlotte Krugler, SC; T.R. Lansford, TX; Dale Lauer, MN; Elizabeth Lautner, IA; Delorias Lenard, SC; Randall Levings, IA; Chuck Lewis, IA; Tsang Long Lin, IN; Mary Lis, CT; Eric Liska, MT; Kevin Maher, IA; Bret Marsh, IN; Barbara Martin, IA; Sarah Mason, NC; Chuck Massengill, MO; Rose Massengill, MO; James Maxwell, FL; Paul McGraw, WI; Sara McReynolds, ND; David Meeker, VA; Shelley Mehlenbacher, VT; Marvin Meinders, VA; Emily Meredith, VA; Gay Miller, IL; Mendel Miller, SD; Janice Mogan, IA; Alfred Montgomery, DC; Peter Mundschenk, AZ; Lee Myers, GA; Yvonne Nadler, IL; Sherrie Nash, MT; Cheryl Nelson, KY; Sandra Norman, IN; Kristen Obbink, IA; Dustin Oedekoven, SD; Kenneth Olson, IL; Claudia Osorio, MD; Kristy Pabilonia, CO; Elizabeth Parker, TX; Steve Parker, GA; Boyd Parr, SC; Janet Payeur, IA; Virginia Pierce, MD; Barbara Porter-Spalding, NC; Lisa Quiroz, CA; Jeanne Rankin, MT; Renate Reimschuessel, MD; M. Gatz Riddell, Jr., AL; Julia Ridpath, IA; Paul Rodgers, WV; Keith Roehr, CO; Susan Rollo, TX; James Roth, IA; Margaret Rush, MD; Mo Salman, CO; John Sanders, WV; Michael Sanderson, KS; David Scarfe, IL; Joni Scheftel, MN; David Schmitt, IA; Renee See, WV; Mark Shearer, IA; Gary Sherman, DC; Kathryn Simmons, DC; Heather Simmons, TX; Julie Smith, VT; David Smith, NY; Justin Smith, KS; Harry Snelson, NC; Diane Stacy, LA; Patricia Stonger, WI; Nick Striegel, CO; Darrel Styles, MD; Manoel Tamassia, NJ; Belinda Thompson, NY; Peter Timoney, KY; Jeff Turner, TX; Liz Wagstrom, DC; John Walther, LA; James Watson, MS; Patrick Webb, IA;
Michelle Willette, MN; Brad Williams, TX; Raquel Wong, HI; Cristopher Young, GA.

The Committee met on Saturday, October 15, 2016, at the Sheraton Greensboro Hotel in Greensboro, North Carolina, from 8:00 a.m. to 1:00 p.m. There were 61 members and 44 guests present. At the beginning of the meeting, the mission statement was reviewed along with the response from USDA-APHIS/VS to the 2015 USAHA Resolution #1, *National Foot-and-Mouth Disease Preparedness*. Members and guests were referred to the USAHA website to view the responses to all of the 2015 resolutions. Thirteen presentations were heard.

**Presentations**

**USDA-APHIS-VS After Action Corrective Action Program for HPAI**

Jon Zack, USDA-APHIS-Veterinary Services (VS), National Preparedness and Incident Coordination (NPIC) Surveillance, Preparedness, and Response Services (SPRS)

Dr. Zack provided an update over the APHIS-VS After Action (AA) Corrective Action Program (CAP) for highly pathogenic avian influenza (HPAI). Specific USDA-APHIS HPAI Reports and After Action Reviews completed:

- 2015 HPAI Fall Plan
- 2015 HPAI Final Report
- 2015 HPAI After Action Report
- 2016 HPAI/LPAI Indiana Final Report
- 2016 Indiana After Action Report

In addition to attending stakeholder meetings and hot washes, USDA-APHIS also conducted the following meetings and activities to collect information:

- April 2015 - First hot wash and regional Acquisition Approval Request (AAR)
- June 2015 - Hot wash/debrief for the four VS National Incident Management Team (NIMT) Command Staffs
- June 2015 - HPAI Fall Planning Workshop
- July 2015 - Hot wash of Joint Information Center (JIC)
- August 2015 - Online survey of APHIS responders
- September 2015 - VS NIMT Workshop

The HPAI reports and after action report (AAR) process, which included widespread interviews, surveys, and subsequent analysis, resulted in over 60 distinct observations and over 150 recommendations related to the response activities conducted by APHIS in 2014–2015. These activities were grouped
based on the 23 critical activities: communications, biosecurity, and incident management critical activities garnered the most feedback. The majority of lessons learned, across all critical activities, fell into three broad themes:

1. The need for revised/new guidance and procedures;
2. Challenges that were due to the scale of the incident; and
3. Observations related to problems in information sharing and coordination.

In terms of guidance and procedures, certain activities required streamlining and improvement in order to meet the other goals of the response effort, such as appraisal and compensation. Additionally, this outbreak, the largest in U.S. history, demonstrated the need for revised guidance on large-scale response capabilities and strategies, like mass depopulation goals and methods. Other critical activities required further elaboration based on the situation on the ground, such as virus elimination requirements.

Many other lessons-learned were related to the challenges of mounting an effective response given the sheer size and complexity of the outbreak. For instance, during the height of the incident there were delays and difficulties because of a shortage of available qualified personnel for critical activities such as diagnostic testing, depopulation, appraisals, carcass disposal, and information management. Equipment, supplies, and/or services were sometimes lacking (i.e., resources for diagnostic testing, depopulation, and disposal).

**USDA Update on the Permit Gateway and Permitting for HPAI**

Fred Bourgeois, USDA-APHIS-VS, Surveillance, Preparedness, and Response Services (SPRS), National Preparedness and Incident Coordination Center (NPIC)

Dr. Bourgeois discussed the EMRS2 Customer Permit Gateway. This is a newly designed secure web application which facilitates and streamlines permit requests for producers. Registered producers can login to request permits and check on the status of any existing request. When a permit is requested, it is entered into the Gateway, it appears in the EMRS2 database automatically. An EMRS2 specialist reviews the request in a queue and reviews the data for completeness. Information entered includes: permit class, permit reason, origin premises, destination premises, item class, and duration/span of permit.

Once registered in the Gateway, a producer may identify all of their premises. After entering a request for a permit, a producer can see the status of their permit. No changes to the permit are allowed after it has been accepted into the EMRS2 database. Once a permit has been approved by a destination State, a producer can enter their permitted movements directly in the Gateway until the permit expires or they no longer meet the terms of the approved permit.
Analytical Support Before and During Outbreaks of Highly Contagious Animal Diseases
Amy Delgado, CEAH, USDA-APHIS-VS, Science, Technology and Analysis Services (STAS)

Dr. Delgado’s presentation provided an overview of analytical support that the Center for Epidemiology and Animal Health (CEAH) can provide before or during an outbreak, and discusses how Federal, State, and industry partners can request help with outbreak investigations. The CEAH provides analytical epidemiology for comprehensive analysis of animal disease outbreaks and control programs; identifies emerging animal health issues and monitors health-related aspects of U.S. livestock management and production; and conducts risk assessments and develops economic and epidemiologic models to inform benefit-cost analysis, risk analysis, and surveillance plans. CEAH analysts develop and maintain a variety of tools to help industry, State and Federal partners better prepare for and respond to animal health emergencies.

Latest Findings: Carcass Management and Decontamination
Lori Miller, USDA-APHIS-VS, Science, Technology and Analysis Services (STAS)

Ms. Miller discussed progress made over the past several years to improve carcass management and decontamination capabilities when responding to animal health emergencies. Her presentation highlighted two general examples of major improvements and then provided a more in-depth discussion over key findings from a number of projects performed recently. Her talk also included a path forward based on the findings.

MSPSA: USDA-APHIS Resource Allocation and Area Command TTX
Sara McReynolds, North Dakota Department of Agriculture, North Dakota State Board of Animal Health

The Multi-State Partnership for Security in Agriculture (MSPSA) and USDA, APHIS, VS have been conducting a series of joint resource management exercises. Dr. McReynolds presented on the exercise. The first part of this exercise series was a tabletop exercise (TTX) in May 2016 that included 11 states, three VS districts, livestock trade associations and local jurisdictions. The scenario consisted of three modules and presented an outbreak of Foot and Mouth Disease (FMD). The first module examined resource management and Incident Command when FMD is in the U.S. but not close to any of the participating states. The second and third modules incrementally moved FMD closer to the participating states, eventually introducing the disease to all of the participating states.

The MSPSA workgroup envisions a series of activities to help participants address areas of improvement identified at the May 2016 TTX and other issues necessary for them to successfully participate in the FY 2018 functional exercise. These activities may include seminars, workshops,
drills and possibly additional TTXs. The exercise series will be culminating in a functional exercise in May 2018.

This series of exercises are included in the FY 16 and 17 VS Training and Exercise Program (TEP) plan. These exercises are described under Events 3.3.2, 3.3.3, and 3.3.4 of the TEP. While the TTX was directed at MSPSA member states and associated VS districts, subsequent activities will be open to states and districts interested in participating and willing to commit the financial and personnel resources necessary to successfully engage in the project activities. This event will give states an opportunity to participate either as impacted jurisdictions or as non-impacted jurisdictions, allowing the latter group to evaluate movement protocols and resource sharing, and participate in visibility and situational awareness aspects of the exercise, but not direct FAD response.

**MSPSA: Development of Materials to Facilitate Discussions Between State and Local Personnel for Incident Command System (ICS), State Contracting, State Agency Coordination, and State/Local Coordination**

Darlene Konkle, Wisconsin Department of Agriculture, Trade and Consumer Protection

Following the 2014-2015 Highly Pathogenic Avian Influenza (HPAI) outbreak in the Midwest, responding states identified lessons learned and best practices that needed to be revisited. The responding states identified four key areas:

1. Incident Command Structure
2. Communications with local agencies
3. Communications with state agencies
4. State contracting.

The Multi-State Partnership for Security in Agriculture (MSPSA), secure egg supply (SES), Inc. and the Iowa State University Center for Food Security and Public Health (CFSPH), worked together to develop resources to assist states in filling these gaps. These resources serve as a starting-point to prompt and facilitate multi-agency discussions to improve response capabilities. Animal health agencies and responding partners are encouraged to customize these resources to best serve an audience and achieve the goals to improve coordination between federal-state-local government and private industry within their own jurisdictions. The resources are available online at the Iowa State University Center for Food Security and Public Health (CFSPH) website:


Specific resources (i.e., presentations) include:

1. Incident Command Structure Update: Evaluate the organizational structure and position requirements to fully utilize response capability and capacity
2. Communication with Local Jurisdictions: Determine when, what, and how to communicate with local response partners to improve collaboration

3. Communicating with State Agencies: Identify the essential information to present during state agency briefings to enhance the efficiency of communication

4. State Contracting in a Foreign Animal Disease Response: Explore challenges and solutions in each state to implement emergency contracting procedures to respond to an animal disease event.

This project was funded through the Multi-State Partnership for Security in Agriculture by the Wisconsin Department of Agriculture, Trade and Consumer Protection by allocating U.S. Department of Homeland Security State Homeland Security Grant Program (HSGP) funds. Developed by SES, Inc. and Center for Food Security and Public Health (CFSPH).

**Update over Palo Duro FMD Exercise**

T.R. Lansford, Texas Animal Health Commission; Becky Brewer-Walker, USDA-APHIS-VS, Surveillance, Preparedness and Response Services (SPRS); Mike Pruitt, USDA-APHIS VS, and Josh Winegarner, Texas Cattle Feeders Association

The Palo Duro II Functional Exercise was conducted over a day and a half on August 16 and 17, 2016, in Amarillo, Texas. With participation from local, state, federal, and private sector representatives, it was designed to exercise a stakeholder response to a foot-and-mouth (FMD) disease outbreak among Texas Panhandle beef cattle, dairy, and swine populations. Exercise participants were organized into four Player Groups—Policy, Command, Industry, and Joint Information Center—in accordance with their occupation and expertise, they responded to scenario injects released from a Simulation Cell. There were 188 participants on Day 1 of the exercise, and 159 on Day 2.

The functional exercise scenario was a continuation of the scenario presented at the November 2015 Palo Duro II Tabletop Exercise (TTX). The Texas Animal Health Commission (TAHC) extended an invitation to deploy one of the VS National Incident Management Teams as a part of the Palo Duro II exercise. The exercise play involved a Unified Command response to an FMD outbreak in a commercial swine operation, a dairy, and a beef feed lot. The Veterinary Services (VS) Green Team located in District 4 was chosen as both Incident Commander (IC) and Deputy IC. Two Texas Panhandle concentrated animal feeding operations workers returned from a trip to Venezuela, introducing FMD to the region.

After a positive diagnosis of FMD at a beef cattle feed yard, the disease was eventually detected at area dairy and swine facilities. The exercise helped to identify gaps in current plans and highlighted agency policies/decisions during an FMD outbreak. The Team members who were 'deployed' as part of the exercise play, were:
The VS Team worked with the TAHC team in a Unified Command Structure. Play was challenging as it was structured in three different time frames, the first few days, two weeks later, two months later. Incident management included; decisions to vaccinate vs euthanize, strategies and actions for vaccination, quarantine and testing, sending negative animals to slaughter, management of milk produced on an exposed, not affected, dairy, and management of selective euthanasia and disposal (swine).

Some key takeaways:

- Exposed challenges of a "top-down" Unified Command co-commanded by TAHC and USDA, which frustrated some participants accustomed to typical emergency management practices and protocols designed to address incidents other than an FMD outbreak (such as natural disasters);
- Identified the need to further develop and coordinate plans among all stakeholders regarding communications and messaging;
- Clarified that packing plants can continue to operate with Food Safety and Inspection Service (FSIS) approval;
- Tested the availability of cleaning and disinfection resources from government agencies and the National Veterinary Stockpile (NVS);
- Emphasized the importance and need for all response partners and affected entities to utilize a common situational awareness system;
- Followed the USDA FMD plans to implement vaccination protocols, including use of the vaccine bank and associated supplies;
- Helped to determine how stop movement and permitted movement of animals will be conducted by federal and state agencies;
- Coordinated effort for vaccine, slaughter, E/D, and messaging to both the agriculture community and the public.

Finally, the complex nature of the FMD outbreak scenario challenged the players and pushed them to examine innovative response strategies. Numerous observations and areas for improvement emerged through player discussions, and the overall interaction among public and private sectors representatives fostered by the exercise was extremely beneficial to local, state, federal, and industry preparedness efforts. From a state perspective, there were several key outcomes. Among those were the lessons learned
through testing the emergency response mechanisms of the state for a response other than a natural disaster, to include funding structure and reporting functions, the need to develop mechanisms for Joint Information Center (JIC) members to interact more broadly outside of an event in an effort to be more aware of each other's capabilities, and an opportunity to evaluate personnel training and capabilities to identify future training needs.

The USDA-APHIS Sources Sought Notices (SSN) for Foot and Mouth Disease Vaccine: Implications and Outcomes
Steve Parker, Merial, A SANOFI Company

The current North America FMD Vaccine Bank (NAFMDVB) stockpile is undersized to respond to anything other than a limited scope outbreak. Thoughtful consideration should be given to advancing the support capacity for FMD bank stockpiles that are in line with U.S. FMD vaccine use policy. Merial has produced for government clients in all regions of the world for endemic disease control efforts and for government preparedness programs.

In FMD-free countries, vaccine antigen banks are the standard model for emergency response to FMD outbreaks. Efficient antigen bank models match the quantity of bank antigen doses to the disease spread potential in the target livestock population combined with the manufacturer's rapid response to convert the antigen to vaccine. The NAFMDVB stores vaccine antigen concentrate for the production of emergency FMD vaccines.

Food Protection and Defense Frame Systems for Animal and Food Emergency Response Training
Penny Norquist, Food Protection and Defense Institute (FPDI)

Animal agriculture stakeholders ranging from federal government officials to primary producers in the food industry all need emergency management competencies that align to serve the national preparedness system. High quality training is needed to prepare for, prevent, mitigate, respond to, and recover from an emergency in the animal agriculture sector, and individuals need an intuitive way to navigate training resources.

In collaboration with Department of Homeland Security Office of Health Affairs (OHA) Food, Agriculture and Veterinary Defense Branch (FAVD Branch), FPDI created a comprehensive training framework for animal agriculture emergency responders. The purpose of this interactive online framework is to recommend training opportunities for every emergency responder in an Incident Command System (ICS) so they may be prepared to complete the tasks needed for efficient response during an animal agriculture emergency. The training framework will serve the vision of the national preparedness system by guiding the development of a skilled cadre of emergency responders, and it will offer a framework for an individual to plot out career development opportunities.

Over the last year, FPDI has made progress on revising the current Frame system and developing frameworks across multiple sectors:
• Converted the Frame IT system over to a ruby-on-rails application to allow for more flexibility. The CAEM presentation will provide a demo of the Frame version 1 administrative view.
• Updated and cataloged course information for the animal and food frameworks.
• Hosted requirements workshops with participants from state and federal agencies, academia, industry, and international organizations to generate training frameworks for the food sector and the one health workforce.

Frame Objectives:
PROFESSIONAL (INDIVIDUAL) TRAINING MANAGEMENT
(CV/Profile Screen)
• Curriculum vitae (CV) format enables the user to document and manage their course records, experiences, education, specialties, and contact information.
• Track progress toward fulfilling recommended courses for an assigned role or future career role.
• Support user mobility across organizations in response to an event or over their career progression.
• Registration form enables quick entry into the Frame system.

ACCESS TO TRAINING
(Framework & Course Catalog Screens)
• Aligns courses and training goals by recommended competencies for a technical role
• Flexible Structure
  (e.g. Incident Command Structure for Animal Frame, Competencies Grid for One Health)
• Organizations can start with a base framework scaffold and customize positions and course recommendations
• Organizations can add volunteers or users that may or may not be in an existing learning management system (LMS)
• Support for upload of just-in-time training courses

REPORTING
• Identification of training progress and gaps by individual, agency, or system wide. Additional reports to be determined based on the needs of the organization.
• One Health- country profile view.

We are looking for confirmation that the roles within the animal frame and alignment of courses meet the needs of your organization. A common list of specialties and real world experiences would provide consistency across the frame as well.
AgConnect® Emergency Exercise: Swine Industry Disease Response
Matt Cochran and Dee Ellis, Institute for Infectious Animal Diseases

The AgConnect® Emergency Exercise, took place over the course of two days, during the first week of August 2016. The exercise addressed business continuity for the U.S. commercial swine industry in the face of a foreign animal disease (FAD) outbreak (classical swine fever (CSF) in this case), and was coordinated and hosted by the Institute for Infectious Animal Diseases (IIAD) at Texas A&M University, a Department of Homeland Security Center of Excellence. The Texas Center for Applied Technology (TCAT) provided personnel and expertise to ensure fluid application of all technologies in use during the exercise. TCAT served as the technical developers of the AgConnect® system and the Emergency Management Exercise System (EMES) - used to drive the exercise).

This was a data driven exercise, with a focus on the function and utility of the AgConnect® suite of tools, to provide for: planning, response and business continuity, biosurveillance, shared situational awareness, data and information sharing, operational coordination, and operational communications.

The exercise was divided into three vignettes, and included prompted swine movements and interstate or state-to-industry communications with each movement. Additional functionalities of the AgConnect® suite were highlighted, and these included: the phylogenetics toolset, mobile health (mHealth) tools and functions, and the Laboratory Capacity Estimation Model. In preparation for the exercise, the players were given hands-on training on the system, and all players and observers were given orientations on swine production and on Secure Pork Supply planning by swine industry attendees. Four state veterinarians (Iowa, Kansas, Colorado, and Indiana) accompanied by their assistant state veterinarian and other staff, served as incident commanders in the exercise. The commercial swine industry was represented and played in the exercise, in communication with the state veterinarians. Representatives from USDA-APHIS were present and interacted as observers with access to all elements of exercise play. Representatives from the Swine Health Information Center observed, and Department of Homeland Security (DHS) Office of University Programs (OUP) along with DHS Science and Technology (S&T) were also in attendance.

All players remained isolated to their respective rooms during exercise play, and gathered back in the large observation room after every movement inject and exercise play, for exchange of commentary and discussion. The exercise was a success, both logistically and functionally. The exercise facility was very well configured, as it is set up as an emergency operations training center, with screens, rooms, and accommodation of incident command organization of responders. Observers were well informed with announcements and visualization of all exercise play within AgConnect®, and had a chance to hear from the State Veterinarians and their staff, in person, after every movement scenario. The State Veterinarians had access
to technical expertise for use of their respective AgConnect® dashboards, and could use house phones to make calls and have conference calls. Exercise controller/evaluators were stationed in each room, and the Emergency Management Exercise System (EMES) allowed for timed, e-mailed injects to be distributed to select participants throughout the exercise. The state veterinarians and industry representatives came away from the exercise concluding that AgConnect® was able to quickly translate information to visualization for situation awareness, and that an important aspect of success was the ability for the swine industry to directly share operational and geospatial information directly through the AgConnect® system. The State Veterinarians were also able to inform each other by sharing geospatial visualizations of their outbreak control efforts and status through AgConnect®. The exercise ran on time, and AgConnect® delivered as expected.

Committee Business:
Five resolutions were submitted by committee members and were adopted through motions made, seconded, and passed by voice vote.

Resolution 1 – Resource Typing for Animal Emergency Response
Resolution 2 – Veterinary License Reciprocity in Emergencies
Resolution 3 – Radiological Incident Response and Resources
Resolution 4 – National Foot-and-Mouth Disease Preparedness
Resolution 5 - Termination of AVMA’s VMAT Program and Participation in Animals In Disaster and Emergency Response

The meeting was adjourned at approximately 1:00 p.m.
The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 3:00 to 5:45 p.m. There were ten members that were present as determined by their initials on the roster. There were 17 guests present. Dr. Ash gave a short presentation about basic housekeeping and the purpose of the CAHSIS committee. The 2015 minutes/report were approved unanimous vote by all members present.

Presentations and Reports

Update from the Subcommittee on Data Standards
Michael McGrath, Trace First

The subcommittee on data standards has been working the past year on a review of outstanding issues and addressing feedback since the electronic Certificate of Veterinary Inspection (CVI) standards were published. They believe they are about 2/3 of the way through the review process. The subcommittee will be continuing to work on the review of the standards through the end of the year and then will be able to look into what they need for starting to create a second version. Version two of the standards will incorporate feedback and address weaknesses from version one. In addition to the actual details within the standards, the committee will need to decide what should be changed about the process of developing standards. Two points to discuss are 1) the schema needs to be tighter—less subject to interpretation, clean up ambiguities and 2) state animal health officials need to put pressure on vendors to participate in the actual standard meeting process so they can have input and address issues upfront.

Questions:
ANIMAL HEALTH SURVEILLANCE AND INFORMATION SYSTEMS

1. Who are vendors?
   a. No specific answer to the question, but talked about how they want vendor input. Often vendors think that when the committee is working on a draft that they can't participate or have a say in the development process. However, the term “draft” still means that it is open for vendors to give input.

2. Is the working group made up of the same people as last year?
   a. Yes, but open participation by any/all members is encouraged. One exception: cannot take formal votes on resolutions without representation from consumers and producers of CVI.

3. Will this eventually be able to work for laboratory messaging data standards?
   a. It is much easier to create laboratory messaging because we have a human standard to begin with, whereas we did not for CVIs. Michael suggested they keep them separate. Additionally, one listener encouraged that it be considered to incorporate small animal CVI standards.

Update from the National List of Reportable Animal Diseases (NLRAD) and the National Animal Health Reporting System (NAHRS) Reportable Diseases List
Maria Celia Antognoli, Center for Epidemiology and Animal Health (CEAH)

**NLRAD update:** Dr. Antognoli described what NLRAD is and its purpose. It provides consistency and transparency of the health status of an animal population. The history of NLRAD was presented. It started in 2006 when a need of reportable diseases list was identified. Five working groups were described. The framework was also described—a current list of U.S. reportable animal diseases, laboratory case classification and reporting requirements, structure and procedures, list maintenance, communication, data management, and information release. There are two categories within NLRAD—monitored diseases and notifiable diseases (emergency incidents, emerging disease incidents, and regulated disease incidents). How does this fit into comprehensive and integrated surveillance? It provides sources of information to make decisions about the health status of animal populations. Next steps for NLRAD: review framework comments, draft a purposed rule, publish for comment, publish final rule, and implement. Processes are in place.

**NAHRS update:** Dr. Antognoli gave an overview of what NAHRS is, why it was created, and its structure. She encouraged the committee to reassess responsibilities to reinvigorate NAHRS participation. 2015-2016 activities: VS NLRAD-NAHRS working group was formed, a web reporting tool was created, USDA eAuthorization access was implemented, and website updated. Next year’s actions include continuing to coordinate NLRAD,
expanding to all states and territories prior to NLRAD regulatory implementation, training, transitioning of equine infectious anemia (EIA) testing reporting from NAHRS to EIA laboratories in 2017-18, enhancing communications with states to coordinate training, and renewing involvement of AAVLD/USAHA CAHSIS Steering Committee.

Questions:
1. Mike Martin: NLRAD framework includes suspect cases but NAHRS only includes confirmed positive cases. How do we line that up?
   a. Need to have a platform for remarks to be able to include that, work with information technology (IT) to have a more robust way to communicate/report

EMRS2GO: Mobile Application for Remote Data Capture and Upload to EMRS2
Fred Brougeois, USDA-APHIS, Veterinary Services (VS)

Dr. Brougeois introduced a new application for all foreign animal diseases (FAD) inputs. He described the problem with the current system in place—lag time, training, data entry, and people wanting a single form to fill out for investigations. The solution: EMRS2GO—offline data entry using tablets, laptops, etc. It accommodates groups of animals or single animals. Downloadable lookup information makes this tool easy and quick to use—standard dropdowns, date defaults, stores information/maps, sites/locations visited previously, etc. The tool collects Global Positioning System (GPS) coordinates, contact info, sample collection, clinical signs, etc. Laboratory submission forms can be filled out and printed to mail in along with premID barcode to the laboratories. Brougeois described the initial contact report (ICR), which is user-friendly for veterinarians who do not have to do FAD investigations very frequently. EMRS2GO will be the preferred method. Training will be provided through instruction materials and webinars. The tool can be expanded to handle other items such as inspection tasks—focused interfaces with easy input. Planned production release = Jan 2017.

Questions:
1. Justin Smith—When an ICR is filled out, will in-house databases be able to get that information as well?
   a. Technology is there, discussions around security/politics/etc. will need to take place. Ideally, yes. Potentially through a simple comma-separated values (csv) file? We need to look into this more.
2. What platforms are used?
3. A member approved this effort because they, along with many others, have been dealing with incomplete data for years. Agree that there is a need for a way to get information from accredited veterinarians to laboratories to Emergency Management Response System (EMRS)
4. Nick Striegel – how can we take something like this to use for Veterinary Services Process Streamlining (VSPS)? Can we build something for VSPS? How do we get this to be a priority?
   a. Brougeois just did what he could on his own and had others help – he took the initiative (didn’t ask, would still be asking). Could same technology work for VSPS? Probably. Need resources and prioritization. Input from others in the audience is that there is a need to start looking at this same platform for other uses now.

5. Rodger Main—can the laboratory see the information from EMRS2GO and map it to make into a laboratory submission form?
   a. We have an order message but haven’t used it for years—need to revitalize this. This is where we want to be and where we should be. Are the laboratories’ Laboratory Information Management Systems (LIMS) advanced enough now to do this? If yes, then we need to discuss this with National Animal Health Laboratory Network (NAHLN) information technology (IT).

6. Mike Martin – are specimen barcodes globally unique within EMRS?
   a. EMRS2GO just transcribes the specimen identification (ID) into the barcode so laboratories can scan it to reduce entry error.

7. Once the form is filled out by a veterinarian who does not have an account, can that information be forwarded/mailed/etc. to someone with credentials to upload if they are not within driving distance?
   a. Need to look into this more, but would be vital to have a system in place.

8. Laboratories would like to see a way that the information we message to Laboratory Management Systems (LMS) be accessible to states by some mechanism so laboratories don’t have to manually send to state health organizations, etc. who are interested in the data.
   a. Potentially can develop another database or central point that laboratories with correct credentials can go into to grab the data that they are associated with.

New Planet Technologies—New Methods for Electronic CVIs
Tyson Hartshorn, New Planet Technologies

New version of SmartICVI—updated and increased capabilities, RxExpress, intuitive workspace, eliminate manual overhead, automated document processing, and four different ways to receive ICVIs. November 10, 2016—virtual demonstration (RSVP by 10-21-16).

Questions:
REPORT OF THE COMMITTEE

1. Can this data be messaged into our own animal health information management systems?
   a. Yes

Swine Diagnostic Data Standardization Project (Swine Health Information Center (SHIC) and USDA Funded Effort)
Marisa Rotolo, Iowa State University Veterinary Diagnostic Laboratory
   This is a multi-laboratory collaboration (Iowa State University (ISU), Kansas State University (KSU), University of Minnesota (UMN), South Dakota State University (SDSU), Clemson, and USDA) to take laboratory results, send them to a third-party database, pool those results, and use them. This requires laboratory data standardization. Results can then be analyzed, summarized and sent to end-users. Using a common language/message system such as Logical Observation Identifier Names and Codes (LOINC) or Health Level Seven (HL7) so laboratories can effectively communicate results. Priorities are working on getting the most important test list standardized first, then moving on to other levels of testing. The intent of this is to be completely consistent with the National Animal Health Laboratory Network (NAHLN) schema. Project completion estimate late Fall 2017.

Data Integration in Real World Situations: Colorado’s Use of AgConnect Linked to USAHerds – Values Realized
Nick Striegel, and Christy Dice, Colorado Department of Agriculture
   AgConnect can take data and upload it from USAHerds and other places, making it very functional. Colorado has used it for emergency management, movement of animals, preparedness planning, training and animal traceability for vesicular stomatitis virus (VSV). Examples were presented of how AgConnect was used. Example #1 was the heavy metal contaminated water incident in a river in Colorado (the Gold King Mine incident) and they were able to map all premises in Colorado affected by the contaminated river. Example #2 – VSV hold, quarantine, and quarantine release premises were mapped in AgConnect. This was useful in doing follow up on over 500 cases per year. Example #3 – 6,000 acres’ wildfire in 2016 summer; used AgConnect to help the Incident Management Team (IMT) with Emergency Management and have IMT work closely with ranchers and farmers to have access to the ranches and roads to increase safety of the people and animals in the area. Example #4 – a highly pathogenic avian influenza (HPAI) scare; used AgConnect to map premises and then used that in training for commercial poultry operations in the state to show how things would look if a real HPAI outbreak were to occur in Colorado.
Using Geographic Information Systems to Support Animal Health Surveillance – Minnesota’s Development of an Interactive Mapping Tool to Respond to an Animal Disease Emergency

Dr. Culhane, University of Minnesota

Dr. Culhane gave an update on how Minnesota used the interactive mapping tool to respond to the highly pathogenic avian influenza (HPAI) outbreak last year as well as some actions they performed after the outbreak was contained. She demonstrated the mapping tool including layers of access and control zone functionalities. After the outbreak, Minnesota collaborated with other states involved in the outbreak to improve some of the mapping and response tools, which included standardizing symbols used and improving some of the mapping capabilities.

Committee Business:

Lisa Becton presented a resolution titled “Sustained Fiscal Year 2017 Funding for APHIS /Influenza A Virus – Swine Surveillance Activities”. This will likely also be presented tomorrow to the swine committee. A motion to approve was offered by Bruce Akey and seconded by Francois Elvinger. CAHSIS discussed the resolution, and the resolution was approved by a unanimous vote of all members present.

New Business:

Western States informed CAHSIS of a resolution urging the USDA-APHIS-VS to work collaboratively with State Animal Health Officials (SAHO) and private commercial database vendors to provide direction and goal setting for states as they move forward to establish or improve their data transfer capabilities. This resolution was sent to USDA and a response was given. This is not an active resolution for this committee at this time, but was something they wanted the committee to be informed about.

Motion to adjourn, motion seconded.
The Committee met on October 19, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 8:00 a.m. – 12:00 pm. There were 42 members and 29 guests present. The meeting opened with a welcome and a review of the committee purpose and discussion of procedural rules. We discussed the prior year resolution number eight, related to potential increased international control of the anesthesia drug ketamine and the outcome that the World Health Organization (WHO) recommended no further controlled restrictions to the United Nations.
Presentations

Free-roaming Horses – The perspective of the Bureau of Land Management
Dean Bolstad, Wild Horse and Burro Program, Bureau of Land Management

Mr. Bolstad presented details regarding the authority and activities of the Bureau of Land Management (BLM) related to management of wild horses and burros on BLM controlled lands. He showed the eight parts of their management plan, and reviewed factors contributing to increasing horse numbers on public lands and held in off-range pasture or corral management facilities. He provided details related to how BLM resources are currently being apportioned for the management efforts. He also addressed questions in horse management issues raised by state animal health and wildlife personnel that pointed to inadequate resources to meet the needs of satisfactorily managing free-roaming horse populations for environmental resource management, public health and safety, and the overall charge to the BLM.

The Effects of Horse Overpopulation in Indian Country Today - A Tribal Perspective
Jason Smith, Confederated Tribes of Warm Springs

Mr. Smith presented the views of the Intertribal Agricultural Coalition and National Tribal Horse Coalition on the problems associated with horse overpopulation on tribal lands.

The complete text of this presentation is included at the end of the report.

Free-roaming Horses – The Perspective of a State Veterinarian
Barry Pittman, Utah Department of Agriculture

Dr. Pittman offered comments regarding free-roaming wild horses and burros in Utah and the partnership between Utah and Bureau of Land Management (BLM). He gave specific examples of management efforts with herds of free-roaming horses. He specifically addressed his responsibility to protect the health and welfare of domestic horses in his state and the efforts related to providing surveillance testing and inspections of wild/feral horses for diseases such as Equine Infectious Anemia and Vesicular Stomatitis.

Committee Business:

The first part of the discussion was related to the evaluation of the need and utility of the Committee on Animal Welfare for the USAHA. Membership was unanimous in their belief that the committee continues to be needed and useful. The chairs asked for specific input regarding scheduling recommendations. Co-scheduling opposite One Health Symposia has presented attendance conflicts for some members. The vice chair does not want this committee overlapping the Committee on Livestock Identification. We asked members to offer any scheduling concerns by e-mail to the chairs.
Another discussion addressed the fact that animal welfare expertise does not necessarily come from within this organization. The lack of availability to fund participation by invited speakers may limit the ability of this Committee to meet the mission statement fully and to provide value to the USAHA. It may be time to seek specific sponsorship of speakers for the Committee on Animal Welfare from allied stakeholder groups.

The last discussion addressed a list of potential topics related to animal welfare, both broadly addressing concerns across animal species, commodity groups and animal function, as well as topics specific to various species or groups. A list of topics was distributed to members with a request to provide feedback to the chairs regarding priorities, additional topics, speaker recommendations, or additional input after further discussion with stakeholder groups. Please see the following list for topics considered or recommended by the membership and guests:

Topics and concerns for potential future discussion of the Committee on Animal Welfare

All species:

• Genetic engineering for animal welfare, e.g. adding gene for polled cattle, and related issues
• Antibiotic free marketing schemes and their consequences on animal welfare
• Animal welfare issues related to animal testing requirements of animal product imports
• High density housing related to explosive animal disease transmission, especially related to highly contagious diseases not routinely prevented by vaccination, e.g. Porcine Reproductive and Respiratory Syndrome (PRRS), foot and mouth disease (FMD), highly pathogenic avian influenza (HPAI), Swine Enteric Coronavirus (SECoV)
• When do disease issues become welfare issues, and when, if ever, do management practices associated with disease reduction take priority over management practices for optimizing animal welfare? If so, what other strategies might be employed to enhance welfare?
• Animal welfare concerns related to a foot and mouth outbreak in the United States
• Impact of economic swings on animal welfare
• Requiring chickens to go outside but making cats stay in the house?
• Comparisons of animal welfare assurance programs across commodity groups
• Animal welfare food labeling comparison and implications
• Fly control
• State animal welfare and animal cruelty laws – enforceable statutes, responsible agencies, training requirements, using/having best management guidelines, appropriate/quality investigations
ANIMAL WELFARE

- Legal guidance and examples – need for legal expertise input in the discussion
- Panel of State officials willing to discuss examples in their states

- Psychology of animal welfare – learning more about how to communicate with the general public regarding fact based decision making and the continuum of practices and animal welfare.

Poultry:
- Update on poultry research related to animal welfare outcomes associated with different caging/housing systems
- Any design concerns/improvements/changes related to poultry welfare suggested in relation to HPAI transmission or control?
- Animal welfare concerns associated with confinement versus free range or pastured management systems

Beef cattle:
- Shelter requirements of cattle in different climates; shelter requirements for feedlots.
- Best management practices related to seasonal mud control
- Hide contamination – how much is too much from a welfare perspective?
- Minimum animal health best management practices necessary for feeder calf welfare

Dairy cattle:
- Concerns related to too many injections – are synchronization programs compromising cattle welfare?
- Lameness interventions for dairy cattle – how much lameness is too much
- Farm Program third party audit verification
- European movement to stop pregnant cattle slaughter
- Heat stress and heat stress management

Sheep:
- Excessively short tail docking in club lambs – still happening
- Growing sheep dairies – production medicine and best management practices for sheep welfare
- Tail docking, castrating best practices for pain control

Goats:
- Growing goat dairies – production medicine and best management practices for goat welfare
- Dehorning and castrating best practices for pain control

Swine:
- Gestation crates – animal welfare realities and options
- Animal welfare concerns associated with confinement versus free range or pastured management systems
- Best management practices related to castration, tail docking, needle teeth trimming, tusk trimming, tail biting, aggression in confinement systems, lameness, management of very large pigs
Horses:
- Soring
- Tripping
- Blood doping
- Tail docking
- Performance enhancement manipulation detection
- Animal welfare concerns related to racing. Science and research to minimize breakdowns with changes in training regimens, track designs, best management practices associated with injuries and recoveries
- Welfare concerns related to carriage horses in cities
- Best management practices and evaluation of appropriate work expectations for working equids

Dogs and cats:
- Importation of sick or injured dogs and cats
- Feral cat colonies – science to support decisions
- Trap spay/neuter, rabies vaccinate – is it really providing better welfare
- Legislation against declawing, tail docking, ear cropping – best management practices associated with elective surgeries.
The Confederated Tribes of Warm Springs (CTWS) and the National Tribal Horse Coalition (NTHC) have always held the horse in high esteem. Historically, this animal has provided an important contribution to our people. Early in reservation life, the horse provided a means to travel and trade along the Columbia River. Over the centuries our people have continued to respect this animal because of the cultural significance it provides: livestock economy, farming, gathering of livestock, hunting, recreation, and ceremonial purposes. Perhaps most significantly for Warm Springs, the horse has, and continues to be utilized and treated as livestock.

The CTWS and NTHC understand that every tribe has their specific cultural belief toward the horse, and we respect each tribal tradition and cultural belief. Warm Springs recognizes the importance of pursuing all avenues of reviving the current dismal horse market, which historically and until recently, has been a vital part of the Warm Springs economy. We, along with many tribal nations, witness daily, the numerous detrimental effects to the physical condition of horses on our reservation and to our tribal economy since the closure of processing facilities in the United States. Without a viable market, there has been a dramatic increase in the number of horses on our tribal lands. This has had an adverse effect on the condition of our rangelands, watersheds, fisheries and wildlife habitat, cultural plants, and foods.

The CTWS Tribal Council, in Resolution 11082, states that “affected Tribal Nations recognize the necessity and benefit of our ability to direct the transport and processing of horses” and “requests that Congress oppose federal legislation that interferes with tribal abilities to direct or conduct the transport, processing, or management of horses for the protection of sustainable natural resources and reserved treaty rights”, and supports “efforts to protect the rights of Tribal Nations through the subcommittee of the National Tribal Horse Coalition (NTHC).”

The CTWS also takes the stand that the horse continues to be held in high regard as a culturally significant animal that has directly contributed to the overall prosperity of the Warm Springs People. Committed to exploring and implementing a number of options to reduce the number of horses on the reservation, the CTWS has, with limited success, offered for the last nine years, a public auction of horses, and has an ongoing castration program. These alone didn’t seem to accomplish our reduction numbers so we have now established a horse removal program that has been very successful.

As we move forward to protect our tribal traditions and treaty rights, the CTWS and NTHC understands the need to pursue a horse processing alternative as a viable and humane option to improve conditions for horses,
our natural resources, and our tribal economy. While this perspective may be unique to Warm Springs, each member of the NTHC brings its own compelling and valuable reasons for managing and controlling their horse population. In this way, we stand together to promote or enhance the horse market in its totality and protect the horse from the cruel reality of starvation, neglect, and abandonment.

In June 2011, the Government Accountability Office (GAO), the research arm of Congress, stated:

Clearly, the cessation of domestic slaughter has had unintended consequences, most importantly, perhaps, the decline in horse welfare in the United States. Horse abandonment and neglect cases are reportedly up, and appear to be straining state, local, tribal, and animal rescue resources. They further commented: Congress may wish to consider allowing USDA to again use appropriated funds to inspect horses at domestic slaughtering facilities, as authorized by the Federal Meat Inspection Act.

These “unintended consequences” of starvation, neglect, and abandonment are something that Congress has known about since 2011. Yet in every budget they have passed from 2012 on, they have prevented the use of federal funds to be used for USDA horsemeat inspectors. They are either: 1.) Ignoring these horrendous consequences, or 2.) These consequences are actually what they do intend. Either one provides a dismal characterization and record of U.S. policy makers with respect to the welfare of horses and alarming environmental and economic Tribal concerns.

Because this policy of banning the use of USDA horsemeat inspectors has had definite Tribal implications, I want to refer to Executive Order 13175, which states:

In order to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

It further states: “Policies that have tribal implications” refers to regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes.

This “consultation” or “collaboration” process has also been ignored.

We know the effect this policy is having on the natural resources of Tribal lands. We know the effect this policy is having on the welfare of horses. But there is another consequence this policy is having that doesn’t get mentioned enough. More and more we find a “Generational Disconnect” to our Horse Culture. There is something that is sometimes referred to as a “Cowboy Culture” on Tribal Reservations throughout the country. This is rooted in love of horses, and a love of the land. It entails hard work and individualism. There is pride in managing horses for riding, rodeos, racing, and hunting and
all the economic advantages that goes with these activities. It is a central element to our Tribal culture and affects every Tribal family that has owned or raised horses for a living. So, when there is no longer a market for horses, due to the overpopulation of horses created by federal policy that doesn’t take into account the effect that policy has on Tribes, that important Tribal culture element begins to die. Every Tribe I know has seen this first hand.

As we move to understand this crisis from differing perspectives, and look to realistic solutions to improve the welfare of horses everywhere, I welcome your input, and hope that the Committee on Animal Welfare will convey a Tribal perspective to your colleagues and U.S. policy makers.
The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 12:30 to 6:15 p.m. There were 12 members and 19 guests present.

Presentations and Reports

United States Department of Agriculture – Aquaculture Program Update
Kathleen Hartman, USDA-APHIS-VS

Dr. Hartman provided the updates on three main topics:

a. Commercial Aquatic Health Program Standards (CAHPS) Program –
   She provided the background and the impetus/genesis of the why the
   program was started including information on the Commercial Bait
   and Sportfish Survey and the cost of regulations. She outlined the
   essential components of the CAHPS program and spoke of the pilot
   CAHPS programs which are tilapia cooperative in North Carolina, the
   salmon producers – saltwater in Washington and freshwater in Maine.
   She provided greater detail of the program in North Carolina. Mr.
   Randy Gray, part of the tilapia cooperative, provided the producer’s
   perspective of their involvement with CAHPS.

b. Program Projects
   i. Hartman spoke of the Trout and Salmon Survey of 2016-2017, which is being undertaken by Dr. Carole Engle, and supported by the Western Regional Aquaculture Center, U.S. Trout Farmers Association, and USDA-APHIS.

   ii. Shellfish Projects – Hartman summarized on an east coast workshop which was held in Maryland this year and the development of a shellfish surveillance project. She also reported on the Pacific Northwest Infectious Salmon Anemia (ISA) surveillance and spoke briefly on the case definitions for infectious salmon anaemia (ISA) and Spring Viremia of Carp.
AQUACULTURE

The upcoming 2018 National Animal Health Monitoring Service Aquaculture Survey will cover all aquaculture rather than just being catfish centric, the National Animal Health Laboratory Network (NAHLN), and the Surveillance Collaboration Services Core One Master program database. She also stated that proficiency testing is planned for all laboratories approved for exported related aquatic pathogen testing.

c. Import/Export updates – Dr. Hartman provided information from Dr. Christa Speekman of the National Import/Export Service, which included the newly negotiated certificates, the bilateral audit with Canada, and the expanding export markets for both finfish and shellfish.

The presentation can be found on the Committee page at www.usaha.org.

Update on the National Aquaculture Association’s Activities Covering Aquatic Animal Health Issues and the Recommendations to the Next Administration

Paul Zajicek, National Aquaculture Association

Mr. Zajicek provided the background about the National Aquaculture Association (NAA) which has three main aims – advocacy, education and promotion. In terms of advocacy, the NAA which represent a very diverse industry supports the USDA as the lead agency for aquatic animal and pathogen regulation, the implementation of the Commercial Aquatic Health Program Standards (CAHPS) and the National Aquatic Animal Health Plan. It also supports increase funding (federal, state and private) for aquatic animal health research; drug, chemical, vaccine and alternatives to antimicrobials and aquatic animal veterinary education programs. He reported that NAA had an aquatic animal health committee and a subcommittee of aquatic animal health professionals as well a welfare committee. He also touched on the NAA activities which included participating in the animal antimicrobial webinar in July. In conjunction with the U.S. Aquaculture Society, North Central Regional Aquaculture Center and National Aquaculture Association had partnered to produce aquaculture webinars including two webinars presented by Dr. Roy Yanong, University of Florida Tropical Aquaculture Laboratory, were focused on what is farm biosecurity and how to write a farm biosecurity plan. These webinars are on the NAA website http://thenaa.net/webinars. There will also be a webinar on Veterinary Feed Directives by Dr. Pat Gaunt, Mississippi State University. The NAA will additionally be involved in the upcoming USDA (November 1) webinar on gaps in aquatic animal health for which the NAA has provided its perspectives. He briefly went over the NAA’s recommendations for the new Administration.

The complete text of this presentation is included at the end of the report.
REPORT OF THE COMMITTEE

Update on the National Oceanic and Atmospheric Administration’s Aquaculture Activities
Mike Rust, NOAA

Dr. Rust was unable to attend in person and joined the meeting video remote.

Rust confirmed that National Oceanic and Atmospheric Administration (NOAA) will be hiring a veterinarian in the next 6–8 weeks to cover aquaculture issues. The veterinarian will be shared with NOAA’s seafood inspection program. He proceeded to lay out the overview of fish/shellfish health management rules developed for offshore aquaculture in the Gulf of Mexico and the need for such in other regions such as California. Other Fisheries Management Councils are looking to develop similar plans to what the Gulf of Mexico Council developed to regulate aquaculture in their regions. NOAA expects that rules will also be needed for offshore aquaculture in the Western Pacific and Northeast areas as they develop their own offshore aquaculture amendments in the not too distant future. They have been developing best management practices for industry and are working with USDA-APHIS to develop guidance for veterinary care in the exclusive economic zone (EEZ). Rules cover animal health plans for permittees, monitoring diseases and for the movement of animals however, NOAA recognizes that the veterinary community can help improve our ability to regulate and manage the developing marine aquaculture industry (fish and shellfish). NOAA needs tools to predict and ensure resource protection of wild stocks (e.g. farm to wild transfer) and protected resources (required under Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA)), as well as protect farms from farm to farm or wild to farm disease transfer. NOAA looks to employ their internal science assets to assist in this area including models for risk, risk impact, and farm management, but they cannot do this alone and need the help from the veterinary community, other agencies (especially USDA-APHIS), industry and others. In addition to risk prediction models, NOAA aims to invest in science to develop technology so that the industry can not only be economically successful but also environmentally and socially successful. He mentioned that NOAA’s science centers might also be able to provide technical assistance and/or facilities to partner with non-NOAA researchers. He named the different grant programs that NOAA has that could support non-NOAA researchers which includes the Saltonstall-Kennedy, Sea Grant and the Small Business Innovative funding programs. There are opportunities for universities, diagnostic laboratories etc. to work with NOAA laboratories via cooperative research and development agreements. He concluded with the information on NOAA’s first Aquaculture Science Review that was completed this summer and anticipates that this will result in a strategic action plan for funding aquaculture science in the near future.
Update on the U.S. Fish and Wildlife Service activities as They Pertain to Aquatic Animal Health

Joel Bader, USFWS

Dr. Bader was unable to attend the meeting in person and presented his report via video remote.

Dr. Bader reported on:

a. Salamander chytrid fungus (Bsal – *Batrachochytrium salamandrivoranas*) and that the interim rule had been published. U.S. Fish and Wildlife Service (USFWS) is relying on the injurious wildlife listing authority of the Lacey Act to prevent the introduction of this fungus into the U.S. They will be addressing public and peer review of the interim rule and anticipates to complete and publish the final rule in the next fiscal year.

b. Categorical exclusion under National Environmental Policy Act (NEPA) for injurious wildlife listing under the Lacey Act. This took effect in October 2015 which allows the Service to act more efficiently by expediting the environmental review process for proposals that do not require more resource-intensive Environmental Assessments (EAs) or Environmental Impact Statements (EISs).

c. Multi-species propose rule Branch of Aquatic Invasive Species (BAIS) published the proposed rule listing ten freshwater fish. The Service completed reviewing peer and public comments on the proposed rule, EA and economic analysis and has prepared the final which was published in October 2016 and will take effect in January 2017.

d. Legislation modernizing injurious wildlife listings Previous congresses have introduced bills that would amend the injurious wildlife provisions of the Lacey Act (please see last year’s committee report for Dr. Bader). In 2016, Representative Slaughter (NY) introduced revising a revised version of the previous session’s bill under essentially the same name "Invasive Fish and Wildlife Prevention Act of 2016" (H.R.5895) which was referred to the Subcommittee on Federal Lands. Senator Gillibrand (NY) introduced the Senate version (S.3278) in 2016, which was referred to the Committee on Environment and Public Works. No further actions have occurred.

He also briefly mentioned risk screenings and *Batrachochytrium dendrobatidis* (Bd) or amphibian chytrid fungus. With regards to the former, additional details are provided in the report that he provided including efforts the Service have undertaken to address concern by various stakeholders. With regards to Bd, numerous comments have been received and reviewed by the Service but no decision has been made as yet to pursue a final rule.

The complete text of this presentation is included at the end of the report.
Development and Expansion of Marine Aquaculture in North Carolina: Challenges and Opportunities
Chuck Weirich, North Carolina See Grant

Although New England has historically been the center of cultured shellfish production on the East Coast, in recent years the industry is expanding in other states along the Atlantic seaboard. Most notable is Virginia, which has undergone phenomenal growth in its shellfish aquaculture industry over the last decade. In 2014, the farm gate value of clams and oysters cultivated in Virginia waters was $56 million, supporting over 500 jobs. Despite sharing a common border and similar coastal resources, growth of the shellfish aquaculture industry has been minimal to date with a 2014 farm gate value of only $532,000.

However, over the course of the last several years, interest in shellfish aquaculture – especially water column farming of oysters has increased greatly in North Carolina, which has been reflected by a steady increase in leases and acreage devoted to this practice. In addition, at the urging of the North Carolina Shellfish Growers Association, the North Carolina General Assembly has begun easing regulatory barriers to entry, state marine institutions are devoting more resources towards research to improve industry efficiencies and output, technology transfer and training efforts have been increased, and strategies are being developed to expand markets for shellfish.

This presentation will provide an overview of the present shellfish aquaculture industry in North Carolina including production practices that are employed. Challenges facing the industry including regulations, user conflict and public perception, seed supply, biofouling of gear, and disease issues will be discussed. In addition, the growth potential of the industry will be examined.

The presentation can be found on the Committee page at www.usaha.org.

International Public Health Impact of Invalid Salmonella Laboratory Testing Methods
Megin Nichols, U.S. Centers for Disease Control and Prevention

Dr. Nichols provided a report on CDC’s investigation into human turtle-associated Salmonella outbreaks in the US and internationally and how these investigations have impacted the export of turtles from the US as well as the way laboratory testing is conducted for exportation and health certificate purposes.

Aquatic Pathogen Testing in NAHLN Laboratories
Christina Loiacono, USDA

Dr. Loiacono provided the history as well as the founding principles and feature of National Animal Health Laboratory Network (NAHLN). She provided a brief outline on the requirements and qualification to become a NAHLN laboratory and provided information in the restructuring of the
NANLN laboratories including the different laboratory levels (1 to 3, affiliate, private and reference laboratories). She described the NAHLN conducting aquatic pathogen surveillance testing and the results of the number of tests completed by these laboratories for infectious salmon anemia and viral hemorrhagic septicemia. She also provided information about the upcoming proficiency testing for the three aquatic pathogens: Infectious salmon anemia virus, Viral hemorrhagic septicemia virus, and Spring Viremia of Carp virus. NAHLN will be working with the aquaculture community to decide which additional pathogens to be added to the three that are currently on the list. It will offer Quality Management System training for both member and prospective NAHLN laboratory members.

The presentation can be found on the Committee page at www.usaha.org.

Overview of Emerging Animal Disease Preparedness and Response Plans

Lee Ann Thomas, USDA-APHIS-VS

Dr. Thomas provided the background information about the emerging animal disease preparedness and response plans including the purpose and the definition of the emerging disease. This is not a response plan for all diseases, but is for new or re-emerging diseases. It is based on a concept paper published in 2014 and has four goals which are 1.) Respond quickly to minimize the impact of disease events, 2.) Communicate findings and inform stakeholders, 3.) Detect, identify, and characterize disease events and, 4.) Undertake global awareness, assessment, and preparedness. It defines four risk levels of emerging disease, as well as the factors used to make preliminary assignments of diseases to risk levels and define roles of the various components which are risk identification team, Veterinary Service leaders, states and industry. It also outlines the response options to be undertaken, depending on the epidemiology of the emerging disease for both international and domestic diseases. The USDA is soliciting comments that are due by November 1, 2016. This feedback will be use to update and finalize the plan https://www.aphis.usda.gov/animal_health/downloads/emerging-dis-framework-plan.pdf

The presentation can be found on the Committee page at www.usaha.org.

U.S. National List of Reportable Animal Diseases (NLRAD)

Dana Cole, USDA-APHIS-VS

Dr. Cole made the presentation as Dr. Theresa Boyle who was slated to give presentation was unable to attend the meeting.

She defined what National List of Reportable Animal Diseases (NLRAD) is, it’s function and a brief history of NLRAD. The framework for the NLRAD was born from concept papers from five working groups. This framework includes a current U.S. list of reportable animal diseases, laboratory case
classification and reporting requirements, structure and procedures, list maintenance, communication, data management, and information release. The list contains notifiable diseases and conditions and monitored diseases (World Organisation for Animal Health (OIE) summary reported diseases). She also described how the NLRAD fits with the Comprehensive and Integrated Surveillance effort. Once the NLRAD framework is finalized, a proposed rule will be drafted and published for comment before the final rule is published. She emphasized that the list is meant to be dynamic.

The presentation can be found on the Committee page at www.usaha.org.

Efforts of the Fish Health Section to Develop Quality Assurance/Quality Control for Interested Fish Health Laboratories

Chris Wilson, American Fisheries Society Dr. Wilson provided a brief outline of the efforts of the Fish Health Section (FHS) to develop quality assurance (QA) quality control (QC) for interested large and small fish health inspection and diagnostic testing laboratories that are not accredited laboratories. This program is meant to assist laboratories with development of their quality management systems and act as a bridge towards eventual third party accreditation e.g. American Association of Veterinary Laboratory Diagnosticians (AAVLD) or International Organization for Standardization (ISO) 17025. It has a tiered system (I-III) and includes both public and private facilities and would be administered through the American Fisheries Society.

Committee Business:

As part of Dr. Wilson’s presentation, two resolutions were presented to the committee for consideration. The first resolution was seeking USDA support for to provide quality assurance (QA) quality control (QC) training at regional/national fish health meetings. The motion for this resolution was made by Mr. Bill Keleher and seconded by Dr. Kevin Snekvik. After discussion, the motion passed without opposition.

The second draft resolution stemming from Dr. Wilson’s presentation was with regard to test panel development by the USDA for the unaccredited laboratories. The resolution was discussed but no motion was made.

The third resolution was one from the Committee on Infectious Diseases of Horses (COIHD) which was regarding laboratory approval for regulated diseases. After discussion, the committee decided to table this resolution with instruction which was that the Committee on Aquaculture appreciates the opportunity to review the resolution but is unable to support the resolution at this time. An email has been sent to the COIHD in this regards.

Based on the discussion on the latter two resolutions, it was decided that there is a need to revisit role and support of non-accredited laboratories which may be a topic for next year’s committee meeting. There will be additional discussion prior to next year’s meeting via teleconference.

Dr. Hartman carried the message to the committee that Dr. Stan Brunson was looking for a volunteer to replace Dr. Jerry Heidel who has been
coordinating the National Animal Health Reporting System (NAHRS) reporting. Dr. Heidel has retired. An email request will be sent to all committee members.

A brief discussion was made on the current structure of the committee meeting. Those in attendance were appreciative of producer input and suggested reaching out to Hubbs-SeaWorld Research Institute if they would be willing to attend and present at next year’s committee meeting which is in San Diego.

The meeting was adjourned at 6:15 p.m.
REPORT OF THE COMMITTEE

AQUATIC ANIMAL HEALTH: CRITICAL TO U.S. AQUACULTURE

Paul Zajicek
National Aquaculture Association

The U.S. Department of Agriculture reports approximately 3,000 farmers with a farm-gate income of $1.4 billion. Hidden in those numbers is the huge diversity of species, hybrids of species and life forms (eggs, larvae, fingerlings, stockers, broodstock or edible) grown within a diversity of production systems and locations. Species may include freshwater or marine fish, crustaceans, amphibians, reptiles, and a variety of invertebrates (e.g., hard and soft corals). Production systems may include indoor or outdoor earthen or lined ponds, net pens or cages, concrete, glass or plastic tanks, earthen, lined or concrete raceways, and bottom, mesh bag or suspended shellfish culture within which freshwater or marine production water can be of single-pass or multiple use. Farm locations are equally diverse to include temperate to sub-tropical climates, mountainous to desert environments, or public or private waterbodies. Markets for the live animals produced in these systems include food (i.e., seafood), public and private stocking for recreational fishing or species recovery, recreational fishing bait, freshwater and marine aquariums, water gardens, and biological control.

The fundamental goal of all aquaculturists is healthy animals to maximize production and reduce input costs and crop loss. The diversity of species, production systems, locations and markets creates a complex matrix of aquatic animal health management considerations and no simple prescriptions to achieve and maintain healthy animals or satisfy international, federal, state or local regulations focused on specific or general pathogens, production animals, or drugs and chemicals.

The National Aquaculture Association supports:

- U.S. Department of Agriculture as the lead agency for aquatic animal and pathogen regulation.
- National implementation of the Commercial Aquaculture Health Program Standards and the National Aquatic Animal Health Plan
- Increased federal, state and private funding for:
  - aquatic animal health research;
  - drug, chemical, vaccine and alternatives to antimicrobial drugs research and approval; and,
  - aquatic animal veterinary education programs.
- Adoption of a risk-based approach to emerging diseases that objectively analyses animal, environment and human health risks and the timely adoption of diagnostic methods or testing standards appropriate to the pathogen, species, and production system.
General Talking Points:

- Invasive species are estimated to cost Americans tens of billions of dollars annually in damages. Examples of problematic species include Asian carps, large constrictor snakes, lionfish, and nutria; all are highly visible and costly examples that have made recent headlines. Other invasive species may be less conspicuous but are just as damaging.

- We recognize the need for a thriving aquaculture industry that helps feed our people and supports our nation’s economy, and we know your industry is committed to developing and using environmentally sustainable practices. We also recognize the value of strong partnerships.

- The Service is working within its authorities and with partners to identify and address the highest threats more efficiently. We need a comprehensive approach. Both voluntary and regulatory improvements, with improved links between the public and private sectors, are needed.

Categorical Exclusion (CatEx) Under National Environmental Policy Act (NEPA) for the Injurious Wildlife Listing Under the Lacey Act:

- The Service’s new categorical exclusion under NEPA for future injurious wildlife listings took effect on October 29, 2015. The categorical exclusion (or CatEx) will allow the Service to list species more efficiently by allowing the Service to expedite the environmental review process for proposals that typically do not require more resource-intensive environmental assessments (EAs) or Environmental Impact Statements (EISs).

- The Service, coordinating through the Department of the Interior, followed all protocols to apply for and receive approval from the Council on Environmental Quality for the new categorical exclusion under NEPA.

- For each listing determination, the Service must still meet requirements of all applicable statutes, executive orders, and regulations, and we will still evaluate each species for injuriousness. This means that we will still prepare the evaluation of the species as injurious and an economic analysis, but we may not need to prepare an EA or EIS.

Multi-species proposed rule:

- On October 30, 2015, BAIS published the proposed rule to list ten freshwater fish (Amur sleeper, crucian carp, Eurasian minnow,
European perch, Nile perch, Prussian carp, roach, stone moroko, wels catfish, and zander) and one crayfish (common yabby) as injurious species.

- After reviewing the peer review and public comments on the proposed rule, environmental assessment, and economic analysis, the Service prepared the final rule.
- The final rule published in October 2016 and takes effect on January 2017. There were no changes to the final determinations for the 11 species from the proposed rule.
- All 11 species have a high climate match in parts of the United States, a history of invasiveness outside their native ranges, and, with one exception (zander in Spiritwood Lake, North Dakota), are not currently found in U.S. ecosystems. We used Ecological Risk Screening Summaries to obtain climate-matching and other information. We also used extensive other publications.
- This is the first rule we promulgated since we signed a Memorandum of Understanding with Pet Industry Joint Advisory Council (PIJAC) and Association of Fish and Wildlife Agencies (AFWA) in 2013, which outlines an agreement regarding the voluntary refrain from importation of species not yet in trade in the United States.

**Legislation Modernizing Injurious Wildlife Listings:**
- While control and management of invasive species is vital, prevention is widely viewed as the most cost-effective means to avoid and minimize harm. The injurious wildlife provision of the Lacey Act is one of the strongest tools available to the Department of the Interior to manage the risks of invasive species within the trade pathway.
- Previous Congresses have introduced bills that would amend the injurious wildlife provisions of the Lacey Act, such as S. 1153 in the Senate and H.R. 996 in the House of Representatives in the 113th Congress. Earlier sessions of Congress have also introduced legislation, showing the interest by Members in this issue.
- S. 1153 would have significantly amended the injurious wildlife listing process, and would have given the Secretary of the Interior additional authorities to prevent the importation of, and interstate commerce in, wildlife pathogens and harmful parasites. In testifying about the bill at a hearing on July 16, 2014, Fish and Wildlife Service Deputy Director Guertin indicated support for the intent and purpose of the bill. However, he raised concerns about provisions that would undermine the Service’s ability to implement and enforce the law’s prohibitions on importation and interstate transport of injurious wildlife, such as a broadening of exemptions under newly created Injurious I and II categories for listing wildlife.
On July 14, 2016, Representative Slaughter (NY) introduced revised version of the previous session’s bill under essentially the same name "Invasive Fish and Wildlife Prevention Act of 2016" (H.R.5895). It was referred to the Subcommittee on Federal Lands. On the same day, Senator Gillibrand (NY) introduced the Senate version (S.3278). It was referred to the Committee on Environment and Public Works. No further actions have occurred.

**Bsal (salamander chytrid fungus):**

- An emerging fungal disease with the potential to lethally affect native salamanders may enter the United States through ongoing importations of salamanders, according to a paper that published in Science in October 2014.
- The fungus (*Batrachochytrium salamandrivorans* or “Bsal”) is related to the already widespread and fatal amphibian chytrid fungus known as Bd. Bsal is not yet known to be present in the United States but has devastated some European salamander populations. Bsal has also been shown through testing to be lethal to other salamander species, including at least 10 native U.S. species, and it is likely to affect more.
- Our country has the highest biodiversity of salamanders on the planet, and salamanders form a crucial link in native ecosystems. The Service is the Federal agency best positioned to prevent its introduction into the United States, relying on its injurious wildlife listing authority under the Lacey Act.
- The Service made it a high priority to prevent this fungus reaching the United States. In late 2014, the Service convened a team of its own experts to evaluate which salamander species should be listed as injurious wildlife to prevent the risk of Bsal’s introduction into the United States and expedited the effective date by publishing an interim rule that took effect on January 28, 2016. We determined that 201 of the world’s approximately 681 known salamander species are likely to be carriers of Bsal. This includes 67 of the 190 U.S. native species.
- The Service is addressing the public and peer review comments and expects to complete and publish a final rule in the next fiscal year. The final rule may remain the same or may change the number of species listed, whether dead salamanders are not considered injurious, and a few other variables. However, the interim rule remains in effect until the final rule takes effect.
- The comment period on this rule is closed.

**Bd (amphibian chytrid fungus):**

- The Service received a petition in 2009 from the Defenders of Wildlife to list amphibians as injurious wildlife unless they are
certified as free of *Batrachochytrium dendrobatidis* (amphibian chytrid fungus). The Service published a Notice of Inquiry in the Federal Register on September 17, 2010, to announce a request for information on the petition. The public information period closed on December 16, 2010.

- The Service received approximately 450 comments and has reviewed the information, as well as other information we acquired. No decision has yet been made to pursue a rule.

**Risk Screening:**

- The Service has developed three rapid screening tools, known as Ecological Risk Screening Summaries, Fish Risk Assessment Model, and Risk Assessment Mapping Program to help determine which species pose a high, low, or uncertain risk of invasion. This tool allows us to use the most current scientific methods and databases to quickly gather and more efficiently analyze data.

- We have already performed hundreds of ecological risk screenings on aquatic animal species. To be transparent, the Service is providing the public with some of the summaries that synthesize the results of the screenings. Some of the reports are available on our website (https://www.fws.gov/injuriouswildlife/Injurious_prevention.html), which was created to serve a partnership with industry and the Association of Fish and Wildlife Agencies relating to animals not known to be imported. I will discuss this partnership MOU below. An additional website was created that includes summaries for species being imported (https://www.fws.gov/fisheries/ANS/species_erss_reports.html). We plan to post more reports as they are finalized.

- As just mentioned, many of these reports are for species that are not yet in trade or in the wild in the United States. If importers are contemplating using these species, these reports can provide the live-animal industry and the public with technical assistance as to whether the species would pose a high or low risk of invasiveness. Thus, industry could make an informed decision to refrain from initiating the importation of high-risk species. Knowledge of both low- and high-risk species will provide industry, States, and consumers with valuable knowledge for deciding which species are more responsible choices to acquire and use. In addition, State natural resource and conservation agencies can use the summaries to aid their management decisions for potentially invasive species and to work with industry on their own agreements for risky species in their jurisdictions.

- We know that the National Aquaculture Association has expressed concern with some aspects of our screening process. Based on
those concerns, we completed peer review per OMB policies for influential science in August 2014. We also revised the Standard Operating Procedures for preparing ERSSs, and that is being posted on the Service’s Injurious Wildlife website. The revised SOP is more detailed and may alleviate some concerns.

• In June 2013, the Service signed a Memorandum of Understanding with the Pet Industry Joint Advisory Council (PIJAC) and Association of Fish and Wildlife Agencies (AFWA) to help prevent future ecological invasions caused by trade in live animals. We expect other parties to join the MOU.

• The MOU focuses on aquatic, nonnative species not yet in trade in the U.S. and, therefore, should not affect the current economic status of the trade industry. The Service will provide technical assistance to the industry characterizing imported aquatic animals with their risk potential as invasive species. We also welcome risk assessment for particular species of concern from partners and stakeholders.

• The Service is working with States, industry, and others through the Invasive Species Committee of the Association of Fish and Wildlife Agencies. Given numerous requests from aquacultural interests to States regarding the potential importation of African Longfin Eel (*Anguilla mossambica*), this committee is currently evaluating this species.

**FYI ONLY:**

**Large Constrictor Snake final rule litigation:**

• In 2010, BAIS published a proposed rule to list nine species of large constrictor snakes as injurious species. In 2012, four species were listed (Burmese and two other pythons, plus the yellow anaconda). In December 2013, the United States Association of Reptile Keepers (USARK) filed a lawsuit against the Department of the Interior for various challenges, including their assertion that the authorizing statute does not give the Department the authority to prohibit interstate transportation (only importation),

• In 2014, we reopened the comment period on the five remaining constrictor snakes (reticulated python, green anaconda, Beni anaconda, DeSchauensee’s anaconda, and boa constrictor). In March 2015, we published the final rule to list the reticulated python and the three anacondas, but withdrew the proposal to list the boa.

• When the second final rule published, the plaintiffs (USARK) for the lawsuit against the first final rule filed an amendment to add the four newly listed species to their challenge. On May 12, 2015, the U.S. District Court for the District of Columbia granted USARK’s motion for a preliminary injunction, finding that the plaintiffs were likely to prevail on the merits of the case that the Service lacks authority to
prohibit interstate transport of species listed as injurious wildlife under Title 18 of the Lacey Act.

- The Department of Justice appealed on our behalf. The appeal was heard in the D.C. Circuit Court on April 1, 2016. The court’s decision is pending.
- In the meantime, specific members of USARK may transport two species of large constrictors listed in 2015, the reticulated python and green anaconda, across state lines in the Continental U.S. except into Florida and Texas.
- The Service has prioritized completion of other injurious wildlife evaluations at this time, such as salamander chytrid fungus, because of the goal of preventing that fungus’s entry into the United States.
REPORT OF THE COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
Chair: Donna Gatewood, IA
Vice Chair: Joseph Huff, CO

Gary Anderson, KS; Chris Ashworth, AR; Bruce Carter, IA; Barbara Determan, IA; Larry Elskan, IA; James England, ID; James Evermann, WA; William Fales, MO; Patricia Foley, IA; Robert Fulton, OK; Donna Gatewood, IA; Larry Granger, CO; Keith Haffer, SD; Percy Hawkes, UT; Rick Hill, IA; Christine Hoang, IL; Amanda Houston, TX; Joseph Huff, CO; Elizabeth Lautner, IA; John Lawrence, ME; Randall Levings, IA; Joanne Maki, GA; David Marshall, NC; Kent McClure, DC; Don Myers, KS; Steve Parker, GA; Julia Ridpath, IA; Kathryn Simmons, DC; Bob Tully, KS; Mary Anne Williams, TX; Brad Williams, TX; Dennis Wilson, CA; Mark Wood, GA; Bereket Zekarias, KS.

The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 1:00 to 4:00 p.m. There were 12 members and 12 guests present. The meeting was called to order, introductions were made, and previous resolutions were reviewed. The committee agreed that the interim responses to the previous resolutions were satisfactory.

Presentations and Reports

Updates on Activities with the International Serum Industry Association
Rosemary Versteegen, International Serum Industry Association (ISIA)

Dr. Versteegen introduced the association and its mission. The ISIA focuses on the ethics of the industry. They have worked toward standardization of the definition of "serum", standardization of testing processes, and are engaging in efforts to confirm source traceability, and tests to identify country of origin. ISIA worked with U.S. Pharmacopoeia (USP) to establish standardized testing protocol for serum products. They also have a gamma irradiation task force to develop guidance and informational documents related to gamma irradiation processes appropriate for serum products.

Membership in ISIA requires audits to confirm that traceability processes are established and practiced. Independent audits are conducted to cover all transactions in the company. Audits focus on each handoff of material. For example, it came in at what price? Went out at what price? Not just origin, but also paperwork for exportation, what kind of serum it is, blending of serum types etc. Companies have to be certified to be a member and undergo the auditing process. Seventy percent (70%) of serum companies two years or older are certified, and more than 90% of all animal serum used globally is provided by ISIA certified members.

Geographic origin: tests for strontium isotopes were evaluated but it was learned that this approach can’t distinguish serum from Mexico versus serum from the U.S. Another approach is the use of trace elements. Very
clear groupings emerge from this approach. Ninety nine percent (99%) resolution was achieved with their current data set. As a result, the group is working to define an industry database and develop a program to identify geographic origin. In addition, they are monitoring other technologies to determine geographic origin, animal age, and species of serum products.

**Looking to the future:** a combination of testing and paperwork audit will strengthen the program. Increased focus from customers and regulators will also strengthen the program.

**Gamma Irradiation Task Force:** last year, a resolution was made at the USAHA meeting to allow fetal bovine serum (FBS) irradiated outside the USA to be imported. The resolution did not pass, and the USDA and USAHA know there is a need to understand the subject better. ISIA is working on a project to clarify gamma irradiation and its role in helping to ensure that serum is free from extraneous agents.

Participants in the task force include suppliers, vendors, and end users. Everyone agreed that they would not wait until this is perfect to begin publishing. Segments/parts of the work are published as ready. Food and Drug Administration (FDA) requested that the information be freely available, so all articles are being published in BioProcesing Journal as open access: www.bioprocessingjournal.com

**Status of the various parts:**
- Introduction to gamma irradiation and serum: Published
- Effect of gamma irradiation on viruses: Published
- Dose mapping and validation: In final editing
- Effect of gamma irradiation on polymers: Almost final
- Product maintenance through the process: Outline complete
- What does this all mean? Waiting for solid drafts of first 5

The presentation can be found on the Committee page at www.usaha.org.

**Center for Veterinary Biologics Updates**
Byron Rippke, USDA-APHIS-VS-STAS, Center for Veterinary Biologics (CVB)
- End of year numbers regarding #licenses, doses released, etc. will be posted on the CVB website: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/veterinary-biologics
- Staffing & budget: FY 2015-16 has been a flat budget. Further, a flat budget expected through 2018. Funding has been static over the past ten years, so there has been a net loss in funding. The majority of funding goes to salaries so they have lost about a third of their staff. Consequently, they're constantly looking for ways to do things more efficiently.
• New labeling: this simplifies efficacy claims
• National Centers for Animal Health (NCAH) portal: access is based on Level 2 USDA e-authorization credentials. The system is entirely paperless. Customer entry is based on familiar APHIS forms. Supporting documents can be uploaded, and the system interacts directly with the CVB database. Efficiencies: time and costs associated with printing and mailing submissions and regulatory responses. It securely maintains a complete list of pending submissions for each establishment, with current review status. It allows simultaneous access to the same information for every authorized user at an establishment. This facilitates team assembly of submissions.
• Categorical exclusion status: proposed rule comment period closed, and comments have been responded to. Publication of final rule is not known.
• National Import Export Services (NIES) Serum Risk Assessment (RA) status: set back a year due to highly pathogenic avian influenza (HPAI). An initial draft was commented on by the RA customers. It is still being worked on but not finished. Timeline is unknown.
• Veterinary International Conference on Harmonization (VICH) Extraneous Agent Testing Working Group: the group is reactivated but details about status are unavailable.
• Pharmacovigilance proposed rule published fall of 2015. All comments have been addressed and signed off through department. The final rule should be published, but date is unknown.

U.S. Industry Considerations When Pursuing Licensure of Wildlife Vaccines
Mark Wood, Merial
The purpose of this presentation is to present the realities of the issues associated with licensing wildlife vaccines. There are three main regulatory authorities:
1. USDA under 9 CFR: this covers immune-based products to prevent, treat, or diagnose animal diseases
2. Food and Drug Administration (FDA) under 21 CFR: contraceptives, performance-based vaccines, and all others not covered by the USDA
3. Environmental Protection Agency (EPA) under 40 CFR: insecticides, fungicides, rodenticides. Includes contraceptives to manage wildlife populations, such as Gonacon

Wildlife vaccines are niche products:
• Not high volume
• Most of their use provisions are restricted to government licensed programs
• Products must be produced at minimal cost
Within 9 CFR, there are basically three streamlined pathways that might be applied to the use of these products:

1. Part 102.6—Conditional licensure. Must be pure and safe and in compliance with all applicable regulations and standard, and may be restricted. Branding is not allowed, and approval from State Veterinarians is required. Conditional licenses require renewal based on the approved term, and renewal is not assured.

2. Part 103.3—experimental use. This may be a temporary pathway, but there are concerns about continuity. There is no commercial branding, labeling, or competitive support provided for this approach. Perpetual 103.3 authorizations have been utilized but there are concerns about how long those will be allowed to continue.

3. Part 106—exemption for products used in department programs or under department control or supervision. This provision is rarely used and has not previously been applied to wildlife vaccines.

Timelines to full licensure:
- Conventional products: 3-4+ years
- Live biotech products: 4-5+ years

Evaluation of wildlife product efficacy should consider field-based analyses including epidemiological approaches and population immunity models. Disease surveillance systems in the field should be considered, as well as immunity sufficient to break field transmission/disease cycles.

Investment incentives are needed for the following reasons:
- Sales volumes are often low, but the cost of goods is typically higher
- Production needs are sporadic (unpredictable forecasts), making production planning problematic
- Low state federal program budgets = minimal return on investment (ROI), thus profit margins are typically lower than commercial products.

Other difficulties encountered include:
- Regulatory oversight is not always clear (USDA-FDA, Environmental Protection Agency (EPA))
- Products are largely orphan, neglected—there are limited/no specified regulations or commercial incentives for investors/sponsors
- Regulatory hurdles—field data have little/no review/acceptance provisions to support pivotal efficacy study consideration
- It is sometimes difficult to justify research and development (R&D) costs for vaccines that compete for the same development resources needed for conventional vaccines.

Possible areas for future consideration to help support wildlife vaccines:
- Consider coordinated review team approach for a more specialized evaluation of these products
- Consider regulatory memos/guidelines specific to the licensure of wildlife vaccines
3. Allow global U.S. companies the opportunity to build on the development work done in other countries—consider the use of those data generated internationally (if applicable) to support product safety, reasonable expectation of efficacy, and/or other product attributes.

4. Consider conditional claims to expand the use provisions for currently licensed products, e.g., additional species claims.

5. Make provisions for assembly/submission/review/approval of field efficacy data.

**Animal Health Institute**

Kent McClure, Animal Health Institute

Biological issues at Animal Health Institute (AHI):

Dr. McClure covered a lot of issues of interest to AHI that don’t need to be repeated. In the industry, there have been some unprecedented changes taking place with regards to regulatory issues. The National Centers for Animal Health (NCAH) portal is a major accomplishment that the industry applauds and embraces. Changes in labeling requirements were not necessarily welcome, but we recognize they were a customer-driven initiative. Veterinarians wanted different information about the products they’re using, and the Center for Veterinary Biologics (CVB) has done their best to satisfy customer needs while at the same time accommodating the needs of the regulated industry. Categorical exclusions were a monumental advance that will eventually allow industry to move quickly to address emerging/evolving disease problems.

Another big topic is related to the potency assay for conventional inactivated rabies products. The current potency test for rabies is a mouse challenge assay. This assay is more and more being recognized as an animal welfare issue, and in addition is an unbelievably variable assay. AHI is partnering with CVB to develop a replacement assay. Because of collaboration between the regulated industry and CVB, two well-characterized monoclonal antibodies have been selected for further evaluation for the development of an enzyme-linked immunosorbent assay (ELISA) test. These efforts are ongoing.

Final issue: international trade. The U.S. releases 100 billion doses of vaccine every year, which are distributed domestically as well as worldwide. This dwarfs the scale of human vaccine distribution by orders of magnitude. Over the past few years, there have been increasing attempts by other countries to try to restrict importation of U.S. products. Historically, restrictions were based on sanitary/phytosanitary concerns, but recently, restrictions appear to be protectionist. Some countries are no longer accepting CVB inspection certificates and are asserting that they need to do their own inspections. In other cases, countries will only accept their own inspections or an inspection from a partnering country. These restrictions are not based on science, but are intended to discourage the importation of products. Some countries/regions have done a very good job of “selling”
their own regulatory system. For example, the E.U. has promoted their regulatory approach to emerging markets, and in so doing have implied that the U.S. regulatory system and U.S. products are inferior to those from the E.U. This is a growing concern. The U.S. needs to engage with global markets to promote the U.S. regulatory system for veterinary biologics as a high quality regulatory system designed to ensure the production of pure, safe, potent, and efficacious veterinary biological products.

ARS Recent Research Related to Biologics for Livestock—Progress and Status
Marcus Kehrli, USDA-ARS-National Animal Disease Center (NADC)

NADC’s mission is to conduct basic and applied research on selected diseases and food safety pathogens of economic importance to the U.S. livestock and poultry industries.

Vaccine research at NADC includes work with a list of 20 pathogens they’re doing some level of research with.

Only two diseases have been eradicated through human effort: smallpox—declared eradicated in May 1980, and rinderpest, declared eradicated by Food and Agriculture Organization (FAO) in October of 2010 and World Organisation for Animal Health (OIE) in May of 2011. Both efforts benefited through the use of modified live vaccines. Live vaccines in general provide stronger, longer lasting immunity as compared to inactivated products.

Dr. Kehrli provided updates with regards to research being conducted on vaccines for the following diseases:

- Brucella in bison, cattle, feral swine
- Tuberculosis in white tail deer and cattle
- Paratuberculosis in cattle, sheep and goats
- Salmonella in swine and turkeys
- Mannheimia haemolytica
- Pasteurella multocida
- Influenza A – swine
- Streptococcus suis in swine

Committee Business:

Resolutions:

- **Sustained Fiscal Year 2017 Funding for APHIS Influenza A Virus – Swine Surveillance Activities.** After a brief discussion, this resolution passed unanimously by verbal vote.
- **International Promotion of the U.S. Regulatory System for the Regulation of Veterinary Biological Products.** After a brief discussion, this resolution passed unanimously by verbal vote.
- **National Foot-and-Mouth Disease Preparedness.** After a brief discussion, this resolution passed unanimously by verbal vote.
Other business:

- A member of the committee asked if there was interest in combining the Committee on Pharmaceuticals with the Committee on Biologics and Biotechnology. He pointed out that he is a member of both committees, and that both had full agendas today. There was a brief discussion and members concluded that there is no apparent benefit to combining the two committees.

  There was no further business and at approximately 4:30 p.m., the committee voted to adjourn.
REPORT OF THE COMMITTEE ON BRUCELLOSIS
Chair: Marty Zaluski

James Averill, MI; Gary Balsamo, LA; Bill Barton, ID; Randall Berrier, CO; Tom Bragg, NE; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; William Brown, KS; Nancy Brown, KS; Beth Carlson, ND; Michael Carter, MD; Robert Cobb, GA; Michael Coe, KS; Walter Cook, TX; Joseph Corn, GA; Wendy Cuevas-Espelid, GA; Donald Davis, TX; Jacques deMoss, MO; Bud Dinges, TX; Leah Dorman, OH; Mark Drew, ID; Anita Edmondson, CA; Hank Edwards, WY; Dee Ellis, TX; Philip Elzer, LA; Donald Evans, KS; Tony Frazier, AL; Mallory Gaines, CO; Francis Galey, WY; Tam Garland, TX; Robert Gerlach, AK; Michael Gilsdorf, MD; Linda Glaser, MN; Chelsea Good, MO; Paul Grosdidier, KS; Rod Hall, OK; Greg Hawkins, TX; Burke Healey, CO; Carl Heckendorf, CO; Linda Hickam, MO; Bob Hillman, ID; Bruce Hoar, WY; Brad Hoxit, NC; Dennis Hughes, NE; Noah Hull, WY; David Hunter, MT; Jamie Jonker, VA; Susan Keller, ND; Bruce King, UT; Diane Kitchen, FL; John Lawrence, ME; Brad LeaMaster, OR; Eric Liska, MT; Jim Logan, WY; Gene Lolli, FL; Travis Lowe, MN; Bret Marsh, IN; Barbara Martin, IA; Chuck Massengill, MO; Paul McGraw, WI; Andrea Mikolon, CA; Eric Mohlman, NE; Sherrie Nash, MT; Cheryl Nelson, KY; Dustin Oedekoven, SD; Steven Olsen, IA; Gary Olson, MN; Elizabeth Parker, TX; Janet Payeur, IA; Alejandro Perera, MEX; William Pittenger, MO; Valerie Ragan, VA; Jennifer Ramsey, MT; Jeanne Rankin, MT; Suelee Robbe-Austerman, IA; Keith Roehr, CO; Shawn Schafer, OH; David Schmitt, IA; Brant Schumaker, WY; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Kathryn Simmons, DC; Daryl Simon, MN; Robert Stout, KY; Nick Striegel, CO; Diane Sutton, MD; Patrick Tarlton, TX; Lee Ann Thomas, MD; Tracy Tomascik, TX; Curt Waldvogel, OH; James Watson, MS; Margaret Wild, CO; RichardWiller, HI; Kyle Wilson, TN; Thach Winslow, WY; Mary Wood, WY; Ching Ching Wu, IN; Marty Zaluski, MT; Glen Zebarth, MN.

The Committee met on October 17, 2016 at the Sheraton in Greensboro, North Carolina. There were 38 members and 24 guests present.

**Brucellosis Ring Test and ELISA Bulk Tank Milk Testing**

Mike Carter, APHIS-VS, Surveillance, Preparedness and Response Services (SPRS)-Cattle Health Center

In a review of resolution 24 regarding the re-evaluation of the Brucellosis Ring Test, the National Veterinary Services Laboratories (NVSL) reported on the first part which was a review of the process for, and evaluate the production of Brucellosis Ring Test (BRT) antigen. NVSL evaluated the cell propagation, cell inactivation, cell dye procedures, and pH range of final antigen. NVSL also produced several lots using different centrifugation parameters and no differences were found. Furthermore, Animal Health and Veterinary Laboratories Agency antigen was evaluated against the NVSL produced antigen and no improvements in sensitivity and specificity was
seen. NVSL's conclusion is it does not appear the quality of the BRT antigen has changed from previous years.

The second part of the resolution was a request to review the BRT procedures, interpretation, and program use to determine where discrepancies may exist and solutions be implemented to correct them. NVSL discussed the BRT procedure and interpretation with laboratories performing the test. They found that negative and positive control use was variable and inconsistent between laboratories. At least two laboratories reported difficulties with specificity at test volumes > than 1 mL, not including NVSL. In general Heat Inactivation Ring Test follow up testing would significantly reduce the false positivity, but low positive controls would occasionally revert to negative, suggesting reduced sensitivity.

In Summary, as laboratories have implemented quality assurance (QA)/quality control (QC) procedures by using standardized controls and interpretation guidelines, the problems with specificity (especially at volumes > 1 mL) have become more apparent. Pilot studies looking at side by side testing with the ELISA in some of problematic herds in collaboration with TAHC suggests the ELISA may be significantly more specific and warrants further work.

**B. suis Outbreak in New York (and Several Other States in the Northeast)**

Tom McKenna, USDA-APHIS, Veterinary Services (VS)

A human case of Brucellosis (a female in New York) led to the identification of a transitional swine operation in New York. Testing of this operation yielded several *Brucella* seropositive swine. There was a history of feral swine contact several years ago at this farm. Trace outs from this farm identified several other positive farms (NY, VA, NJ, ME). One of the trace out farms had 59 of 73 tested animals test seropositive for *Brucella*. This farm housed several heritage breeds raised outside.

Depopulation of the two contact herds from New Jersey and Virginia included sending some Brucellosis reactors to a slaughter plant in Vermont (VT). This resulted in the VT Department of Health questioning whether or not the slaughter plant workers had appropriate personal protective equipment (PPE) to protect them from potential exposure to the *B. suis* organism. This concern grew, and led to discussions among Food Safety Inspection Service, Centers for Disease Control, VT Department of Health, VT Department of Agriculture, and APHIS. These discussions are still ongoing, and may result in a modification of how reactor, and exposed swine herds are handled in future outbreaks.

The response to this outbreak was done in coordination among the New York State Department of Agriculture and APHIS.

**Federal Expert Select Agent Panel**

Marty Zaluski, Montana Department of Livestock
Dr. Zaluski presented on the Federal Experts Select Agent Panel (FESAP) using a presentation provided by Dr. Steve Olsen, USDA-ARS, who could not attend.

FESAP was established in 2010 and tasked with policy issues relevant to the security of biological select agents and toxins. Per recommendations from Department of Health and Human Services (DHHS) and USDA, FESAP was tasked in 2016 with considering removal of *Coxiella burnetti, Rickettsia prowazekii, Brucella abortus, Brucella suis*, and *Brucella melitensis*. *Brucella* was put on Select Agent list because of efforts by Department of Defense to develop *B. suis* bioweapon in the 1950s.

The listing of *B. abortus* has had a dramatic effect on research done on the organism with the number of facilities shrinking from 11 in 1996 to just one currently. This is due to the extreme administrative burden of operating a select agent facility, and the high consequence for any violations. With fewer facilities conducting research, there are fewer studies conducted, and therefore, the costs to states with brucellosis infected wildlife are continuing with no additional tools being developed.

FESAP addressed several concerns during the evaluation process including Infectious dose, severity of disease with pulmonary exposure, mortality, laboratory exposure, more laboratory exposures to *brucella* than *francisellai*, concern that *Brucella* will be obtained from laboratories. After consideration of these issues, FESAP recommended the delisting of *B. abortus* and *Rickettsia prowazekii*.

**National Brucellosis Eradication Program Report**

Mark Camacho, USDA-APHIS-VS

All 50 states are currently brucellosis class-free. There is one domestic bison herd under quarantine with a test and remove herd plan in place while two affected beef herds were released from quarantine in 2016. In FY 2016, Wyoming found two new affected bovine beef herds. One herd was released from quarantine in July 2016 leaving just one herd still under quarantine.

Approximately 1,717,165 cattle and bison were brucellosis tested under the National Surveillance Plan including approximately 162,166 cattle in the Greater Yellowstone Area. There are nine cattle and two bison national surveillance slaughter facilities. Approximately 92 fluorescence polarization assay (FPA) positives (>20mP) were identified from slaughter surveillance during FY 2016 with no confirmed infected herds found. In addition, 148 trace investigations from slaughter occurred revealing that Texas also investigated FPA results in the suspect range FPA >= 10 - 20mP explaining why there were more trace investigations than FPA (+)s.

Approximately 3,955,575 calves were reportedly brucellosis officially calf hood vaccinated but the brucellosis committee felt that this was a reporting error and this number was too high to be accurate. In addition, approximately 228,866 animals were brucellosis adult vaccinated nationwide during FY 2016. Approximately 914 herds were certified as Brucellosis-Free herds.
The proposed TB/Brucellosis combined rule was published in December 2015 and generated much discussion and public comment. VS is meeting to address these concerns and hopes to modify the rule to incorporate the best comments and suggestions into the new rule.

Research Update
Jack Rhyan, USDA-APHIS, Wildlife/Livestock Disease Investigations Team

Preliminary results of a study examining the use of GonaCon, an immunocontraceptive vaccine, in bison show lack of *Brucella abortus* shedding or transmission in a pasture containing contracepted *Brucella*-seropositive bison and sentinel seronegative bison after four calving seasons. This is compared to a control pasture containing an equal group of unvaccinated seropositive bison; in the control pasture 18 *B. abortus* shedding events have occurred from 11 cows over the four calving seasons. Of the 11 cows, 5 have had two or more shedding events. Work on the DryDart continues as an option for remote vaccination of bison with Rb51. An ongoing study shows DryDart vaccination of bison with Rb51 results in antibody production. Gamma interferon assays are in progress. Work on a killed, spray-dried, brucellosis vaccine designed for elk continues with encouraging results from a mouse study. Two attempts to develop an outdoor model for vaccine testing in elk using natural exposure as the challenge have not produced positive results. That work and the detection of breath and fecal volatile organic compounds as a screening tool for brucellosis in wildlife continue.

National Brucellosis Testing Protocol for Cattle, Bison and Cervids
Mark Camacho, USDA-APHIS-VS

Prior to 2007, brucellosis testing was not consistent across states and across laboratories with different numbers and types of tests used in many instances. Interpretation of these different protocols was difficult across state lines. Depending on the specific testing regimen the interpretation of the testing protocol would vary depending on parallel or series testing approaches which can affect sensitivity and specificity dramatically.

In 2013, USDA developed a national standardized testing protocol for brucellosis in cattle, bison and cervids that consisted simply of a screening test followed by a confirmatory test. The protocol is Rapid Automated Presumptive (RAP) or Buffered Acidified Plate Antigen (BAPA) screening test which, if positive, will be followed by the fluorescence polarization assay (FPA) test. If the FPA test is positive, then NVSL will also run a Complement Fixation test for supplemental information for the epidemiologist.

All non-negative brucellosis samples from approved laboratories are supposed to be confirmed at National Veterinary Services Laboratories (NVSL). If samples come to NVSL which have not followed the national protocol, then NVSL will simply perform the standardized testing protocol. If samples come to NVSL that were non-negative to a screening test only, then NVSL will run the FPA and complement fixation (CF) in series. If samples
come to NVSL with non-negative confirmatory tests, then NVSL will perform both of the confirmatory tests and report both to the customer.

Summary of Elk Brucellosis Surveillance in Montana
Jennifer Ramsey, Montana Fish, Wildlife and Parks

From 2011-2015, Montana Fish, Wildlife and Parks carried out a targeted brucellosis surveillance project to delineate the geographic distribution of brucellosis, evaluate risk of seropositive elk shedding *Brucella abortus*, identify potential pathogen exchange through elk movement, and evaluate transmission risk to cattle. Results of the targeted surveillance project will be summarized, and results of 2016 brucellosis surveillance in Montana will be presented, and planned efforts for future work will be discussed.

Current Status of Brucellosis in Elk in Idaho
Mark L. Drew, Idaho Department of Fish and Game (IDFG)

Idaho has recognized brucellosis in elk since 1998. Although brucellosis is not considered a population limiting disease, it is of importance to the livestock industry in Idaho and IDFG is cooperating with Idaho State Department of Agriculture (ISDA) and USDA to minimize elk-cattle interactions during the high-risk period, January to June. Elk management in Idaho is done by zones which typically configure around a known population of elk which are managed within a population objective using population surveys conducted every 3-5 years.

Brucellosis in elk in Idaho is restricted to eastern Idaho, in four elk management zones – from north to south, Island Park, Palisades, Tex Creek and Diamond Creek. Total elk population in these zones is approximately 10,000. In eastern Idaho, most elk populations are at objectives or below. Elk movements from summer to winter range is not a specific pathway and the final destination depends on the year, snow depth and food availability. Live elk captured for management or research activities have been sampled for brucellosis across the state.

Live elk surveillance from 1998-2015, over 3,100 animals have been sampled, with 174 seropositive, 113 of which are from Rainey Creek, Game Management Unit (GMU) 67 – the feedsite in eastern Idaho that was disbanded in 2005. The highest seroprevalence in elk occurs in the Smokey Bennett, near Sun Valley where a feeding operation with lots of *Yersinia* spp. cross reactions were found. The feed site was disbanded in 2003. The second zone of high seroprevalence is Pallisades – showing brucellosis in the Rainey Creek feed site which was disbanded in 2005. From live animal samples, the majority of seropositive animals are in eastern Idaho, but there are a few scattered animals in other places that are considered to be *Yersinia* cross reactions. Using hunter killed elk samples in a similar protocol to Wyoming and Montana and aimed primarily at cow hunters, IDFG sends out about 1,500 samples per year, expects to get 15% back and 50% of those are suitable samples. Summarizing elk hunter surveillance from 1998-2015, over 3,500 samples, but only 97 seropositive animals have been
found. All of them are in eastern Idaho with the majority in GMU 61, 62, 62A, 64, 65, 67 all in eastern Idaho. Island Park and Pallasades zones have the highest seroprevalence. Elk cattle interaction management is a cooperative effort with ISDA and USDA, primarily focused on actions to minimize elk-cattle interactions in the high-risk period (January to June) and include fencing haystacks and winter cattle feeding areas, hazing elk, depredation hunts on elk, and hunter management to keep elk population levels within social and biological tolerance levels.
REPORT OF THE COMMITTEE

REPORT OF THE BRUCELLOSIS SCIENTIFIC ADVISORY SUBCOMMITTEE
Phil Elzer, Chair
Louisiana State University

The Subcommittee met on October 16, 2016 at the Greensboro Sheraton Hotel in Greensboro, North Carolina from 12:30-5:30pm. Attending subcommittee members were: Don Evans (KS), Valarie Ragan (VS), Jack Rhyman (CO), Phil Elzer (LA) Chair.

Discussions

There was an interactive discussion on what to do with animals which have cross reacting titers using the standard diagnostic tests. There are numerous microorganisms which may cause a false positive on the current diagnostic tests for brucellosis. Points to keep in mind regarding cross reactions: 1.) Are the tests being run properly; 2.) What is the age and pregnancy status of the animal; 3.) Do the titers wane over time; 4.) Were multiple tests run; 5.) What is the vaccination status of the animal; 6.) Does the animal have another infection which is activating the immune response?

One must perform a complete epidemiological investigation prior to releasing the herd; and one possible outcome of the investigation might be animal slaughter for the collection of tissues for bacterial culture.

Old Business

No action has been taken on these items. The committee feels that these issues need to be addressed.

a. The committee recommends that Dr. Zaluski solicit the state veterinarians primarily from Florida, Texas, Hawaii and any others to get data on the number of cattle which are positive on serological tests and if these positive reactions are known or thought to be due to *Brucella suis* exposure. This type of data will be important to have when asking companies to develop a test to distinguish between *B. suis* and *B. abortus* infections in cattle.

b. The committee recommends that Wyoming, Montana and Idaho work with National Veterinary Services Laboratories (NVSL) to culture any sheep that are serologically positive on the *B. ovis* test.

New Business

Review of 2011 USAHA Resolution 26

RESOLUTION NUMBER: 26 APPROVED

SOURCE: COMMITTEE ON BRUCELLOSIS

SUBJECT MATTER: CALFHOOD VACCINATION OF BISON UP TO TWENTY-FOUR MONTHS OF AGE
BACKGROUND INFORMATION:

The United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services requested that United States Animal Health Association’s Brucellosis Scientific Advisory Subcommittee evaluate the use of *Brucella abortus* “Strain RB 51 vaccine” in bison between the age of 12 and 18 months due to the later maturity of bison as compared to cattle. Data was previously presented by Dr. Steven Olsen regarding serological responses in bison calves vaccinated with RB 51 between the ages of 12 and 24 months. Bison calves vaccinated during this time frame remained seronegative after vaccination. The scientific advisory subcommittee of the Brucellosis committee recommended the use of this vaccine in this age of animal.

RESOLUTION:

The United States Animal Health Association urges that the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services adjust the allowable age of RB51 official calfhood vaccination of bison through 24 months of age.

INTERIM RESPONSE:

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) appreciates the opportunity to collaborate with the United States Animal Health Association (USAHA) on brucellosis vaccination. We have reviewed the resolution to adjust the allowable age of RB51 official calfhood vaccination of bison to 24 months of age. We recognize that the Brucellosis Scientific Advisory Subcommittee’s evaluation of the serologic responses in bison calves indicated that calfhood vaccination with *Brucella abortus* RB51 stimulated an immune response and, when tested, these bison calves remained seronegative throughout the study.

We also recognize that the safety and efficacy of the use of the *B. abortus* Strain RB51 vaccine in bison calves of the proposed 4 to 24-month age range must be evaluated before considering changes to regulations and program standards. USDA Agricultural Research Service (ARS) is evaluating serologic responses of bison to multiple inoculations with *B. abortus* RB51 and evaluating the safety and efficacy of booster vaccination of bison.

In addition to this work, further evaluation is needed to support this resolution, and we request your assistance. Specifically, we ask that the USAHA Brucellosis Scientific Advisory Subcommittee evaluate relevant data and provide recommendations on the feasibility of adjusting the age for vaccinating bison. If relevant data are not available, we would appreciate input on a plan to scientifically validate the vaccination age for bison. A report from the USAHA Brucellosis Scientific Advisory Subcommittee at or before the 2012 USAHA meeting would facilitate further discussion and decision-making.
REPORT OF THE COMMITTEE

Other issues, such as extra-label use of the *B. abortus* Strain RB51 vaccine in bison, need to be addressed as well. VS will continue to seek appropriate options and resolutions to these issues.

If a change in age of brucellosis vaccination for bison is feasible, we will reflect changes in the new comprehensive regulations and program standards that VS is developing for the brucellosis and bovine tuberculosis programs.

**Recommendation:**

The Brucellosis Scientific Advisory Committee contents that multiple safety studies on the use of RB51 in bison of all ages have already been conducted and published. The Committee also recognizes that USDA Agricultural Research Service (ARS) is evaluating serologic responses of bison to multiple inoculations with *B. abortus* RB51 and evaluating the safety and efficacy of booster vaccination of bison. However, the Committee feels that the data from that study will inform future decisions on the potential use of multiple inoculations with RB51, yet does not further inform the policy question of increasing the age of acceptable calfhood vaccination for bison. As safety of RB51 vaccination in bison calves and adults has been documented, efficacy of RB51 in calves and adults as been documented with various results, and more importantly, it has been shown that RB51 vaccination of bison at various ages has been shown to not induce titers on standard brucellosis tests. The Committee is not aware of APHIS' requirements to “validate” a vaccination age. If APHIS will provide the process used to “validate” the vaccination age for cattle, the Committee will be pleased to evaluate the literature for similar such studies in bison.

The Committee recommends that the age for official calfhood vaccination in bison be raised to 24 months due to the documented later age of maturity in bison.

Select Agent delisting of *Brucella abortus*.

If *Brucella abortus* is not removed from the select agent list, the committee recommends that a message be sent to the Department of Homeland Security expressing the need to have the organism delisted. Each *Brucella* species should be considered separately for removal from the list.

Future of the Scientific Advisory Subcommittee.

Due to the lack of scientific issues over the past three years, the members’ recommendation that the subcommittee be retired until further notice.
The annual meeting of the Subcommittee was called to order at 12:30 p.m. on October 16, 2016. In his absence, Chairman Bill Barton delegated responsibility for chairing the meeting to Dr. Scott Leibsle, Idaho Deputy State Veterinarian. There were 18 members of the Committee on Brucellosis and GYA subcommittee in attendance.

Presentations

Idaho Update
Scott Leibsle, Idaho Department of Agriculture

Idaho currently has no herds under quarantine for brucellosis. A domestic bison herd in Swan Valley and a small beef herd west of Ashton, both identified as affected with brucellosis in 2012, were released from quarantine in 2015. The affected beef herd completed post quarantine assurance testing in May 2016 and all cattle tested negative. The domestic bison herd has a post quarantine assurance test scheduled for December 2016. In 2015, 12,242 head of cattle were tested to meet designated surveillance area (DSA) testing requirements. This included 863 for herd certification; 2,234 due to change of ownership; and 9,145 returning from grazing in a DSA. This number does not include cattle in other areas of the state outside of the DSA that were tested to meet other states import requirements.

The Idaho Department of Fish and Game (IDFG) continues to conduct wild elk surveillance around the outside borders of Idaho’s DSA. In 2015, IDFG distributed 1,500 hunter test kits in the west and southern region of the DSA. Fifteen (15%) percent of the hunter test kits were returned to the Animal Health Laboratory for testing, which yielded 157 useable samples. Twelve (12) samples were seropositive, resulting in a seroprevalence of 7.79%. Landowner kill permits and depredation hunt permits are also utilized in areas known to be affected by brucellosis. This year, surveillance will focus on the northwestern and western edge of Idaho’s DSA. The Idaho Brucellosis Coordination Team consisting of Idaho State Department of Agriculture (ISDA), IDFG and Idaho Veterinary Service (VS) personnel continues to meet annually to discuss surveillance and mitigation strategies and make improvements when necessary.

The ISDA and Idaho’s cattle producers remain committed to managing appropriately to prevent the risk of transmission of brucellosis from wildlife to cattle. A regulation, established in 2014, requiring producers transporting test eligible cattle or bison in the DSA, to any location outside of the DSA, to obtain a movement permit prior shipment, has increased Idaho’s oversight of the DSA and provided for additional opportunities to conduct surveillance and
outreach activities. Industry support and assistance with enforcement of Idaho’s brucellosis testing requirements for cattle leaving our DSA are paramount to the program’s success.

Montana Update
Marty Zaluski, Montana Department of Livestock

Affected Herd Epidemiologic Investigation: One domestic bison herd remains under quarantine since 2010 and continues annual entire herd testing. This herd is within Montana’s Designated Surveillance Area (DSA).

DSA Compliance Evaluation: Montana’s annual internal audit examines compliance with DSA regulations. Overall compliance is high. In FY16 over 90% of herds within the DSA were in compliance which is consistent with previous years’ findings. The evaluation included 337 active producers with cattle in the DSA and approximately 78,500 cattle. Seventy-eight percent (78%) of those cattle are from herds that tested ≥15% of the total herd size with an additional 13% from herds that were confirmed in compliance with testing requirements for movement and sale but with lower herd replacement rates (and therefore, sold fewer test eligible animals). The evaluation also includes DSA adult vaccination (AV) statistics. Over 6,000...
adult vaccinations were administered in FY16. This accounts for an AV rate which remains well below the goal of 30%.

Environmental Assessment for Yellowstone Bison Quarantine: In January 2016, the National Park Service proposed to establish an operational quarantine for Yellowstone bison for conservation purposes. The environmental assessment (EA) proposed that the quarantine facility be either located near Yellowstone National Park (YNP), or at the Fort Peck Tribe near Wolf Point, Montana which is over 400 miles away from the YNP boundary. Department of Livestock (DOL) supported the local quarantine alternative and objected to locating the quarantine in a remote location where the DOL lacks authority on the sovereign nation. DOL also expressed concern that the proposed quarantine at Fort Peck is not allowed by the 2003 Brucellosis USDA Uniform Methods and Rules (Section 6.D), and Montana Code Annotated (MCA 81-2-120 (1)(d)). Currently, 49 bison are being held in YNP and awaiting a decision.

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Elk Surveillance: The live elk capture study has continued in 2016 with new captures near the Wyoming/Montana border and recaptures for testing.
REPORT OF THE COMMITTEE

of 27 collared elk. This project began in the winter of 2011 to evaluate the prevalence and extent of brucellosis exposure in elk near Montana’s DSA boundary and to document elk movement patterns. Since 2011, elk in eleven study areas have been sampled. This information has been used by DOL to determine the extent of potential livestock exposure to brucellosis and to effectively determine the location of the DSA boundary.

Wyoming Update
Jim Logan, Wyoming Livestock Board

The bison herd in Park County that had been under quarantine since November 2010 was released from quarantine in October 2015. Two Brucellosis affected cattle herds were found by routine, required testing in Wyoming in late October 2015. Both herds are located in the Wyoming Brucellosis Designated Surveillance Area (DSA). One is in Park County (60 miles east of Yellowstone National Park (YNP)), and the other in Sublette County (60 miles south of YNP). Both herds were exposed to brucellosis infected elk and genomic testing has verified elk as the source of both infections. These two affected herds are not epidemiologically linked.

The Park County herd underwent three, consecutive, negative, whole-herd tests (with the last post-calving) and the quarantine on that herd has been released. This herd had only one brucellosis reactor and it was a relatively simple case to resolve. There was only one fence-line contact herd associated with this affected herd. A herd test was conducted on the contact herd in November 2015 and no suspects or reactors were found so the quarantine was released.

The Sublette County herd originally had 11 reactor animals and, following their removal, the herd had one negative, whole-herd test in January 2016. Unfortunately, two additional reactor cows were found in the second whole-herd test in March, so the requirement for three, consecutive, negative tests started anew. The herd was tested again on May 21 and 22 and two additional reactors were found. The herd will remain under quarantine until it has had three consecutive, negative, whole-herd tests with at least one being post-calving.

There were seven contact/commingled herds associated with this affected herd. Some ran steers and spayed heifers and were not required to be quarantined or tested. The others were placed under quarantine until a herd test was conducted. All herd tests were negative and the contact herds were released from quarantine. All contact herds will undergo an assurance test this fall following summer grazing. Wyoming worked with the producer, contact herd owners, USDA-APHIS, and the United States Forest Service (USFS) within state and federal rules to facilitate grazing management this summer, allowing only test-negative cows that had already calved to be turned out. A herd test will be conducted in late October. The quarantine remains in effect and the producer has been very cooperative.

Wyoming has been fortunate to have the valued assistance of the Wyoming State Veterinary Laboratory (WSVL) in the diagnostic work on both
brucellosis cases. The laboratory has purchased most of the reactor animals and performed complete necropsies and tissue cultures as part of a research project. The state of Wyoming purchased the last reactors through a state indemnity fund and those animals were also necropsied at the Wyoming State Veterinary Laboratory. Tissue cultures were conducted at the WSVL and NVSL and *Brucella abortus* was isolated from several tissues.

The regulatory serology unit of the WSVL continues to provide excellent service for our Wyoming producers and veterinarians in testing brucellosis samples and getting results quickly and accurately. We have also been fortunate to have the good cooperation of USDA-APHIS in dealing with the epidemiology and regulation of these cases.

Due to findings of brucellosis in free-ranging elk in the Bighorn Mountains of Wyoming during the fall of 2012 (since 2012 there have been a total of nine Brucellosis seropositive elk found on hunter killed surveillance), the Wyoming Livestock Board (WLSB) initiated voluntary brucellosis testing of test-eligible, adult cattle originating from Big Horn and Sheridan counties. Approximately 11,000 head of cattle have been tested since initiation of the surveillance program in both Sheridan and Big Horn counties with no suspect or reactor cattle found. We are encouraging producers and veterinarians to have test eligible cattle from Big Horn and Sheridan counties tested prior to a change of ownership either at the ranch or at livestock markets and have commitments from several producers and veterinarians to test this fall.

Staff veterinarians have been working with producers, markets, and veterinarians in and out of the DSA to educate them about Brucellosis issues and to encourage risk assessment and herd plan development. We have held meetings in Big Horn, Sheridan, and Johnson counties with producers, veterinarians, and Wyoming Game and Fish Department (WGFD) personnel to discuss the disease risks and surveillance testing needs.

The WGFD has increased surveillance for Brucellosis in elk herds that reside in the Bighorn Mountains through hunter kill surveillance and also through a newly-initiated radio collar movement study. Although the number of elk that have been found seropositive is relatively small, both the WLSB and WGFD remain concerned and vigilant of the threat of disease transmission from elk to cattle.

Forty (40) veterinarians conducted testing for Brucellosis on cattle from the Designated Surveillance Area (DSA) and the Brucellosis Area of Concern during Wyoming Fiscal Year 2016. A total of 43,875 cattle/bison were tested on Wyoming ranches and at livestock markets and 2,094 cattle were sampled at Wyoming slaughter plants to comply with WLSB Chapter 2 brucellosis rules. An additional 6,500 head have been tested in July, August, and September.

The WLSB Brucellosis Chapter 2 rule was recently revised to clarify brucellosis testing requirements. The board voted on September 15 to require testing on all sexually intact females 12 months of age and over that leave or are sold from within the DSA. The WLSB declined to impose mandatory test requirements in Big Horn County until further information on
elk surveillance testing and the WGFD’s elk radio collar study are available. The board is depending on voluntary testing of cattle sold from Big Horn and Sheridan counties to provide adequate surveillance for Brucellosis.

Committee Business
The Committee was presented a resolution passed by the Western States Livestock Health Association that advises USDA-APHIS to conduct comprehensive reviews of each Greater Yellowstone Area (GYA) state’s brucellosis program at least once every three (3) years. The GYA subcommittee has chosen to allow the full Committee on Brucellosis to consider submitting a concurrent resolution to APHIS to request regular reviews of each GYA state’s Brucellosis program.
REPORT OF THE COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

Chair: Peregrine Wolff, NV
Vice Chair: Julie Napier, NE

Thomas Albert, VA; Paul Anderson, MN; Celia Maria Antognoli, CO; James Averill, MI; Kay Backues, OK; Bill Barton, ID; Scott Bender, AZ; Warren Bluntzer, TX; Tom Bragg, NE; Rhonda Brakke, IA; Deborah Brennan, MS; Sarah Cannizzo, OR; Beth Carlson, ND; Walter Cook, TX; Susan Culp, TX; Donald Davis, TX; Jacques deMoss, MO; Barbara Determan, IA; Bob Dittmar, TX; Mark Drew, ID; Roger Dudley, NE; Heather Fenton, GA; John Fischer, GA; Nancy Frank, MI; Richard French, NH; Tam Garland, TX; Robert Gerlach, AK; Paul Gibbs, FL; Colin Gillin, OR; Michael Gilsdorf, MD; Paul Grosdidier, KS; Keith Haffer, SD; Greg Hawkins, TX; Bill Hawks, DC; Kristi Henderson, OR; Michael Herrin, OK; Linda Hickam, MO; Robert Hilsenroth, FL; Brad Hoxit, NC; David Hunter, MT; John Huntley, AZ; Russell Isett, TX; Donald Janssen, CA; Lori Keresztes, IN; Diane Kitchen, FL; Patrice Klein, DC; Todd Landt, IA; John Lawrence, ME; Chuck Lewis, IA; Mitch Lockwood, TX; Travis Lowe, MN; Mark Luedtke, MN; Bret Marsh, IN; David Marshall, NC; Chuck Massengill, MO; Bob Meyer, CO; Michele Miller, WI; Eric Mohlman, NE; Yvonne Nadler, IL; Julie Napier, NE; Alecia Naugle, MD; Jeffrey Nelson, IA; Cheryl Nelson, KY; Sandra Norman, IN; Tommy Oates, TX; Dustin Oedekoven, SD; Gary Olson, MN; Mitchell Palmer, IA; Janet Payeur, IA; William Pittenger, MO; Justin Roach, OK; Jonathan Roberts, LA; Keith Roehr, CO; Susan Rollo, TX; Shawn Schafer, OH; David Schmitt, IA; Dennis Schmitt, MO; Krysten Schuler, NY; Marc Schwabenlander, MN; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Daryl Simon, MN; Jonathan Sleeman, WI; David Smith, NY; Diane Stacy, LA; Kelly Straka, MO; Manoel Tamassia, NJ; Patrick Tarlton, TX; Robert Temple, OH; Lee Ann Thomas, MD; Brad Thurston, IN; Jeff Turner, TX; Kathleen Turner, FL; Tom Van Klee, TX; Curt Waldvogel, OH; John Walther, LA; Ray Waters, IA; Skip West, OK; Margaret Wild, CO; Kyle Wilson, TN; Nora Wineland, MO; Richard Winters, Jr., TX; Peregrine Wolff, NV; Mary Wood, WY; Glen Zebarth, MN.

The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 8:00 a.m. to 1:00 p.m. There were 41 members and 12 guests present. The mission of statement of the committee was read.

Presentations and Reports

Management of Endemic CWD in Farmed Elk Using Antemortem Rectal Biopsy Testing
Nicholas J. Haley, Department of Microbiology and Immunology, Midwestern University

Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy (TSE) affecting members of the cervid family which has
been reported in 24 states and two Canadian provinces, as well as the Republic of South Korea and most recently Norway. The disease has been found with increasing frequency in both farmed and free ranging cervids – transmitting freely and frequently within both groups. Management has historically involved depopulation in the case of farmed animals and herd reduction in the case of wild deer and elk, the latter with limited success. In CWD endemic areas, where prevalence rates in farmed deer and elk mirror those found in wild cervids, the appropriateness of alternative management strategies for farmed animals has not been examined. We sought to evaluate the practicality and sustainability of managing CWD in a closed elk herd, where CWD prevalence rates approach 20%, using a test and cull strategy relying on rectal biopsies and conventional and experimental diagnostic approaches. We have correlated our findings with genetic background, pregnancy status and progesterone levels, sex, and age to further our understanding of the epidemiology of CWD. We will continue to monitor these correlations over the length of the study to identify the effects of our strategy on CWD prevalence, herd genetics, and reproductive success. This project represents a unique opportunity to collect valuable information on CWD diagnostics, epidemiology, and resistance.

**CWD Ante-Mortem Testing**

Tracy A Nichols, USDA-APHIS, Wildlife Services National Wildlife Research Center

Dr. Nichols reviewed the pro’s and cons of the current information on some ante-mortem CWD testing options and implementation of live animal tests.

**Overview of Advocacy and Public Policy at the AVMA**

Gail Golab, American Veterinary Medical Association (AVMA)

Dr. Golab presented an Overview of Advocacy and Public Policy at the AVMA. Addressed were on what, to whom, and how the AVMA advocates on behalf of veterinarians and their patients. Advocacy at the federal, state, and international levels, and with for-profit and not-for-profit businesses was discussed, as well as the roles of AVMA volunteer leadership, members, and staff. A case study on compounding was used to demonstrate how AVMA is working at the federal and state levels to effectively resolve related challenges faced by the profession, its patients, and its clients. Mention was made of the recent retooling of the AVMA in an effort to better serve its members, including a planned 2017 effort to develop an advocacy and public policy agenda.

**Annual Update from the Cervid Health Team, Fiscal Year (FY) 2016 Voluntary Chronic Wasting Disease (CWD) Herd Certification Program**

Alecia Naugel and Randy Pritchard, USDA-APHIS-VS
CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

The APHIS National CWD Herd Certification Program (HCP) was implemented in 2014. It is a voluntary Federal-State-industry cooperative program administered by APHIS and implemented by participating States. The program provides uniform national herd certification standards that minimize the risk of spreading CWD in farmed cervid populations. Participating States and herd owners must comply with requirements for animal identification, fencing, recordkeeping, inspections/inventories, as well as animal mortality testing and response to any CWD-exposed, suspect, and positive herds. APHIS monitors the Approved State HCPs to ensure consistency with Federal standards through annual reporting by the States.

With each year of successful surveillance, herds participating in the HCP will advance in status until reaching five years with no evidence of CWD, at which time herds are certified as being low risk for CWD. Only captive cervids from enrolled herds certified as low risk for CWD may move interstate. Currently, 29 States participate in the voluntary CWD Herd Certification Program and have Approved HCPs. FY 2016 marks the fourth year that Approved States have submitted their CWD HCP annual reports to APHIS. In FY 2016 there were 2,704 enrolled cervid herds: 2,129 deer, 447 elk and 128 mixed species herds. Of those, there were 2,331 certified cervid herds: 1789 deer, 421 elk and 121 mixed species herds.

**VS PCEP Evaluation**

Veterinary Services (VS) conducted an internal evaluation of its Cervid Health Program in 2016 at the request of VS leaders. The evaluation used VS’ Program Continuous Evaluation Process (PCEP), a standardized process designed to help VS leaders improve programs and services by examining (1) the program goals with respect to alignment with VS goals, stakeholder needs, program status and allocated resources; (2) the program strategies with respect to suitability for achieving program goals effectively and efficiently; and (3) the program value to stakeholders. A total of 49 stakeholders, including 40 stakeholders external to VS, were asked to provide input to the PCEP evaluation. Seven VS veterinary medical officers and one Wildlife Services veterinary medical officer met from May through June 2016 to complete the evaluation and to provide recommendations for the program. Recommendations and stakeholder input regarding the CWD Herd Certification Program (HCP) from the review were provided to the CWD Program Standards Working Group.

**CWD in Farmed and Wild Cervids**

**Summary of CWD detections.** As of September 30, 2016, CWD has been confirmed in wild deer and elk in 22 U.S. States, and in farmed cervids in 16 States. In total, 24 States have identified CWD in wild and/or farmed cervids. CWD has been reported in 77 farmed cervid herds in the United States. Confirmation of the disease in free-ranging elk and white-tailed deer in Arkansas in 2016 marked the first reports of CWD in the wild cervid population in this State.
FY 2016 CWD Detections in Farmed Cervids. Seven new positive captive cervid herds were identified in FY 2016 (5 white-tailed deer and 2 elk). None of the seven positive herds were certified herds in the Herd Certification Program.

- **Texas: Two new herds**
  
  In February 2016, NVSL confirmed CWD in a 3½-year-old, natural addition whitetail buck that was hunter-harvested from a release site on a ranch in Medina and Uvalde counties. The deer originated from a breeding facility on the ranch. Based on the possible exposures, both the breeder pen and the release site were considered positive premises. The buck was genotype GG at codon 96 and tested positive on both lymph node and obex. Two more positive deer have been identified out of 349 animals in the herd that have been tested since February using post-mortem and/or ante-mortem samples. The breeding facility and the associated hunting facility tested at least 130 white-tailed deer for CWD as part of routine post-mortem surveillance within the five years prior to the first positive case. The positive herd was within 50 miles of another known positive farmed cervid herd at the time of diagnosis. The herd currently has approximately 780 whitetail deer under State quarantine.

  In April 2016, NVSL confirmed CWD in a 3 ½-year-old, natural addition white-tailed doe in Medina County. The doe was genotype GG at codon 96 and tested positive on both lymph node and obex. Subsequently, an additional 13 positive deer were identified by post-mortem and ante-mortem testing, including five 96GG, six 96GS, and two 96SS genotypes. The herd tested a total of 181 deer for CWD as part of routine post-mortem surveillance in the five years prior to the positive diagnosis. This positive herd is within ten miles of the positive herd identified in Medina/Uvalde Counties in February 2016. Approximately 1,000 white-tailed deer currently reside on the premises that remains under State quarantine. Federal indemnity was used to remove and test select animals to inform the epidemiological investigation and evaluate the performance of ante-mortem tests.

- **Wisconsin: Three new herds**

  NVSL confirmed CWD in a 3-year-old, natural addition buck on a white-tailed deer breeding/hunting facility in Three Lakes, Wisconsin in November 2015. The facility is located in Oneida County. The buck was positive on both obex and lymph node, but was not tested for genotype. One additional positive hunter-harvested 5-year-old buck was positive on both lymph node and obex (untested genotype). No CWD positive cervids have been found in wild or farmed cervids within 50 miles of the positive premises. The herd tested at least 129 deer for CWD as part of routine post-mortem surveillance were reported within the five years prior to the positive
diagnosis. The herd consists of approximately 450 white-tailed deer and is under State quarantine. Federal indemnity was not provided for this herd.

In January 2016, NVSL confirmed CWD in a 2½-year-old, natural addition white-tailed buck in Iowa County, Wisconsin. The farm had been under quarantine since 2002 because it is located within five miles of CWD-detection in wildlife. Only a few deer are kept on the farm for exhibition. The buck was positive on both obex and lymph node, with an untested genotype. The herd was enrolled in an HCP program in 2002, but was not compliant at the time of diagnosis. Twelve valid CWD test results had been reported in the five years prior to the positive animal diagnosis. The herd currently has an inventory of less than ten CWD-susceptible species. Federal indemnity was not provided for this herd.

NVSL confirmed CWD in a white-tailed deer in Oconto County, Wisconsin in September 2016. The deer was a female, one-year-old natural addition that was found dead. The lymph node was CWD-positive but prion was not detected in the obex sample tested. The facility includes a separate breeding farm at the same location, with approximately 850 deer in the breeding farm and an estimated 1500 deer in the hunting preserve. This preserve is not on a Herd Certification Program. There have been 1,078 deer tested from this preserve since 2010. A quarantine was issued. It will require 100% testing of all deer that die or are killed and are 12 months of age, in both operations. There are no plans to depopulate this farm at this time.

- **Iowa: One new herd**
  
  NVSL confirmed CWD in an elk from a hunting preserve in Pottawattamie County, Iowa, in January 2016. An adjacent breeding facility owned by the same producer was depopulated for CWD in 2012. The breeding facility received exposed deer from another positive herd in Iowa. The hunting preserve tested seven animals for CWD in 2012 (no other testing known). The hunt facility currently consists of white-tailed deer and elk and the plan is to hunt out the remaining animals. Federal indemnity was not provided for this herd.

- **Colorado: One new herd**
  
  In June 2016, NVSL confirmed CWD in an elk from a facility in Eagle County, Colorado. The 9-year-old cow elk was born on another premises in Colorado, but had been at this Eagle County facility for the past eight years. This facility consisted of a small herd used for personal meat production. Communication with state animal health officials indicated that only one other elk resided on the premises at the time of CWD detection. That animal was
I propose to the Committee:

- Members of this sector should learn more about State and national FMD planning. Each individual facility should have a basic understanding of FMD response strategies, and how it affects their ability to do business.
- There are Key Components guidance in Secure Zoo, including Biosecurity, Surveillance, Animal Movement, Preservation, and Visitation. Not all guidance is appropriate for every facility. You
must tailor your plan, along with your State Animal Health Official based upon your business model.

- This sector should be encouraged to participate in FAD exercises in their States. Gaps in planning and overall sector management can be explored in a 'no risk no fault' environment.

**Committee Business:**

The Committee accepted the report from the Farmed Cervid Subcommittee and discussed and passed four resolutions, three of which were brought forward from the Farmed Cervid Subcommittee and one from the Committee on Infectious Diseases of Horses.
The Subcommittee on Farmed Cervidae met on October 17, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina. The following committee members were present: Charly Seale (TX), Bret Marsh (IN), Shawn Schafer (ND), Eric Mohlman (NE), Patrick Carlton (TX), David Hunter (MT), Collin Gillin (OR) and Robert Meyer (WY). Paul Anderson, (MN), John Fischer (GA) and Glen Zebarth (MN) were not able to attend. There were a total of 98 people in attendance at the meeting.

Reports

Dr. Nicholas Haley presented on the epidemiology and management of endemic CWD in farmed elk. He presented on his research projects regarding ante-mortem testing for CWD, live animal CWD testing effectiveness, vaccine development and nontraditional methods for management of CWD infected herds. He also discussed genetic resistance characteristics in elk. His research supports that live animal testing in CWD infected herds can be an effective tool in the management of infected herds.

Dr. Davin Henderson presented on recent work with sensitivity and specificity studies using the RTQuick and protein misfolding cyclic amplification (PMCA) CWD assays as compared to testing using conventional immunohistochemistry (IHC). He said that these tests perform far better than IHC and that testing of fecal samples for CWD using these tests shows promise.

Dr. Tracy A Nichols, Animal Health Inspection Service (APHIS), Wildlife Services National Wildlife Research Center, presented on her research on ante-mortem CWD testing options and implementation of live animal tests.

Dr. Randy Pritchard, USDA-APHIS-Veterinary Services, presented on recent cases of CWD in the United States and the current status of the CWD Herd Certification Program in the United States.

Dr. Nancy Hannaway, USDA-APHIS-Veterinary Services, presented on pilot projects on use of live animal tests in CWD Herd Certification approved states. She reported that there are currently 29 CWD Herd Certification Program (HCP) approved states. She also reported on the DPP tuberculosis test in cervidae. There were 1,750 cervidae tested by DPP in 2016. Five animals were classified as reactors, euthanized and necropsied. None of these five reactor animals were found to be infected with tuberculosis.

Dr. Alecia Naugle, USDA-APHIS-Veterinary Services (VS), discussed revision of the CWD Program Standards, movement of wild cervidae and ante-mortem CWD testing. She handed out a document
summarizing USDA recommendations for changes to the CWD Program Standards. Comments on these recommendations will be considered.

Three resolutions were drafted, discussed, voted upon and passed out of the Subcommittee on Farmed Cervidae for subsequent consideration and possible action by the full USAHA Committee on Captive Wildlife and Alternative Livestock. These resolutions are as follows:

1) National Cervid TB Herd Accreditation Program
2) Live animal testing for CWD.
3) CWD testing protocol for wild cervidae
The Committee met on October 15, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 3:00 - 5:00 p.m. There were eight members and 15 guests present. Attendees were welcomed and general overview and housekeeping comments were made.

The National Academies of Science (NAS) 2013 report on veterinary workforce served as the foundation for Committee presentations and discussions. The NAS report concluded that there are minimal workforce shortages but societal needs for doctor of veterinary medicine (DVM) expertise is growing; education and research funding has declined so that there is inability to meet societal needs; the current return on investment (ROI) for the DVM education is not sustainable and the response is slow; the profession is losing presence in Food Animal production and care; and global food security is critical, complex, and will require One Health solutions. Four presentations provided updates regarding selected sectors of the veterinary profession and relevant points related to the NAS summary and recommendations.

American Association of Industrial Veterinarians (AAIV) Perspectives on the Veterinary Workforce
Mia Cary, AAIV and North American Veterinary Community (NAVC)

Dr. Cary provided an overview of the AAIV, indicating that the organization’s mission is to advance the professional skills and standards of veterinarians engaged in any phase of industry, corporate, and public employment. The organization was founded in 1954 as a non-profit and currently has approximately 500 members. AAIV exists to advance professional standards, increase awareness of DVM contributions, inform the profession on diverse opportunities, and promote communication and collaboration. Industry positions are generally attractive and there has been
some expansion due to promotion of One Health and public health in recent years. Extensive education and experience is often required, particularly in regards to regulatory expertise. The AAIV continues to support and promote the benefits and value of traditional general practice positions because those positions/experience are foundational for most “industry” veterinary positions in manufacturing (biopharma, medical supplies/equipment, food and feed), distribution, laboratory services and equipment, animal insurance, schools, government, and private industry.

The AAIV is attempting to address the National Academy of Sciences (NAS) conclusions and recommendations in the following ways:

Societal needs for DVM expertise is growing but positions are lacking
- AAIV is implementing collaborative partnerships (subject-matter experts, SMEs), networking events at national meetings, supporting career-transition workshops, and increase overall awareness.

Education and research funding has declined with inability to meet societal needs
- Potential for collaboration via industry research centers of excellence, many animal health companies offer/fund educational programs, and quarterly educational webinars for members occur.

Current ROI on the DVM education is not sustainable with a slow response
- Industry is willing to support/fund but not able to be the sole supporter, industry-based intern programs at animal health headquarters are available with a broad reach into private practice.

Losing presence in the Food Animal production and care
- Industry provides many field-based herd health programs. Telehealth is growing and should be considered, and the potential exists for greater university-industry collaboration.

Global food security is critical, complex, and requires One Health solutions
- Many animal health companies have similar missions when it comes to promoting the profession and industry veterinarians are often focused on global food security.

The bottom line is, AAIV believes the veterinary profession must aggressively communicate and collaborate within and beyond to proclaim and demonstrate relevance to the public and decision makers to ensure continued, and greater success.

**Veterinary Services Perspectives on One Health**

Brian McCluskey, USDA-APHIS-VS

Dr. McCluskey provided an overview of the USDA-APHIS perspectives regarding One Health. There is obvious and extensive interconnectedness of the environment, animals and people that is not new to veterinarians. However, there must be new innovative ways to communicate and collaborate among animal, human and environmental health specialists. The USDA has had multi-agency coordination groups in the past, which have now transitioned to the VS One Health Coordination Center (OHCC), which provides One Health subject matter expert (SME), builds alliances and
coordinates partnerships, creates One Health communication pieces, conducts outreach, and develops/delivers One Health tools. The OHCC is concerned and engaged regarding workforce development by providing core competencies, One Health competency framework for Workforce Resilience (OH-FRAME), and university collaboration and curricular integration. The OHCC enthusiastically supports workforce competency, expertise and collaborations.

**National Association of State Public Health Veterinarians**  
Tom Sidwa, Texas Department of State Health Services

Dr. Sidwa provided an introduction and overview of the National Association of State Public Health Veterinarians (NASPHV), which has a mission of facilitating collaboration among State Public Health Veterinarians and the veterinary health community. There are approximately 220 members in NASPHV, with the majority of state-employed members being in the agricultural arena and secondarily in public health and wildlife sectors. The association and its members provide veterinary public health consultation to human and animal health professionals in governments, private medical practices, and other health related organizations. NASPHV responds to emerging One Health issues including zoonoses to educate and implement prevention and control measures. They publish four compendia that include rabies, chlamydia, disease prevention in public settings, and standards for zoonotic disease prevention for veterinary personnel. Collaboration routinely occurs between NASPHV and other organizations: United States Department of Agriculture (USDA), United States Animal Health Association (USAHA), Council of State and Territorial Epidemiologists (CSTE), Center for Disease Control and Prevention (CDC), Food and Drug Administration (FDA), and American Veterinary Medical Association (AVMA).

There are gaps-opportunities for additional veterinary positions in the State Public Health since a State Public Health Veterinarian (SPHV) is not available in all 50 states and in some states the State Veterinarian is asked to perform SPHV duties and/or may serve as the State or Deputy State Epidemiologist. Advanced degrees such as Masters of Science (MS), Master of Public Health (MPH), or Doctor of Philosophy (PhD) may be desired, along with 1-3 years’ experience in public health. In addition to difficulty in matching applicant qualification, compensation can be a challenge as well. Funding of a SPHV position in states without one and promoting the veterinary workforce role in One Health through mentoring students and outreach to national organizations and universities is strongly encouraged by the NASPHV.

**National Association of Federal Veterinarians (NAFV) – Veterinary Workforce Update**  
Mike Gilsdorf, NAFV

Dr. Gilsdorf provided the following 2015 statistics for U.S. veterinarians: the total public and corporate veterinarians is 111,406 and the Public Health
veterinarians are divided rather equally among industry and federal positions with academic positions double at approximately 38%. The Federal positions are primarily FSIS (34%), APHIS (25%), and Army (18%), with a total decrease from 2015 (3,199) to 2016 (2,933). There have been at least six workforce assessments since 2009, including the GAO report stating that the federal government lacks a comprehensive understanding of the sufficiency of its veterinarian workforce and recommending an advisory group. The Talent Management Advisory Council (TMAC) and Veterinary Medical Officials (VMO) were designated as Mission Critical until 2010 and then in 2011 a subgroup was formed for strategic planning, emergency management and recruitment/retention. In 2012, the TMAC published an assessment of the workforce needed to staff a large transboundary animal disease outbreak. The FSIS has instituted multi-year relocation incentives and expenses, which may vary for different locations but even so the vacancy rate remains at 11%. The Veterinary Services (VS) staff attrition between 2010 and 2014 caused a reduction of 15%; however, the 2017 budget may provide additional funds to rehire some personnel. There is also a student loan repayment program $10,000 gross payment per year would be possible for a three-year service agreement, yielding a total repayment of $30,000. Various programs have been, or are being implemented in the federal government, which follows recommendations of the National Academies of Science (NAS) report for state and federal governments to re-examine their policies on remuneration, recruitment, and retention of veterinarians. Based on the action being taken by the USDA to close gaps found in their workforce, the TMAC intends to use that assessment and the resulting actions as a model to be discussed, modified, and implemented by other federal agencies for their veterinary workforces.

Committee Business:

The Committee developed and passed the resolution entitled, “Veterinary Public Practice Awareness and Promotion.”
The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina beginning at 3:40 p.m. There were 17 members and 14 guests present.

**Presentations and Reports**

**Subcommittee on Mycotoxins in Pet Food: Recommended Dietary Guidance Concentrations**

Larry J. Thompson, Nestle Purina

In the 2015 meeting, Renate Reimschuessel of the Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM) requested the Committee:

1. Delineate working ranges for development of quick mycotoxin test kits for pet food for the following mycotoxins: T-2/HT-2, Ochratoxin-A (OTA), and Zearalenone (ZEA).

2. Develop and recommend guidance concentration limits in dry kibbled pet food diets for the following mycotoxins: T-2/HT-2, Ochratoxin-A (OTA), and Zearalenone.

A subcommittee meeting was held at Iowa State University on March 17 and 18, 2016 to discuss this topic. Attendees included: Larry Thompson, Michelle Mostrom, Tim Evans, Steve Ensley (host), Cat Barr, Cindy Gaskill, Karyn Bischoff, Deon van der Merwe, Paula Imerman, and Gary Osweiler. The subcommittee approach was to review related literature and regulations on these mycotoxins, review the risk assessment approach and assumptions (e.g., uncertainty factors), including comparisons with other animals (e.g., pig) and standard intakes for dogs and cats. The subcommittee also chose to review real world cases and suspected cases in order to develop ranges of likely concern for these mycotoxins as well as to develop final dietary concentration recommendations. Significant challenges to this approach
included that no risk assessment guidance has been put forth by FDA-CVM, including use of uncertainty factors as well as direction on standard intakes used for risk assessment calculations. The subcommittee noted that the final levels used may change due to differing approaches utilizing differing assumptions in these and other areas. At end of March 2016, the subcommittee forwarded to FDA-CVM the generated final working ranges suggested for development of a quick screening method for these mycotoxins in dry pet food products:

<table>
<thead>
<tr>
<th>Mycotoxin</th>
<th>Suggested Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-2+HT-2</td>
<td>10-250 ppb</td>
</tr>
<tr>
<td>OTA</td>
<td>5-50 ppb</td>
</tr>
<tr>
<td>ZEA</td>
<td>50-500 ppb</td>
</tr>
</tbody>
</table>

At the 2016 meeting, the Subcommittee held final discussions and forwarded to Dr. Reimschuessel the following suggested limit guidelines for the mycotoxin in dry pet food, on a dry matter basis:

<table>
<thead>
<tr>
<th>Mycotoxin</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-2 plus HT-2</td>
<td>Dog 250 ppb</td>
</tr>
<tr>
<td></td>
<td>Cat 50 ppb</td>
</tr>
<tr>
<td>Ochratoxin A</td>
<td>10 ppb</td>
</tr>
<tr>
<td>Zearalenone</td>
<td>200 ppb</td>
</tr>
</tbody>
</table>

The Committee was updated on the status of the radionuclide review in production and other animals by Lisa Murphy. She is collaborating with Steve Hooser in the review and update.

Karyn Bischoff motioned the Committee, seconded by Michael Filigenze, to endorse the following statement on environmental lead residues, to be used by the American Veterinary Medical Association’s (AVMA) Committee on Environmental Issues:

“Lead - The AVMA recognizes that lead in the environment is a health risk to people, pets, livestock, and wildlife. The AVMA encourages research, education, and actions to mitigate the risk by elimination of lead exposure and continued development and use of alternative products.”

After discussion, the Committee voted to support the statement along with comments on suggested minor changes to the statement concerning the actual feasibility of elimination (underlined above) versus a mitigation or reduction in lead exposure, which the Committee’s felt would more accurately support the ideas presented in the statement.

Sarah Nemser of FDA-CVM’s Veterinary Laboratory Investigation and Response Network (VET-LIRN) thanked the Committee on its support of the program and updated the Committee on activities, including a planned proficiency testing for anticoagulant rodenticides in liver. Planning is ongoing and participating laboratories will be contacted with further information when
available. Lori Smith inquired as to a proficiency testing for nitrate in forage, as Kentucky has access to differing known levels of nitrate in forage. The Committee agreed to pursue this in conjunction with the American Academy of Veterinary and Comparative Toxicology (AAVCT) and a phone conference in early 2017 was planned for further arrangements.

Wilson Rumbeiha, who is the Toxicology Section Editor for Journal of Veterinary Diagnostic Investigation (JVDI) discussed the continuing need for expert toxicology reviewers for the journal. He reminded the Committee that an email to him or the Editor, Grant Maxie, stating the member’s expert area and that the member would be willing to act as reviewer, was all that was needed to get on the database.

In response to a question from the Chair, a guest from the FDA-CVM Office of the Director, Michael Murphy, updated the Committee on continuing changes and initiatives in the area of compounding drugs, including antidotes used to treat toxicoses in food animals and other animal species.

The Committee adjourned at 5:50 p.m.
REPORT OF THE USAHA/AAVLĐ COMMITTEE ON FOOD AND FEED SAFETY

Chair: Patrick McDonough, NY
Vice Chair: Craig Shultz, ID

Robin Anderson, TX; Chris Ashworth, AR; James Averill, MI; Deanna Baldwin, MD; Adrienne Bautista, CA; Richard Benton, MS; Karyn Bischoff, NY; Richard Breitmeyer, CA; Deborah Brennan, MS; Beverly Byrum, OH; Wendy Cuevas-Espelid, GA; Glenda Davis, AZ; Ignacio dela Cruz, MP; Dubraska Diaz-Campos, WA; Kathy Finnerty, MA; Mallory Gaines, CO; Tam Garland, TX; Robert Gerlach, AK; Chelsea Good, MO; Laura Goodman, NY; Jerry Heidel, OR; Douglas Hepper, CA; Joseph Hill, SC; Susanne Hinkley, NE; Christine Hoang, IL; Donald Hoenig, ME; Danny Hughes, AR; John Huntley, AZ; Doreene Hyatt, CO; Ghazala Jawad, NC; Annette Jones, CA; Ellen Kasari, CO; Susan Keller, ND; Joe Kendall, AB; Hailu Kinde, CA; Daniel Kovich, DC; T.R. Lansford, TX; Dale Lauer, MN; Elizabeth Lautner, IA; Bill Layton, MT; Tsang Long Lin, IN; Gene Lollis, FL; Bret Marsh, IN; David Marshall, NC; Patrick McDonough, NY; Katherine McNamara, VT; David Meeker, VA; Shelley Mehlenbacher, VT; Brenda Morningstar-Shaw, IA; Nicole Neeser, MN; Gene Niles, CO; Sandra Norman, IN; Ogi Okwumabua, WI; Kenneth Olson, IL; Stephanie Ostrowski, AL; Lanny Pace, MS; Elizabeth Parker, TX; Amar Patil, NJ; David Pyburn, IA; John Ragan, VA; Lisa Ramsey, VA; Renate Reimschuessel, MD; Grant Rezabek, OK; M. Gatz Riddell, Jr., AL; Roxana Sanchez-Inguneza, KS; John Sanders, WV; Joni Schefelt, MN; David Schmitt, IA; Craig Shultz, ID; Richard Sibbel, IA; Kathryn Simmons, DC; Harry Snelson, NC; Stan Stromberg, OK; Anil Thachil, NY; Larry Thompson, MO; Bob Tully, KS; Shauna Voss, MN; Liz Wagstrom, DC; Doug Waltman, GA; Robert Wills, MS; Dennis Wilson, CA; Nora Wineland, MO; Jennifer Wishnie, IA; Raquel Wong, HI.

The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 1:30 to 5:30 p.m. There were 12 members and 13 guests present. Basic housekeeping tasks were covered, sign in and voting protocols were discussed.

Presentations and Reports

Interstate Shipment of Raw Milk and Listeria Outbreaks
Megin Nichols, DHHS/CDC/OID/NCEZID/DFWED/ORPB

The Centers for Disease Control and Prevention (CDC), along with federal and state partners, investigated Listeriosis in two people residing in California and Florida, linking them to consuming raw dairy products from Dairy Farm A in Pennsylvania. Dairy Farm A is an unregulated venue that ships milk interstate. Both illnesses occurred in 2014 and both ill people in this outbreak were hospitalized; the ill person from Florida died and the other recovered. Public health investigators used the
PulseNet system to identify these illnesses. PulseNet is the national subtyping network of public health and food regulatory agency laboratories coordinated by CDC. DNA "fingerprinting" is performed on Listeria bacteria isolated from ill people by using techniques called pulsed-field gel electrophoresis (PFGE) and whole genome sequencing (WGS). Although the two illnesses occurred in 2014, the source of these illnesses wasn't known until January 29, 2016, when the U.S. Food and Drug Administration informed CDC that whole genome sequencing of Listeria bacteria from raw chocolate milk produced by Farm A showed that it was closely related genetically to Listeria bacteria from the two ill people described above. The Listeria isolates from these two ill persons had indistinguishable PFGE patterns and were highly related by WGS analysis to isolates from a sample of raw chocolate milk produced by Dairy Farm A. Because Listeria was recently found in raw milk produced by Farm A, CDC is concerned that conditions may exist at the farm that may cause further contamination of raw milk and raw dairy products distributed by this company and make people sick. Raw milk is milk from cows or other animals that has not been pasteurized to kill harmful bacteria. This raw, unpasteurized milk can carry dangerous bacteria such as Listeria, Salmonella, E. coli, and Campylobacter, which are responsible for causing numerous foodborne illnesses and outbreaks. We recommend that people drink and eat only pasteurized dairy products (including soft cheese, ice cream, and yogurt). Pasteurization is the process of heating milk to a high enough temperature for a long enough time to kill dangerous bacteria. This is especially important for people at higher risk for foodborne illness: children younger than five, pregnant women, adults 65 and older, and people with weakened immune systems.


Updates from the FDA Vet-LIRN
Renate Reimschuessel, Vet-LIRN, DHHS/FDA/CVM/OFVM/CVM/OR

During the past six years, the Veterinary Laboratory Investigation and Response Network (Vet-LIRN) has grown from an idea in August 2010 to a functioning network comprising 38 laboratories. The activities initiated during this time are varied yet all focused on forwarding CVM’s mission to promote human and animal health. Dr. Reimschuessel reported on a short list of the activities and accomplishments of the Vet-LIRN.

Vet-LIRN

1. In December 2010, the newly formed Vet-LIRN staff consisted of a Director, a support scientist, a liaison to Office of Surveillance and Compliance, and a contract Oak Ridge Institute for Science and Education (ORISE) chemist. The network now has another support scientist and two veterinarians working on investigation and response to consumer reports.

2. Vet-LIRN held its first stakeholder meeting in March 2011, and by August 2011 we had 16 Vet-LIRN laboratory partners. The network has grown to 38 laboratories.

4. Vet-LIRN collaborated with six Food Emergency Response Network (FERN) laboratories to test a number of animal feed products for various contaminants. This study’s results were published in 2014.

5. Vet-LIRN collaborated with three FERN laboratories to optimize methods and test pig tissues for triazine contaminants. This study’s results were published in 2015.

**Vet-LIRN Laboratories**

1. Vet-LIRN awarded a contract to document feed contamination events between 2006-2011 to help CVM prioritize efforts and resources.

2. In 2012, Vet-LIRN initiated a proficiency testing (PT) program in collaboration with the Moffett Center and Iowa State University. We conduct, on average, three proficiency tests per year. These can be chemical, microbiological or pathology. During 2015 the PT’s were: 1) Listeria in pet food PT, 2) inter-laboratory comparison of Vitamin E in animal serum, 3) Vitamin E in animal serum PT. In collaboration with NVSL, Vet-LIRN laboratories also participated in a Salmonella Group D serology PT.

3. In 2012, Vet-LIRN initiated an infrastructure funding opportunity to provide infrastructure funding for Vet-LIRN laboratory activities including testing during investigations. [http://grants.nih.gov/grants/guide/pa-files/PA-12-194.html](http://grants.nih.gov/grants/guide/pa-files/PA-12-194.html). Currently 30 laboratories have received funding. In 2015 and 2016, supplemental funds were awarded to facilitate travel and training for our partner laboratories.

4. Vet-LIRN program office participated in multiple National Level Exercises (NLE) and Integrated Consortium of Laboratory Networks (ICLN) exercises. These activities contribute to overall preparedness of our network for emergency response.

5. Vet-LIRN conducts approximately 30-50 in depth case investigations per year. These cases evaluate consumer reports of potential problems with animal feed or animal drugs.

6. Vet-LIRN continues to lead the Center’s testing program to investigate the root cause of pet jerky treat associated illness. We are focusing on Fanconi cases, but also developed a multifaceted product testing program.

8. Vet-LIRN sponsored a meeting in January 2016 for awardees of methods grants to present their progress reports to FDA and each other.

9. Vet-LIRN was named, along with NAHLN, as a partner in the president’s “Combating Antibiotic Resistant Bacteria” initiative. Vet-LIRN is initiating a pilot study to test antibiotic susceptibility of selected veterinary pathogens and conduct whole genome sequencing on a subset of these isolates. Vet-LIRN plans to approach any new tasks needed by CVM with the same energy and innovation that has brought the program to its present state.

http://www.fda.gov/animalveterinary/scienceresearch/ucm247334.htm

Review of Multistate Foodborne Outbreaks 2015-2016
Colin Basler, DHHS/CDC/OID/NCEZID/DFWED/ORPB

This presentation provided an overview of the methodology used for multi-state foodborne outbreak identification and investigation. In addition, recent multi-state foodborne outbreaks of Salmonella and E. coli including outbreaks linked to new food items, e.g., pork, shell eggs, frozen stuffed chicken entrees, sushi, organic nut butters, protein supplements, cucumbers, ground beef, and flour were reviewed.

Finally, emerging issues such as the rise of multi-drug resistant foodborne outbreaks and the implementation of whole genome sequencing in foodborne outbreak detection were discussed.

Here is a link to the details of the outbreaks that were discussed: http://www.cdc.gov/foodsafety/outbreaks/multistate-outbreaks/outbreaks-list.html

- Pork- *Salmonella* enterica serotype I 4, [5],12:i:-
- Eggs- *Salmonella* Oranienburg
- Frozen Stuffed Chicken Entrees- *Salmonella* Enteritidis
- Frozen Yellowfin Tuna Sushi- *Salmonella* Paratyphi B variant L(+) tartrate(+) and *Salmonella* Weltevreden
- Sprouted Nut Butters (sprouted almonds, cashews, and hazelnuts)- *Salmonella* Paratyphi B variant L(+) tartrate(+)
- Raw Powder Supplements and Meal Replacements- *Salmonella* Virchow
- Cucumbers- *Salmonella* Poona
- Ground beef- STEC/E coli O157
- Flour- STEC/E coli O121 and O26
Whole Genome Sequencing and Plasmid Genomics of Antimicrobial Resistance: *Salmonella*'s Mobile Genetic Elements and the Antimicrobial Resistance Genes They Carry

Jonathan Frye, USDA-ARS, U.S. National Poultry Research Center

This presentation highlighted ongoing research projects that are part of the work of the Bacterial Epidemiology and Antimicrobial Resistance Research Unit. With the emergence of antibiotic resistance (AR), multidrug resistance (MDR), and carbapenem resistant Enterobacteriaceae (CRE), the specter of widespread untreatable bacterial infections threatens human and animal health. The ability of these emerging resistances to transfer between bacteria on mobile genetic elements (MGEs) could cause the rapid establishment of MDR bacteria in animals leading to a foodborne risk to humans. To sample the diversity of AR genes and MGEs in *Salmonella*, we selected animal isolates collected from 1997-2011 by the National Antimicrobial Resistance Monitoring System (NARMS). The ~70,000 *Salmonella* in the collection were isolated from beef and dairy cattle, chicken, swine, turkey, their meat products, the processing environment, and from farms. To obtain the greatest variety of AR genes and MGEs, 193 isolates were chosen based on their resistance phenotypes, serovars, and PFGE patterns, resulting in 75 serovars with diverse PFGE patterns. Whole genome sequencing (WGS) and bioinformatics analysis were used to identify AR genes and MGEs. Most isolates had AR genes detected as well as MGEs such as plasmids, integrons, or both. The AR genes were often located on the MGEs and many were arranged into MDR cassettes of several contiguous AR genes. Some of the MGEs and AR genes have been previously found in *Salmonella*; however, they are arranged differently and have not previously been found in animal isolates, in the serovars analyzed, or in isolates from human infections. Together this demonstrates that different factors may be affecting the development and spread of MGEs encoding AR in *Salmonella* found in animals as compared to humans. The next step will be to identify the animal environments that lead to the development and spread of AR so that these can be targeted with interventions to reduce this risk to human and animal health.

Food Safety Modernization Act/FSMA - Update

Michael J. Murphy, HHS/FDA/CVM/OFVM/CVM/OCD

As the implementation of the FDA Food Safety Modernization Act (FSMA) continues, the agency today issued two draft guidances to assist industry with the implementation of the Preventive Controls for Animal Food rule and another draft guidance to assist businesses in determining whether the activities they perform are within the “farm” definition. Two of the draft guidances are meant to assist domestic and foreign companies in complying with Current Good Manufacturing Practice (CGMP) requirements and with human food by-product requirements under the FSMA Preventive Controls for Animal Food Rule.
Veterinary Feed Directive/VFD – Update
Michael J. Murphy, HHS/FDA/CVM/OFVM/CVM/OCD

In December 2013, the FDA took a significant step forward in addressing antimicrobial resistance by publishing Guidance #213, which calls on animal drug sponsors of medically important antimicrobials used in food-producing animals to withdraw production indications (e.g., “growth promotion” or “feed efficiency”) as approved uses from their labels, and to bring the remaining therapeutic uses of these products under the oversight of a veterinarian by the end of December 2016. The Veterinary Feed Directive (VFD) final rule, is an important piece of the agency’s overall strategy to promote the judicious use of antimicrobials in food-producing animals. This strategy will bring the use of these drugs under veterinary supervision so that they are used only when necessary for assuring animal health. The VFD final rule outlines the process for authorizing use of VFD drugs (animal drugs intended for use in or on animal feed that require the supervision of a licensed veterinarian) and provides veterinarians in all states with a framework for authorizing the use of medically important antimicrobials in feed when needed for specific animal health purposes.

Modeling the Transboundary Survival of Foreign Animal Disease Pathogens in Contaminated Feed Ingredients
Scott Dee, Pipestone Veterinary Services

Project Objectives were two-fold - to model if foreign animal diseases could survive in feed ingredients shipped from Asia to the USA, and to evaluate whether two chemical mitigants could reduce risk. The hypothesis was that pathogen survival will be influenced by ingredient and treatment. Based on the Swine Health Information Center pathogen matrix, ten Foreign Animal Disease (FAD) viral pathogens were identified as significant risks to the U.S. swine industry. Due to the inability to work with these actual agents, we used “surrogate viruses”, which allowed us to study closely related and structurally similar viruses, but not the actual FAD pathogens. The designated FAD and the selected surrogate were as follows: foot and mouth disease virus (FMDV), (Seneca Virus A), Campylobacter fetus subsp. venerealis (CFV), (Bovine Virus Diarrhea Virus), pseudorabies virus (PRV), (Bovine HerpesVirus-1), African swine fever virus (ASFV), (Vaccinia virus), Nipah virus (Canine Distemper Virus), Swine Vesicular Disease Virus (Porcine Enterovirus) and Vesicular Exanthema Virus (Feline Calici Virus). Other selected pathogens (PRRSV 174, PCV2 and Vesicular Stomatitis
Virus) did not require surrogates. Using a model previously validated to study the risk of contaminated feed ingredients for the transboundary spread of PEDV (Dee et al 2016), we selected feed ingredients known to be imported from China to the USA based on the U.S. Government Harmonized Tariff Schedule (hs.usitic.gov). These included organic and conventional soybean meal, soy oil cake, dried distiller's grain with solubles (DDGS), lysine, choline, vitamin D, pork sausage casings, and several pet foods (dry and moist). Ingredients were inoculated with representative surrogates (5g ingredient and 100 uL virus). Controls consisted of complete feed inoculated with surrogate or saline (negative control) as well as stock virus alone (positive control) in the absence of feed matrix. The design involved non-treated control ingredients, along with 2 mitigants: SalCURB-treated ingredients and MCFA-treated ingredients. These samples were then incubated in an environmental chamber for 37 days programmed using actual T and % RH data recorded during a journey from China to the U.S. (Beijing to Shanghai to San Francisco to Des Moines) in December 2012 through January 2013 (SeaRates.com). Samples were tested by polymerase chain reaction (PCR), VI and bioassay for porcine surrogates or on primary cells for surrogates of non-porcine origin at two day postinoculation (DPI) (Beijing), eight DPI (Shanghai), 25 DPI (San Francisco) and 37 DPI (Des Moines) to represent specific points in the model.

Results: As of this writing, testing of the FMDV, CSFV and PRV surrogates has been completed. Preliminary data indicate the survival of the FMDV surrogate (SVA) and the PRV surrogate (BHV-1) at all points during the 37-day shipping period from China and into the U.S. Both surrogates survived in conventional soybean meal and soy oil cake, while SVA also survived in lysine, pet food, Vitamin D, complete feed and casings. Both positive controls (SVA and BHV-1 stock virus) did not survive. In contrast, the CSFV surrogate (BVDV) appeared to be less stable and did not survive the 37-day journey, independent of ingredient. It did, however, survive until the samples theoretically entered the port of San Francisco (25 DPI) in conventional soybean meal and moist dog food.

Discussion: Under the conditions of this study, these preliminary results suggest that contaminated feed could serve as vehicles for FAD introduction to the U.S., supporting our previous results which focused on PEDV. Phase 2 has begun, consisting of surrogates for ASFV, Vesicular Exanthema Virus and Nipah Virus along with PRRSV.

Reference

Committee Business:
Dr. McDonough began with a review of the Committee’s past year discussion topics, the mission statement of the Committees and that we need to be thinking of how our committee meets the strategic plans of both the
REPORT OF THE COMMITTEE

USAHA and the AAVLD. He also explained that this joint committee functions within the concept of One Health that includes the complex interconnectedness of human and animal and ecosystem health. Finally, he announced that the USAHA seeks to evaluate its entire Committee structure, and we will be requesting input and comment in the near future from committee members as this process develops. We also discussed the need to continue the committee’s business throughout the year in between annual meetings, perhaps via the mechanism of teleconferences or webinar links.

The meeting was adjourned at 5:30 p.m.
REPORT OF THE USAHA COMMITTEE ON FOREIGN AND EMERGING DISEASES
Chair: Tammy Beckham, KS
Vice Chair: Alfonso Clavijo, KS

Helen Acland, PA; Bobby Acord, NC; Bruce Akey, TX; Gary Anderson, KS; Celia Maria Antognoli, CO; James Averill, MI; Lyndon Badcoe, WA; Jamie Barnabei, MD; Mohit Baxi, ON; Karen Beck, NC; Tammy Beckham, KS; Lisa Becton, IA; Peter Belinsky, RI; Bob Bokma, MD; Bethany Bradford, VI; Philip Bradshaw, IL; Richard Breitbart, CA; Deborah Brennan, MS; Becky Brewer-Walker, AR; Charlie Broadus, VA; Charles Brown II, WI; Kenneth Burton, KS; Bruce Carter, IA; Michael Carter, MD; Gregory Christy, FL; Alfonso Clavijo, KS; Matt Cochran, TX; Dana Cole, CO; Joseph Corn, GA; Paula Cowen, CO; Stephen Crawford, NH; Wendy Cuevas-Espelid, GA; Susan Culp, TX; S. Peder Cuneo, AZ; Glenda Davis, AZ; Donald Davis, TX; Ignacio dela Cruz, MP; Thomas DeLiberto, CO; Leah Dorman, OH; Brandon Doss, AR; Edward Dubovi, NY; Anita Edmondson, CA; Brigid Elchos, MS; Dee Ellis, TX; Larry Elsken, IA; François Elvinger, NY; Conrad Estrada, VA; Anna Claire Fagre, CO; Joshua Fine, MD; Katherine Flynn, CA; Patricia Foley, IA; Kent Fowler, CA; Richard French, NH; Mallory Gaines, CO; Susan Gale, AZ; Jane Galyon, IA; Tam Garland, TX; Cyril Gay, MD; Robert Gerlach, AK; Paul Gibbs, FL; Colin Gillin, OR; Michael Gilsdorf, MD; Linda Glaser, MN; Timothy Goldsmith, MN; Paul Grosdidier, KS; Percy Hawkles, UT; Greg Hawkins, TX; Bill Hawks, DC; Melinda Hergert, TX; Linda Hickam, MO; Rick Hill, IA; Heather Hirst, DE; Donald Hoenig, ME; Thomas Holt, FL; Richard Horwitz, RI; Dennis Hughes, NE; Pamela Hullinger, CA; David Hunter, MT; John Huntley, AZ; Carla Huston, MS; Wei Jia, NY; Annette Jones, CA; Ellen Kasari, CO; Calvin Keeler, DE; Darlene Konkle, WI; Charlotte Krugler, SC; T.R. Lansford, TX; Elizabeth Lautner, IA; John Lawrence, ME; Randall Levings, IA; Chuck Lewis, IA; Tsang Long Lin, IN; Linda Logan, TX; Pat Long, NE; Margie Lyness, GA; Janet Maass, CO; Bret Marsh, IN; David Marshall, NC; Scott Marshall, RI; Barbara Martin, IA; Michael Martin, SC; Sarah Mason, NC; Rose Massengill, MO; James Maxwell, FL; Thomas McKenna, MA; Sara McReynolds, ND; Scott McVey, KS; David Meeker, VA; Shelley Mehlenbacher, VT; Gay Miller, IL; Janice Mogan, IA; Igor Morozov, KS; Thomas Myers, MD; Lee Myers, GA; Sherrie Nash, MT; Cheryl Nelson, KY; Sandra Norman, IN; Dustin Oedekoven, SD; Kenneth Olson, IL; Kristy Pabilonia, CO; Lanny Pace, MS; Elizabeth Parker, TX; Steve Parker, GA; Roger Parker, TX; Boyd Parr, SC; William Pittenger, MO; David Pyburn, IA; Jeanne Rankin, MT; M. Gatz Riddell, Jr., AL; Keith Roehr, CO; Susan Rollo, TX; James Roth, IA; Margaret Rush, MD; Mo Salman, CO; John Sanders, WV; Michael Sanderson, KS; David Scarfe, IL; Shawn Schafer, OH; Jack Schlater, IA; David Schmitt, IA; Aaron Scott, CO; Russell Shoeb, ME; Kathryn Simmons, DC; Jonathan Sleeman, WI; Rebecca Smith, IL; Julie Smith, VT; Harry Snelson, NC; Diane Stacy, LA; Nick Striegel, CO; Sabrina Swenson, IA; Manoel Tamassia, NJ; Belinda Thompson, NY; Beth Thompson, MN; John Thomson, IA; Brad Thurston, IN;
The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 8:00 a.m. to 5:30 p.m. The Chair opened the session with an introduction, a welcome, and a review of the purpose of the committee.

Time-Specific Paper

Dr. Bouna Diop, Secretary of the Food and Agriculture Association (FAO), World Organisation for Animal Health (OIE) Peste des Petits Ruminants (PPR) Global Secretariat, presented a time-specific paper on PPR Global Eradication Program (PPR-GEP): Seizing the Opportunity to Drastically Improve the Livelihoods and Resilience of 300 Million of the World’s Poorest Families, Now and Forever.... The paper, in its entirety, is included at the end of this report.

Presentations

Session 1: Federal and Center Updates

DHS S&T’S Agricultural Defense Program Overview

R. Motroni, Department of Homeland Security (DHS), Science and Technology Directorate (S&T), Chemical and Biological Defense Division (CBD)

The Agricultural Defense Branch within the Department of Homeland Security performs work consistent with the roles and responsibilities articulated in Defense of United States Agriculture and Food (Homeland Security Presidential Directive, HSPD-9). This includes a broad range of research in development efforts to enhance current capabilities and develop state-of-the-art countermeasures for high-consequence foreign animal diseases. This includes near- and long-term research and development for vaccines and diagnostics, in coordination with internal and external stakeholders. This consists of five main projects covering the breadth of an animal health response: Enhanced Passive Surveillance; Foreign Animal Disease Vaccines and Diagnostics; Foreign Animal Disease Modeling; Agricultural Screening Tools; and Livestock Decontamination, Depopulation and Disposal. The Agricultural Defense Branch funds most of their research through contracts, but there are multiple ways of working with agricultural defense projects within the Science and Technology Directorate including: 1) Grant; 2) Cooperative Research and Development Agreement (CRADA); and 3) Contract. The grant process is a competitive process with the
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deliverables to include publication, report, or completion of a project. The contract is also a competitive process in which the deliverable is a product or service. The CRADA is awarded by the Notice of CRADA intent, and either party may approach the other to initiate. The deliverable is a product or services agreed to on both sides, but no money is awarded from the Federal Government to the collaborator. More information is available at: http://www.dhs.gov/contract-opportunities.

USDA-APHIS-NVSL Update
Beverly Schmitt, APHIS-NVSL

Diagnostic testing at the National Veterinary Services Laboratories (NVSL) showed a slight increase in numbers compared to FY2015. During the time period between October 1, 2015 and September 30, 2016, NVSL received over 43,000 accessions and reported results for over 400,500 tests. In January 2016, NVSL confirmed HPAI H7N8 (North American lineage) from turkeys in Indiana. NVSL also confirmed LPAI H5N1 (North American lineage) from a commercial turkey flock in Missouri and HPAI H5N2 (Eurasian-NA lineage) from a mallard duck located in Alaska as part of Wildlife Services wildbird surveillance. NVSL completed the second of two studies using the pseudorabies strain China HeN1 in pigs and observed vaccines available in the U.S. appear to confer some degree of protection. NVSL collaborated with the ANSES Laboratory for Study and Research on Equine Diseases in France to obtain Trypanosoma equiperdum strain OVI for the purpose of improving diagnostic testing for dourine. NVSL continues to provide support for the equine piroplasmosis outbreak in the western U.S. In September 2016, NVSL confirmed the first major infestation of New World screwworm in more than 30 years in Florida Key deer. NVSL received renewals to ISO 17025 and ISO 9001 in 2016.

USDA-APHIS-NAHLN Update
Sarah Tomlinson, APHIS-NAHLN-NVSL

The National Animal Health Laboratory Network (NAHLN) restructure was officially implemented in January 2016, with all laboratories in the NAHLN now designated as Levels 1, 2, 3, or Affiliate laboratories; there are not yet any Specialty laboratories. Overall in FY15, almost all NAHLN laboratories received an increase in funding above 2015 levels.

The NAHLN continued to support foreign animal disease investigations and focus on animal disease preparedness activities in 2016. Lessons learned and preparedness planning from the 2015 highly pathogenic avian influenza (HPAI) outbreak were invaluable for efficiently responding to the HPAI/LPAI outbreak in Indiana in January of this year. Network activation was not needed for this response, but several regional laboratories were on standby for receive and test samples as needed. Also in May and June, NAHLN laboratories were involved in outbreak investigations of LPAI in Missouri turkeys, and in Pennsylvania, New York, and New Jersey in response to the finding of H3N2 LPAI in live bird markets. NAHLN
laboratories also continue to support wild bird HPAI surveillance for the second year. Eight NAHLN laboratories across the different U.S. flyways are conducting testing of approximately 35,000 samples for the upcoming year.

Increasing NAHLN laboratory messaging capabilities continues to be a top priority with Veterinary Services (VS) now accepting messages for nine diseases, with two more targeted for implementation this year. The NAHLN is also collaborating with four NAHLN laboratories and the Swine Health Information Center on a project to enhance messaging data standards and to develop data flow and reporting requirements for supporting the National List of Reportable Animal Diseases (NLRAD) initiative.

Based on feedback from the 2015 HPAI outbreak, barcoding was identified as a priority for streamlining laboratory processes. The Exercises and Drills Working Group (EDWG) is conducting an evaluation of barcoding use across the NAHLN with the goal of providing recommended best practices for this tool. The EDWG also sponsored a webinar in June highlighting collaborative best practices for NAHLN laboratories when participating in foreign animal disease investigations in partnership with NVSL and federal/state regulatory authorities.

The Methods Technical Working Group (MTWG) initiated a new membership structure in January. Under the new structure, there are now general and core members, with each group meeting bi-monthly. Core members lead sub-groups addressing specific topics or projects identified as priority for the NAHLN, calling on the general membership to help fill needed expertise in the sub-groups. The core held a two-day strategic planning meeting in June to review the mission and direction of the MTWG and prioritize methods validation and comparison projects for the next year.

VS and the NAHLN continue to engage in activities related to antimicrobial resistance (AMR) and the NLRAD. In July, the APHIS-AAVLD joint working group completed recommendations for a pilot project to implement AMR surveillance in U.S. veterinary diagnostic laboratories. Similarly, the draft laboratory implementation plan for the NLRAD has been finalized. This work is a product of a joint working group comprised of NAHLN Coordinating Council members and representatives from the National Animal Health Reporting System.

Finally, we continue to focus on quality management and training for the laboratories. In July, the NAHLN Program Office hosted the sixth annual Quality Management System Training, in collaboration with AAVLD trainers, attended by 54 participants from NAHLN laboratories across the U.S.

**USDA-APHIS-NVSL FADDL Program Overview**

Karen Havas, APHIS-NVSL, Foreign Animal Disease Diagnostic Laboratory, Plum Island

The Foreign Animal Disease Diagnostic Laboratory (FADDL) FY16 overview provided a summary of the diagnostic, reagent production, assay development and capacity building work conducted by FADDL from October
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2015 to September 2016. It summarized the support provided to national and international partners and the greater scientific community as a whole.

Foreign Animal Disease Research Updates from USDA-ARS, Plum Island
Luis L. Rodriguez, Plum Island Animal Disease Center

The Foreign Animal Disease Research Unit (FADRU), Agricultural Research Service (ARS) conducts research to develop and transfer solutions to agricultural problems of high national priority. Foreign animal diseases represent a major threat to U.S. agriculture. Introduction of these agents, either accidental or deliberate, has devastating social and economic effects not only in the country’s agricultural systems but also in a wide range of economic activities. Diseases of concern include but are not limited to foot-and-mouth disease, classical swine fever, African swine fever and exotic vesicular stomatitis.

During the past year, important advances were made in FMD research, specifically; improving foot-and-mouth disease virus (FMDV) vaccines with novel adjuvant approaches; understanding molecular mechanisms of FDMV persistence in natural hosts; understanding the host range of field strains of FMDV; and understanding the host factors critical for FMDV replication. In African swine fever a new generation Differentiation of Infected and Vaccinated Animals (DIVA) marker vaccine to control classical swine fever (FlagT4) is undergoing advanced development with reversion to virulence and efficacy trials under way. In addition, new candidates for an African swine fever virus (ASFV) live attenuated vaccines (LAV) vaccine were created by removal of specific genes that determined virulence. The two different attenuated virus strains were able to induce protection in swine against ASF infection with the highly virulent Georgia isolate. This is the first time that an experimental vaccine is reported to protect against this virulent field isolate from ASFV-Georgia strain. During 2016 progress was made in the characterization of vesicular stomatitis viral strains associated to the continuing U.S. outbreak in 2014 and 2015. Strains obtained from APHIS-NVSL were sequenced and phylogenetically characterized, showing that the 2015 outbreaks were related to the original virus introduced in 2015. Work has continued toward understanding the mechanisms of pathogenesis of epidemic VSV strains causing outbreaks in the USA. In collaboration with The Pirbright Institute, a new LAMP PCR assay was developed to detect FMD and VSV in a single test.

Swine Health Information Center Overview
Paul Sundberg, Swine Health Information Center

The mission of the Swine Health Information Center (SHIC) is to protect and enhance the health of the United States swine herd through coordinated global disease monitoring, targeted research investments that minimize the impact of future disease threats, and analysis of swine health data.
To start meeting this mission in 2015, the nine members of the SHIC Board hired Dr. Sundberg as the organization’s first executive director in June 2015. A summary of SHIC’s achievements includes the following:

- **Communication/Collaboration.** From the onset, SHIC reached out to many groups that have a connection to swine health to help define and refine its mission. Chief among these stakeholders include USDA-APHIS, pork producers, veterinarians, and allied industry. Because of our linked industries, SHIC also has engaged Canadian counterparts as well to help coordinate disease information and response with their domestic industry.

- **Global Disease Assessment.** To build on SHIC’s assessment of disease status from a global perspective, it conducted a survey of swine diseases and disease issues with the international network of the group’s Monitoring and Analysis Working Group. Responses came from 13 foreign countries, including Japan, Korea, Philippines, China, Poland, Ukraine, Russia, United Kingdom, Spain, Brazil, Chile, Columbia, and Canada.

- **VDL Support.** Acting upon its mission, SHIC gave support to four veterinary diagnostic laboratories with the explicit purpose of standardizing the way that they report their testing results. This collaboration is on track to improve the ability of the diagnostic laboratories to communicate test results and just as importantly to help improve communication about the real-time status of U.S. disease trends and outbreaks.

- **Disease Risks Research.** SHIC funded many research projects over the past year. However, a highlight would have to be the project that will help define disease introduction risks to the U.S. pork industry that come from importing feedstuffs and feed components.

- **Rapid Response Teams.** To help foster rapid onsite responses to disease investigations across the United States, SHIC developed a geographic system for rapid response investigations of disease outbreaks on farms. SHIC’s board approved dividing the country into regions with Rapid Response Teams, each with small groups swine health experts who can be deployed on farms within 72 hours after a request. Each group is tasked with investigating any disease or potential outbreak for epidemiology, assessment of potential introduction pathways and management of the outbreak review.

- **Diagnostic Fee Support.** To help more producers and their veterinarians solve outbreaks with unknown etiology, SHIC developed a system of support to help offset some diagnostic fees after the initial diagnostics are completed. SHIC can help producers in cases where there are incidents of high or ongoing morbidity or mortality where an etiology is either not identified or there is a strong suspicion that the identified etiology is not the likely cause of the outbreak.
• **Swine Disease Matrix.** This project will help the pork industry be better prepared for emerging diseases and has helped to bring coordination of researchers to meet this objective.

• **Senecavirus A.** From the SHIC’s targeted SVV research, practitioners and producers alike learned much more about SVV’s etiology and how to combat it at the farm level. A combination of fact sheets, webinars, and research reports all combined to help the industry get a handle on this emerging disease.

**Institute for Infectious Animal Diseases Overview**

Elizabeth Parker, Institute for Infectious Animal Diseases, Texas A&M University

The Institute for Infectious Animal Diseases (IIAD) was awarded as a Department of Homeland Security Science and Technology Center of Excellence in 2004, with Texas A&M University as the lead institution and renewed as a co-lead with Kansas State University’s Center of Excellence for Emerging Zoonotic and Animal Diseases (CEEZAD) in 2010. IIAD was also recognized as a World Organisation for Animal Health (OIE) collaborating center in the specialty of biological threat reduction in 2014. The Institute focuses on research, education, and outreach to promote and enhance global animal, public and ecosystem health by providing innovative, sustainable, inter-disciplinary solutions to address complex global challenges. As an OIE collaborating center, IIAD provides its expertise internationally to support and implement animal health initiatives, provide scientific and technical training, and conduct scientific research focused on global animal health.

IIAD focuses research priorities to help support and defend U.S. agriculture as a critical infrastructure. The IIAD mission helps support this goal by providing cutting-edge, multi-disciplinary, basic and translational research and education products that support our industries, state, federal, and international partners. With prevention, detection and response outcomes intended to enhance resiliency, increase capacity, and build sustainability, current emphasis areas include:

• Biological research – delivering better tools and options for comprehensively addressing disease detection, control and eradication.

• Integrated data-sharing tools – improving daily animal health management, providing real-time information to support improved decisions during disease events and contribute to business continuity.

• Training – educating a diverse, multi-sectoral workforce of animal and public health workers, laboratory scientists, and epidemiologists.

A few examples of current projects of interest to the Committee are:

1. Tools to mitigate spread of FMD at feedyards - this just completed project resulted in advancements for an affordable commercial
undercarriage and wheel truck wash installed at a feedyard. The unit uses approximately three gallons of water per full tractor-trailer wash and waste water is re-captured. Further advancements or expansion to other livestock sectors are currently under discussion between other interested parties. Funding was provided by Department of Homeland Security (DHS) Science and Technology Directorate (S&T). Partners included West Texas A&M University, Texas Cattle Feeder’s Association, and a feedyard in Texas.

2. Integrated biosurveillance for mosquito-borne diseases - this collaborative project between the Lawrence Livermore National Library (LLNL), IIAD and Texas A&M University (TAMU) College of Veterinary Medicine and Biomedical Sciences (CVM) aims to establish an operational biosurveillance test-bed in the Southeast Texas/Mexico border region focusing on surveillance of insect, animal and human populations. Samples and data from this test bed and related scientific investigations are expected to lead to a better understanding of genetic, environmental and societal factors affecting disease spread and prevalence. This will enable improved prediction of vectorborne disease emergence and spread, along with objective assessment of diagnostic technologies and interventions. The focus of this project will be arthropod-borne viral diseases that are currently expanding into the United States - including Zika, Dengue, and Chikungunya. Funding is provided by LLNL.

3. 3B ELISA - In collaboration with industry, academia and government, this project developed and validated an foot-and-mouth disease (FMD) 3B non-starch polysaccharide (NSP) differentiating vaccinated from infected animals (DIVA) enzyme-linked immunosorbent assay (ELISA) which has demonstrated to be a faster, more robust, and more sensitive assay than the current gold standard. Testing bovine, caprine, porcine and ovine samples, U.S. licensure is currently in final stages u . If approved, it would be the only U.S. produced FMD NSP ELISA on the market. Additional swine testing is currently under discussion by the Canadian Food Inspection Agency (CFIA). Funding was provided by DHS S&T. Partners include VMRD, Inc., U.S. government (DHS Plum Island Animal Disease Center (PIADC), USDA-APHIS Foreign Animal Disease Diagnostic Laboratory (FADDL), and USDA-ARS PIADC) and the international community (CFIA, the Government of Mongolia’s Ministry of Food and Agriculture’s State Central Veterinary Laboratory, and the Pirbright Institute all performed testing).

4. AgConnect® Emergency exercise– Held in August 2016, this data-driven exercise focused on the technical function and utility of the AgConnect suite of tools, to provide for: planning, response and business continuity, biosurveillance, shared situational awareness, data and information sharing, operational coordination,
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operational communications. The notional scenario was a high-consequence porcine disease affecting Kansas, Colorado, Indiana, Iowa and used real industry daily operational data from two major swine integrators. Over 60 participants from 18 organizations tested how the AgConnect® system would allow for more efficient communication and sharing of data to support informed decision making during an animal health emergency. Throughout the two-day exercise, participants used AgConnect® to work through various commercial swine controlled movement requests necessary for business continuity during this hypothetical swine disease outbreak. Following each of the requested movement scenarios, state animal health officials and industry representatives came together for discussions to determine if the requested realistic movements could occur and how AgConnect® assisted with their decisions. The state veterinarians and industry representatives concluded that AgConnect was able to quickly translate information to visualization for situation awareness, and that an important aspect of success was the ability for the swine industry to directly share operational and geospatial information directly through the AgConnect system. The State Veterinarians were also able to inform each other by sharing geospatial visualizations of their outbreak control efforts and status through AgConnect and participants agreed on the tool’s value of using live, real-time data and novel technology solutions to support decision-making.

5. Enhancing Biosecurity Best Practices (EBSA) of Livestock Diseases in South Africa – just initiated in collaboration with the Agricultural Research Council-Onderstepoort Veterinary Institute (ARC-OVI), EBSA’s National Department of Agriculture (NDA) and TAMU CVM, targeted educational activities will a) enhance capacity of local veterinary and laboratory diagnostic personnel, b) increase knowledge and best practices in small farmers and c) promote awareness of the importance of biosecurity by the implementation of web-based technologies that will allow livestock owners, animal health workers and veterinary workforce to easily recognize infectious diseases. In Year 1, government veterinarians from four high-density livestock provinces will receive biosafety, biosecurity and surveillance training as well as export and import regulations for diseases prevalent in EBSA. Combined the targeted provinces produce fifty-eight percent of the country’s pork, 54 % of beef and 43 % of poultry, have a high prevalence of infectious diseases (FMD, African swine fever (ASF), porcine cysticercosis, highly pathogenic avian influenza (HPAI) and Newcastle disease) and extensively export livestock and their products. In subsequent years train the trainer and other activities will extend knowledge to animal health workers and livestock owners. Funding is provided by the USDA Foreign Agricultural Service (FAS).
6. Gap analysis – foreign animal and emerging disease workshops for U.S. swine and cattle sectors are planned for 2017. Each workshop will identify current gaps, prioritize needs and outline suggested next steps.

Center of Excellence for Emerging and Zoonotic Animal Diseases Overview
Juergen A. Richt, Center of Excellence for Emerging and Zoonotic Animal Diseases, Kansas State University, College of Veterinary Medicine

The Department of Homeland Security’s Center of Excellence for Emerging and Zoonotic Animal Diseases (CEEZAD), based at Kansas State University, recently implemented the seventh year of its Strategic Plan. During the recently-completed Year 6, CEEZAD researchers continued to assist its commercial partner with development work to earn a USDA license for its safe, efficacious, differentiation of infected and vaccinated animals (DIVA)-compatible, subunit Rift Valley Fever (RVF) vaccine. Promising progress was made on a novel approach to African swine fever vaccination by utilizing a heterologous prime-boost vaccine strategy of simultaneously administering various combinations of subunit proteins and plasmid DNA specific for different antigens. A very successful project utilizing a Newcastle disease virus-vectedored highly pathogenic avian influenza (HPAI) vaccine provided significant protection in challenge studies, in both live and inactivated forms, for U.S. H5Nx avian influenza strains. The DIVA-compatible HPAI vaccine also has mass-application potential. Among the other nearly 30 projects coordinated by CEEZAD are vaccine and rapid field detection projects for various Transboundary Animal Diseases (TADs) such as classical swine fever, African swine fever, Rift Valley fever, Schmallenberg virus, and foot-and-mouth disease (FMD) (diagnostics). Additionally, in Year 6, CEEZAD continued co-funding, with the National Pork Board (NPB), a second round of vaccine, diagnostic, and epidemiology/modeling projects in the TAD mission space. Work also continues on developing web-based TAD education courses for veterinarians, students, and homeland security personnel and workforce development initiatives, along with National Bio- and Agro-Defense Facility (NBAF) research transition, and workforce development projects.

Session 2: Models: Current and Future Role/Needs of Disease Spread Models at the Research/Academic, State, and Federal Levels to Support Federal Preparedness and Response Activities
Panelists Included:
Amy Delagdo, USDA-APHIS Center for Epidemiology and Animal Health
Jon Zack, National Preparedness and Incident Coordination (NPIC), USDA-APHIS-VS Surveillance, Preparedness and Response Services (SPRS)
Sasidhar Malladi, University of Minnesota and USDA-APHIS Center for Excellence in the Arts and Humanities (CEAH), University of Minnesota
Emergency response planning continues to evolve to more strategically stop and prevent disease spread while maintaining business continuity and allowing as many animals as possible to reach their intended purpose. As a result, there is an increased need for scientific and analytical approaches to support emergency preparedness planning. Investments in epidemiologic modeling enhance our ability to evaluate trade-offs in investments in human and material resources, develop plans to quickly and accurately identify infected herds, develop plans to quickly assess animals and animal products for the presence of disease, explore options for more targeted approaches to depopulation and disposal, and to gage alternative control strategies for disease control. Investments in economic modeling allow us to estimate the fair market value of animals or animal products when data are limited; estimate economic impacts, including trade losses, associated with response options; and examine costs associated with response and potential trade-offs.

The Role of Epidemiologic and Economic Models in Emergency Preparedness and Response
Amy Delgado and Jon Zack, USDA-APHIS-VS

During the 2014-2015 outbreaks of HPAI in the U.S., past investments in modeling paid off. Modelers provided key information to estimate budgetary and material resource needs; examined alternative disease control strategies; evaluated vaccination strategies; informed surveillance, movement requirements, and permitting guidance; and analyzed export recovery to better understand how trading partners respond to outbreaks. Moving forward, Veterinary Services plans to increase partnerships for data collection and sharing, parameter development, and model application. They also plan to explore model enhancements for new and current tools to allow for more complex control options or other types of disease spread, while maintaining engagement with the emergency response community to ensure the work being done is meeting key needs.

Modeling Tools to Support Business Continuity Planning Efforts
Sasidhar Malladi, University of Minnesota and USDA-APHIS-CEAH

Both qualitative and quantitative approaches can be used to support a business continuity planning. For example, proactive risk assessment approaches have been used to evaluate the risk of moving infected, undetected products or animals from monitored premises. During the 2015
HPAI outbreak, risk analysis work supported outbreak investigations, answered questions on pre-movement active surveillance, and supported outbreak response. Examples of modeling work used during the HPAI outbreak included NASAHO permit group requests to evaluate active surveillance protocols for permitted movements, the impact of pre-movement isolation period (PMIP) duration, and live bird movement from pullet to egg-layer operations. Since the HPAI outbreak, Minnesota modeling work has included supporting the secure food supply plans, impact of early depopulation during an HPAI outbreak, and the movement of embryonated eggs to human influenza vaccine production. In the future, it is important to improve model parameters, suggest guidelines based on modeling results, and continue to evaluate different control strategies and inform decision-making. Models serve as valuable tools for business continuity planning and outbreak response.

Avoiding Garbage In-Garbage Out: Partnerships for Model Parameter Development: USDA, ARS and VS Collaboration

Luis Rodriguez, Foreign Animal Disease Research Unit, USDA-ARS, Plum Island

Dr. Rodriguez completed the national-level perspective on the use of models. There is a large amount of data available within Agricultural Research Service (ARS) that is relevant for disease models. The agreement between USDA, ARS, and Center for Epidemiology and Animal Health (CEAH) for disease modeling collaborations has provided an increase in resources and personnel within ARS to facilitate data collection to support modeling work at CEAH. The aim of this collaboration is to improve national disease models for transboundary animal diseases using real data to inform model parameter development and address data and knowledge gaps. The current ARS/CEAH collaboration is focused on foot and mouth disease (FMD). Since modeling tools rely on good data to be useful, understanding FMD pathogenesis and transmission based on work being performed at ARS provides a very valuable partnership and will help to further enhance and improve modeling work in the U.S. Data that ARS has available to support modeling projects include FDMV shedding/detection, onset and severity of clinical FMD, serology, vaccine and biotherapeutic efficacy, and transmission within and between species. Examples of estimating and determining disease transmission was presented to the committee based on experimental projects conducted at ARS, with the relevance of the differences between the two and resulting use and impacts for disease models discussed. In addition to experiments, these data can be leveraged with additional studies being performed by ARS to fill knowledge gaps, such as FMD clinical studies, studies of endemic FMD epidemiology and ecology, prospective animal experiments, and international collaborations. Future work within the ARS/CEAH collaboration will include classical swine fever (CSF) and African swine fever (ASF) data to further inform modeling efforts for these diseases as well.
Benefits of Modeling Activities for State Animal Health Officials’ Offices: A Kansas State University Pilot for Hosting USDA’s Animal Disease Spread Model (ADSM) Within A University Environment

Lindsey Holmstrom Department of Diagnostic Medicine and Pathology, College of Veterinary Medicine, Kansas State University

Animal Disease Spread Model (ADSM) is a freely available computer simulation model that can be used to analyze different disease control strategies and potential resource requirements, prioritize response options, demonstrate the impact of a disease within a region, and facilitate education and outreach activities such as to train the next generation of disease modelers or support state animal health officials (SAHO) foreign and emerging diseases (FED) exercises. As such, it has broad utility for use at local/state, regional and global levels. For the utility of such a tool to be fully realized, there is interest for ADSM to be useful and supported outside of the federal government and for collaborations within the modeling community to continue to be strengthened, which includes collaborations between the federal and state government and universities/research organizations. There is also a need for broad adoption and steady-state use of modeling tools at regional, state, and local levels and interests to continue to build expertise on publicly available tools. Universities are uniquely positioned to be a resource to both federal and state partners as they can provide expertise and support on the use of models for emergency preparedness and response. Over the next year, planned activities specific for ADSM include identifying and evaluating current SAHO data availability, identify SAHO needs that models can support, identify knowledge and capability gaps, and collect input and feedback on the model application process.

The Modeling Session concluded with a panel discussion on the Current and future role/needs of disease spread models at the research/academic, state and federal government levels to support FED preparedness and response activities. Participants included the above speakers, as well as Dr. Marianne Ash with the Indiana State Board of Animal Health and Dr. Julie Helm with Clemson University. Topics discussed by the panel included the need to develop a national disease model parameter database that is available to the modeling community, how best to evaluate different modeling tools available and provide recommendations of their use to federal and state decision-makers, how to determine the granularity of data needed to support modeling efforts, and how to ensure data confidentiality when sensitive data are used by models. Drs. Marsh and Helm provided their previous experiences from working with disease modelers from a state-level perspective and recommendations for future work.
Food and Agriculture Organization of the United Nations: The Emergency Prevention System for Animal Health (EMPRES-AH), Crisis Management Centre – Animal Health (CMC-AH), and FAO-OIE Rinderpest Secretariat

Bouna Diop, Secretary of the FAO/OIE Pestes petit de Ruminant (PPR) Global Secretariat, Food and Agriculture Association (FAO)

The link between human and animal populations, and with the surrounding environment, is particularly close in developing regions where animals provide transportation, draught power, fuel, clothing as well as proteins (meat, eggs, and milk). Animal products do not only represent a source of high-quality food, but are also a source of income for many small farmers and animal holders in developing countries. Healthy animals are closely related to healthy people and a healthy environment.

A comprehensive approach – the One Health approach – is needed to manage the complexities of changing disease landscapes. This approach gives greater emphasis to agro-ecological resilience, the protection of biodiversity, the efficient use of natural resources and the safety of food supply chains particularly in areas worst afflicted by poverty and animal disease. Speeding up response times, by early detection and reaction is essential.

FAO implements animal health programs related to the establishment of best practices in the prevention and control of priority diseases which threaten animal production, public health and trade through its international and regional networks, animal health projects and disseminating practical information. These include the FAO Emergency Prevention System (EMPRES) Animal Health and the Crisis Management Centre Animal Health (CMC-AH).

EMPRES-AH works to monitor and provide early warning ultimately to prevent animal diseases. Protecting livestock against diseases and preventing their spread is one of the keys to fighting hunger, malnutrition, and poverty. The Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES) was established by FAO’s Director General in 1994. The FAO Animal Health Service is entrusted with the EMPRES animal disease component, which provides information, training, and emergency assistance to countries to prevent, contain and control the world’s most serious livestock diseases, while also surveying for newly emerging pathogens.

Most of the emerging human pathogens have an animal (livestock or wildlife) origin. Hence there is the need for national and regional animal disease surveillance systems to prevent not only losses to livestock production, but to reduce threats to human health as well. The EMPRES strategy is to prevent and control diseases at their source. Prevention is at the core of EMPRES and investment in prevention is essential to secure sustainable and safe animal production. The core EMPRES precepts are:
early warning, early detection, early reaction, enabling research, coordination, and communication.

The CMC-AH is FAO’s rapid response unit in EMPRES-AH that works alongside governments to prevent or limit the spread of high-impact animal diseases. Transboundary animal diseases have the ability to rapidly spread over large geographical areas and can have a devastating impact on animal productivity and production, trade, human health, and consequently on the economic development, livelihoods and food and nutrition security of populations. The CMC-AH is FAO’s rapid response mechanism to animal disease emergencies. The CMC-AH is a joint arm of FAO’s Animal Production and Health and Emergency and Rehabilitation Divisions. Established in partnership with the World Organisation for Animal Health (OIE), the CMC-AH fields rapid response missions to countries to help assess epidemiologic situations, diagnose outbreaks of animal diseases, and set up immediate measures to prevent or stop disease spread.

With a global network of veterinary and operations experts within FAO and partner organizations, the CMC-AH is able to rapidly mobilize and deploy response teams to any region of the world. The Centre works closely with EMPRES-AH colleagues and with the Global Early Warning System (GLEWS) to continuously track and analyze the animal disease situation worldwide, and operates in constant collaboration with OIE and World Health Organization (WHO) to complement FAO’s technical expertise at every step of the response.

The CMC-AH first monitors animal health crises and anticipates responses using intelligence from GLEWS. The centre continually plans for deployment and works with partners worldwide to rapidly mobilize teams of experts. Once deployed, mission teams provide affected countries with targeted expertise to control epidemiological situations or outbreaks. Where needed, the CMC-AH also assists with mobilizing new resources. The consequences of animal disease emergencies can continue well after outbreaks occur and the CMC-AH works with other FAO units to support governments to transition from emergency assistance to medium- and longer-term action plans for disease control.

FAO has invested beyond the regular FAO programs to help lead the FAO-OIE Rinderpest Secretariat to maintain global freedom from the rinderpest virus. The official declaration of global freedom from rinderpest was made in May 2011, and the FAO and OIE members directed the two organizations to work jointly to manage all aspects of rinderpest in the post-eradication period. They recommended that every country destroy their stocks of rinderpest virus containing material or sequester them in a secure facility for safe keeping.

After global declaration of freedom of rinderpest, rinderpest virus containing materials (RVCMs) were reported present in at least 27 laboratories in 24 countries. Some of the more than 24 laboratories worldwide that had in their possession of RVCMs were determined to be low bio-containment facilities. These containment units posed a serious risk of
reintroduction for the virus into cattle grazing grounds around the laboratory and create possibilities of its dissemination into wider areas. Insufficient containment protocols combined with a lack of awareness about rinderpest among livestock holders, veterinarians, policy makers, and the community, contributed to a presence of a weak early reporting mechanism to detect the virus in the event of re-emergence.

In June 2012, a Joint Advisory Committee was established to advise the FAO and OIE on approval of facilities holding rinderpest material and those that hold or produce vaccine; approval of requests for research and manipulations of the virus; review of plans and results of site visits of holding facilities; and planning and implementing other rinderpest related activities as required.

Technical assistance is needed to facilitate and make sustainable the maintenance of adequate surveillance systems and national preparedness, facilitation of access to diagnostic reagents or facilities and relevant rinderpest vaccines. Another project involves sequencing rinderpest virus containing material for its genetic information, linking that with historical information on the samples and destroying what has been sequenced. The facilities involved in these projects will provide services to other facilities that wish to have their holdings sequenced. Services include development and deployment of diagnostic kit project containing non-infectious material; maintaining diagnostic capacity at the OIE reference laboratory for rinderpest; maintaining an inventory of facilities holding rinderpest material; advocacy for virus destruction and sequestration; decrease in number of countries storing rinderpest virus; approval of research relevant to the rinderpest-free era; development of international preparedness plan and update of national contingency plan.

**Senecavirus A (SVA) – Swine Industry Experience**

Harry Snelson, American Association of Swine Veterinarians

Sporadic cases of Senecavirus A, also known as Seneca Valley Virus or SVV, have been diagnosed in the U.S. swine herd for many years. The incidence of clinical cases increased dramatically in 2015, however. The clinical presentation mimics foot and mouth disease (FMD) thus raising concerns about the possibility of overlooking an FMD introduction and additional challenges associated with harvest channel surveillance.

**SENECAVIRUS A (SVA) – USDA Response**

Ellen Kasari, United States Department of Agriculture

Senecavirus A (SVA), belongs to the same family as FMD (Picornaviridae). It has been identified in U.S. swine since the 1980s under a variety of clinical presentations. More recently, SVA has been associated with clinical disease in swine that includes vesicular lesions that are indistinguishable from foot and mouth disease (FMD). USDA summary data of foreign animal disease investigations initiated due to vesicular lesions in swine will be shared along with a brief summary of findings from USDA.
surveys associated with these investigations. Veterinary Services Guidance document 7406.2, developed to clarify how USDA would handle animals or herds that may have SVA, will be summarized.

**Emerging Animal Disease Preparedness and Response Plan**

Dana Cole, CDC
Lee Ann Thomas, USDA-APHIS-VS


The framework for the plan was outlined in the 2014 VS concept paper, *Veterinary Services Proposed Framework for Response to Emerging Animal Diseases in the United States*. The plan provides strategic direction for VS at all levels to detect and respond to emerging animal diseases. It also defines assessment, communication activities, and possible response measures for an emerging animal disease occurring in the United States. The plan will provide strategic guidance, as well as outline roles and responsibilities of Federal and SAHOs and industry partners for detecting, communicating, and responding to emerging animal diseases.

VS will apply a collaborative approach to increase awareness of, detect, characterize, investigate, and respond to emerging disease threats and provide accurate information to all interested parties. VS will use the activities described in the plan to provide a solid scientific foundation for developing strategic interventions and informing the public of all appropriate actions.

Communication and collaboration among those government agencies, industries, and stakeholders impacted by a potential or emerging disease is essential to ensure a timely and appropriate response. VS will engage the National Assembly of State Animal Health Officials (NASAHO), American Association of Veterinary Laboratory Diagnosticians (AAVLD), industry associations, and industry emerging disease groups as appropriate to share information develop response options. Formal USDA communications around specific response activities, such as investigative studies, eradication, control, or certification programs will be coordinated with APHIS Legislative and Public Affairs.

**Farm Bill Provision to Fund Improvements to Protect Animal Agriculture**

Liz Wagstrom, National Pork Producers Council

Background: The continued reduction in appropriated funds to address critical programs that protect animal agriculture has left the industry in a perilous state. The increasing volume of trade and tourism presents an increased pest and disease risk to animal agriculture. Even though Animal and Plant Health Inspection Service (APHIS) conducts risk assessments to mitigate these risks from importation of meat and meat products, the risk
from hitchhiking pests and diseases via transportation and international travelers still remains. The recent outbreak of highly pathogenic avian influenza (HPAI) and porcine epidemic diarrhea (PED) has highlighted APHIS’ inability to handle large scale emergencies due to shortage of financial and human resources. Perhaps most alarming is the critical shortage of foot-and-mouth disease (FMD) vaccine needed to manage an FMD outbreak.

Potential Solution: It has been suggested by members of Congress and APHIS officials that the animal agriculture industry seek mandatory funding through the next Farm Bill, similar to the funding authorization obtained by the plant industry. While there seems to be a consensus within the animal agriculture industry to pursue such funding, the structure of the mechanism for distributing the funds will need to be modified to meet the livestock industry needs.

The beef, pork, dairy and sheep industries are particularly concerned about the insufficient quantity of FMD vaccine. Alleviating the shortage will require contracting for an offshore antigen bank that includes all 23 serotypes currently circulating in the world, and sufficient surge production capacity sufficient to produce upwards of 500 million doses of vaccine during an outbreak. Such a fix is likely to exceed $100 M per year over the life of the Farm Bill.

New World Screwworm Cases in Key Deer, Big Pine Florida
Samantha Gibbs, U.S. Fish and Wildlife Service

On September 30, 2016, New World Screwworm (Cochliomyia hominivorax) was identified in Key deer located on the island of Big Pine Key, Florida at the National Key Deer Refuge. The Florida Department of Agriculture and Consumer Services, Division of Animal Industry (FDACS-DAI) initiated a Foreign Animal Disease Investigation in coordination with the U.S. Department of Agriculture (USDA). The U.S. Fish and Wildlife Service continues to respond to cases of screwworm infestation in Key deer, with nearly 100 animals euthanized to date for welfare reasons.

Joint Animal-Plant Health Criminal-Epidemiological Investigations Concept
Stephen Goldsmith, FBI Weapons Mass Destruction Directorate

Course Format: Two day “Crim-Epi” training workshop that includes briefings, discussion sessions, demonstrations of operational techniques and procedures, discussion of field operational scenarios, and information Sharing and Red Cell exercises. The Animal-Plant Health (APH) Joint Criminal-Epidemiological Investigations Course is based on the Public Health Crim- Epi Course developed and implemented by the FBI and CDC for the last ten years.

The APH Crim-Epi Course focuses on preventing or responding to acts of terrorism against pre- harvest agricultural production (e.g.
livestock, crops, forest resources, range and pastures, and susceptible wildlife).

This course is also based on and serves to implement the elements of the Federal Bureau of Investigation (FBI), Weapons of Mass Destruction Directorate (WMDD) and Animal and Plant Health Inspection Service (APHIS) Memorandum of Understanding (MOU) for joint law enforcement and epidemiological investigations of acts of agricultural terrorism and the intentional introduction of high consequence animal and plant diseases.

This is an FBI Course designed to be delivered at the Field Offices in support of WMD Coordinator agriculture industry outreach program requirements and annual performance objectives for Biological Countermeasures and Counterterrorism operations.

**Mission:** To provide an efficient and effective joint APH and Law Enforcement (LE) response to suspicious biological events and possible intentional introductions of Foreign Animal and Exotic Plant Diseases and Pests. Establish information sharing and threat communication procedures, emphasize the benefits of joint investigations and response operations, and develop operational relationships between FBI, local and State Law Enforcement, State Departments of Agriculture, and USDA field level response personnel.

**Why Needed:**

- An intentional bioterrorism attack against U.S. agricultural targets will be difficult to discern between the more common accidental or natural disease introductions and would be a National Security Event. The agriculture and veterinary communities have been slow to recognize that agriculture is a target of domestic and international terrorist individuals and groups. Agroterrorism has national security significance with potentially severe consequences to the U.S. economy, export markets, and the balance of trade.
- Evidence of intentional introductions of Foreign and Emerging Animal Diseases (FEAD), Exotic Plant Diseases, Pests, Noxius weeds is inherently fragile and difficult to recognize and detect so there is a limited window of opportunity to identify and report threats, initiate investigations, and prevent or disrupt an on-going act of terrorism.
- Key tools for Joint Criminal-Epidemiological Investigations include: establishing joint triggers, indicators, and tripwires for suspicious or intentional acts and disease
  - outbreaks, rapid notification, and early information sharing between LE and APH agencies of unusual disease investigations, intelligence threat assessments, reports of suspicious activities and criminal investigations, effective use of interagency
REPORT OF THE COMMITTEE

Threat Credibility Evaluations (TCE), and joint
Crim-Epi investigations and response operations.

- The Course is the key action element for the implementation of the
  Joint Memorandum of Understanding between FBI-WMDD –
  USDA-APHIS – USDA Office of the Inspector General (OIG) and is
designed to assist LE and APH agencies to jointly detect and
effectively respond to possible intentional APH disease
introductions while maximizing resources and communication
between operational, field level personnel.

**Target Audience:** Local and State Law Enforcement, FBI Field Office
Personnel (Agents-WMD Coordinators and Intelligence Analysts), State
and USDA Field Veterinary Medical Officers, Animal Health Technicians,
Epidemiologists, Emergency Coordinators, Agricultural Law Enforcement
Investigators (USDA-OIG, APHIS Investigative and Enforcement Services'
(IES), State Brand Inspectors, State Agricultural Law Enforcement
Investigators, etc.). The domestic course has also been adapted for
international training events with partner nation Agricultural, Public Health,
and Law Enforcement agencies and has been used as a model for
developing capability for joint biological terrorism response operations in
Malaysia.

**Goals and Long-Term Vision:**

- **Facilitate Threat and Operational Awareness:** Provide an
overview of criminal and epidemiological investigational procedures
and protocols for a response to a bioterrorism attack against
agricultural targets and to enhance the understanding of the roles
and responsibilities of LE and Agricultural agencies.
  - Long Term Vision: LE understands the goals and
techniques of animal and plant disease
investigations. APH understands the LE priorities and
procedures such as intelligence operations, the roles
and duties of the FBI WMD Coordinator, crime scene
preservation and investigations, chain of custody, and
protecting sensitive information.

- **Develop Information Sharing Protocols:** Develop joint alert
notification and information sharing techniques and procedures,
develop jointly recognized triggers, indicators, and tripwires,
develop communication plans and contact lists for LE and APH
personnel.
  - Long Term Vision: Develop field level communication
procedures for information sharing, joint threat
assessments procedures, and joint investigations.
Define the type of information that is of value, why, and
establish effective and time sensitive protocols.
FOREIGN AND EMERGING DISEASES

- **Foster State and Local APH-LE Contact Networks:** During the training, APH and LE personnel meet their counterparts and develop working-level relationships, identify resources and assets for joint operations, develop useful operational points of contact.
  - Long Term Vision: Strong professional ties are developed between APH and LE personnel, development of working groups and joint planning teams, and build timely information sharing protocols for suspicious and unusual disease investigations and outbreaks.

- **Personnel Requirements:**
  
  **FBI:**
  - Lead Instructors: personnel from the WMDD, Biological Countermeasures Unit
  - Intelligence Analyst from WMDD, Chem-Bio Intelligence Fusion Cell
  - WMD Coordinator(s) and Intelligence Analyst(s) from the Field Offices
  - sponsoring the Crim-Epi Courses
  - Additional WMD Coordinators and FBI Laboratory Division Hazardous
  - Evidence Response Team Unit SME’s to serve as training facilitators

  **USDA-APHIS Veterinary Services:**
  - Lead Instructors: VMO – FADD’s from USDA APHIS Veterinary Services
  - Additional VMO’s from the 6 SPRS Districts to serve as training facilitators

- **Plant Protection and Quarantine**
  - Lead Instructor: Plant Disease SME from PPQ, Riverdale, MD
  - Additional PPQ SME’s from field / District Offices to serve as training facilitators

- **State Departments of Agriculture:**
  - Lead facilitator: State Veterinary Medical Officer / State Plant Disease Responsible Official from the State where the FBI Field Office is located to serve as training facilitator and to provide State specific informational-operational briefings.

**FBI WMD Directorate, Biological Countermeasures Unit Points of Contact:**
Supervisory Special Agent Kathleen Giles ([Kathleen.giles@ic.fbi.gov](mailto:Kathleen.giles@ic.fbi.gov))
Stephen Goldsmith DVM, Management Program Analyst ([Stephen.goldsmith@ic.fbi.gov](mailto:Stephen.goldsmith@ic.fbi.gov)).

The Professional Development Services Branch provides technical training for federal, state and military veterinarians. Liz Clark presented an
update on Foreign Animal Disease (FAD) Training and the International Training courses. The presentation also included an update on new projects and training initiatives being developed for Veterinary Services veterinarians.

Dr. Paula Cowen presented an update on the Veterinary Services Training and Exercise Plan (VSTEP). An update on the drills and exercises completed by the members of the VSTEP for FY 2016. An update on future VSTEP initiatives was presented.
FOREIGN AND EMERGING DISEASES

PPR GLOBAL ERADICATION PROGRAM (PPR-GEP): SEIZING THE OPPORTUNITY TO DRASTICALLY IMPROVE THE LIVELIHOODS AND RESILIENCE OF 300 MILLION OF THE WORLD’S POOREST FAMILIES, NOW AND FOREVER...

Bouna Diop
FAO/OIE Pestes petit de Ruminant (PPR) Global Secretariat, Food and Agriculture Association (FAO)

Peste des petits ruminants (PPR), or sheep and goat plague, is a destructive, fast spreading viral disease that kills sheep and goats (referred to as small ruminants) and devastates livelihoods throughout most of Africa, the Middle East, West, Central and South Asia, and most recently East Asia. The PPR situation is dynamic and threatening. In 2016, the disease was reported for the first time in Georgia and Mongolia. Sheep and goats (2.1 billion heads worldwide) are the primary livestock resource of many low-income, food-insecure rural families worldwide. They are reared within a variety of production systems and provide milk, meat, wool, fibre (cashmere and angora, and skins. They also support the livelihoods of traders, processors, wholesalers, and retailers involved in local, national, regional and international trade of live animals and their products.

The annual global losses due to PPR have been estimated at between US$ 1.4 billion to US$ 2.1 billion. PPR’s impact on sheep and goat populations adversely affects livelihoods, food security, and employment, including for women and youth. It both entrenches and exacerbates poverty and malnutrition.

Based on the experience of the successful eradication of Rinderpest in 2011 through a massive global effort spearheaded by Food and Agriculture Organization (FAO) and World Organisation for Animal Health (OIE), PPR was identified as the most suitable and feasible animal disease to next be targeted for global eradication. The global eradication of PPR is readily achievable provided sufficient political, financial and technical investment. PPR is readily diagnosed and there is a reliable, inexpensive vaccine available that confers life long immunity in vaccinated animals. In addition, there are no latent carrier states or wildlife reservoirs for PPR which simplifies the eradication efforts.

The PPR global eradication program (GEP) aims to eradicate PPR by 2030, greatly contributing to small ruminant production for a growing world population, estimated to be 9.7 billion by 2050. Consumption of small ruminant meat and dairy products is forecast to increase by 1.7 million metric tonnes and 1.8 million metric tonnes per year respectively. In a recent benefit-cost analysis of global PPR eradication, the ratio is estimated at 33.8. Investing in PPR eradication will pay for itself many times over as a contribution to improving the lives of the world’s most vulnerable pastoral and rural communities (over 300 million rural families). The PPR-GEP will contribute to the 2030 Agenda for Sustainable Development, supporting the achievement of many of the Sustainable Development Goals.
The PPR global eradication effort is framed as a 15 year process running through to 2030, divided into three five year phases. The first five years of activities are important catalysts to support and target the control and eradication achievements set forth in the Global Strategy, particularly in affected and at risk countries. The 62 countries (as of September 2016) that report infection with PPR and the 14 suspected of being infected or at risk are the major focus of the PPR-GEP (Total of 76 countries).

The PPR-GEP objectives for the first five year phase are to:

- lay the foundation for and commence the eradication of PPR by reducing its prevalence in currently infected countries.
- develop capacity for non-infected countries to demonstrate the absence of PPR virus as a basis for official recognition of PPR free status by the OIE.
- strengthen national Veterinary Services (VS) and their systems as the key players in the successful implementation of the PPR-GEP.
- where appropriate support activities to reduce the prevalence of other priority small ruminant diseases.

The program approach comprises a multi-country, multi-stage process involving assessment, control, eradication and maintenance (of PPR virus freedom) stages. The four stages described in the PPR-GCES correspond to a combination of decreasing levels of epidemiological risk and corresponding levels of prevention and control.

Key components of the program:

- Building an enabling environment for PPR-GEP implementation: logical and structured framework, full support and involvement of farmers, the adaptation of the legal framework, and the strengthening of VS.
- Support efforts to better understand the presence (or possibly the absence) of PPR in a country or region, its distribution among the different farming systems, the patterns of spread and, ultimately, to establish a decisive control plan based on the information acquired. This requires both an assessment of the epidemiological situation and establishment of a functional surveillance system.
- Implement measures toward PPR eradication: different measures will be combined namely vaccination, improved biosecurity, animal identification, movement control, quarantine and stamping out. Vaccination will play a vital role. Depending on the assessment and surveillance data, the total number of animals to be vaccinated during the programme is estimated at around 1.5 billion. The 79 countries historically free from PPR will be assisted to prepare their dossiers to apply for OIE PPR free status on a historical basis.
- Functional coordination mechanisms established at global, regional and country levels will ensure successful implementation of the programme. The FAO/OIE PPR Global Secretariat established in
Rome will insure coordination with regional and national stakeholders.

The estimated budget for the five year programme is around: US$996 Million.

By improving the livelihoods and increasing the resilience of hundreds of millions of the world’s poorest people, PPR eradication is a key contributor to sustainable development and building peace through security in some of the most vulnerable and unstable regions on Earth. In this regard, the broad international consensus and political support, the high rates of return of investment in disease eradication, which spans generations, and the proven FAO-OIE partnership, are strong guarantees of success.

Contact: PPR-Secretariat@fao.org
REPORT OF THE COMMITTEE ON GOVERNMENT RELATIONS
Chair: Barbara Determan, IA

Barbara Determan, IA; Kristin Haas, VT; Timothy Hanosh, NM; Annette Jones, CA; Susan Keller, ND; Bruce King, UT; Paul McGraw, WI; Doug Meckes, NC; Boyd Parr, SC; David Schmitt, IA; David Smith, NY; Scott Stuart, CO; Marty Zaluski, MT.

The Committee began its meetings on Tuesday, March 15, 2016 at the American Veterinary Medical Association (AVMA) office in Washington, D.C. There were 27 participants, including committee members, district chairs and members of American Association of Veterinary Laboratory Diagnosticians (AAVLD.) The first meeting took place with the AVMA and the American Association of Veterinary Medical Colleges (AAVMC).

The meeting began at 8:30 a.m. with Mark Lutschaunig, Director of Government Relations, Ashley Morgan, and Gina Luke providing an overview of the AVMA Washington, D.C. office, which includes nine staff members and each are involved with portfolios. Currently, in Congress there are three veterinarians (Kurt Schrader, (OR); Ted Yoho, (FL); and Ralph Abraham, (LA) – also an MD). There is a Congressional veterinary caucus now including 35 members chaired by Yoho and Schrader. Primary work has been on appropriations and there are 12 bills and yet there are no bills on the floor at this time. Ranking members want to pass all in order, however, time is running out and there is a possibility of a continuing resolution. An AVMA handout was distributed detailing Fiscal 2017 Agriculture Appropriations support of AVMA, which includes the Veterinary Medicine Loan Repayment Program (VMLRP), Veterinary Services Grant Program, Food Animal Residue Avoidance Databank (FARAD), National Animal Health Laboratory Network (NAHLN), Animal and Plant Health Inspection Service (APHIS), USDA’s Research Enterprise, Funding for Antimicrobial Resistance, AVMA and Coalition Partner Requests. AVMA is in support of the President’s budget of $901 million for APHIS.

Ashley Morgan reported on the AVMA looking at President’s Antimicrobial Resistance Plan and update on Congress looking at legislation pertaining to antibiotic and growth promotant legislation. In addition, she discussed the proposed Data Act pertaining to annual reporting by drug companies and industry, the Pathogen Reduction and Reform Act, and legislation proposed to amend the Federal Meat Inspection Act and Egg Products Inspection Act. The AVMA is opposed due to the negative consequences. She reported there are several human focused acts, including the Medical Innovation Act. The Government Accountability Office (GAO) has been asked to conduct a study to monitor and control antibiotic resistance. Regarding the implementation of the Veterinary Feed Directive (VFD) rule there are now more summit meetings. Dr. Akey expressed concern about unfunded mandates. Ongoing discussion included gathering and reporting of information related to antibiotic use. Currently, any data coming out is lacking in disease response and failures. We almost need to
survey on what is working perhaps through a National Animal Health Monitoring System (NAHMS) type of study. “Resistance data means nothing as the goal is trying to reduce resistance and sales data does not provide this.”

Gina Luke reported on AVMA actions including work with Coalitions Partners including Animal Ag Coalition, Friends of Agricultural Research Service (ARS), Supporters of Agriculture Research, Agriculture and Food Research Initiative (AFRI) Coalition, National Coalition for Food and Agriculture Research, National Association for the Advancement of Animal Science, S-FAR (U.S. Stakeholder Forum on Antimicrobial Resistance) and Informal Coalition on Biodefense and Public Health Preparedness. Kevin Cain reported that they started work in mid-January regarding appropriations and reported having 151 meetings, there were 79 participants and “Hill day” was on March 3rd along with AAVMC.

Gina Luke reported two more priorities in her portfolio include first the E-Fairness Act associated with the mandatory collection and payment of taxes to states on internet purchased items. States are losing tax dollars and veterinary online drug purchases creates approximately a ten percent disadvantage to veterinarians. Secondly, is the Higher Education Act to abolish student loan origination fees that is basically a tax on student loans and would like to see the reinstatement of the student loan subsidy lost in 2012 for professional students and all students beyond a bachelor’s degree. The AVMA supports increasing the Veterinary Medicine Loan Repayment Program (VMLRP) from the current $5 million to $6.5 million.

Next, Mark Lutschaunig reported on the Horse Soring bill that has a lot of support, but does not appear to be going anywhere this session, as well as, the Horse Transportation bill pertaining to not allowing decked transport of horses, which primarily relates to rodeo stock – already illegal for transport to slaughter. Finally, there is a bill to prevent animal crushing that the AVMA supports and primarily relates to chicks and dogs and the individuals who make videos of such acts. Gina also added they are looking ahead to the next Farm Bill and preparations need to start early to be prepared.

For the AAVMC, Kevin Cain reported they are the only group going to Congress specifically for the Veterinary Services Grant Program (VSGP) and the VMLRP. The AAVMC is partnering with about 20 different coalitions. Also, the NALHN requests were one of their requests for their Hill Day. This is the 50th year anniversary for AAVMC. The AFRI line in the President’s Budget is $350 million, which is about doubled, but most of that is mandatory spending. He reported both the Senate and House cannot agree on the budget, it is an election year, unless Congress gets action on bills done by June there may be little done until after the election, with a new President there are approximately 8,800 appointees (the President’s Silver Book) and there will be several appointee changes in Departments, and a lot of major bills may not be passed. Meeting with AVMA and AAVMC adjourned at 10:30 a.m.
The Committee next met with Food and Drug Administration (FDA) Center for Veterinary Medicine (CVM). Participants included Bill Flynn, Mike Murphy, Roxanne Schweitzer, and Diane Milazzo by phone. Center for Veterinary Medicine (CVM) staff provided an overview of their regulatory authority. CVM does not regulate veterinary biologics (which are regulated by USDA).

The CVM budget was reviewed. The FY2016 included $3.5 million for the Food Safety Initiative. Vet-Laboratory Investigation and Response Network (LIRN) laboratories are funded by this initiative. The initiative also included funds for the Food Safety Modernization Act. The CVM FY2016 budget included a $3.0 million reduction. CVM requested funds for the Combating Antimicrobial Resistant Bacteria (CARB) initiative but did not receive funding. FDA received CARB funding but money was not added to the CVM budget.

For the FY2017, the CVM is requesting a 5.7% increase. This would include $1 million for the CARB initiative and $2.2 million to support Animal Drug Review (evaluates pioneer drug products).

The CVM is focused on reducing inappropriate use of antibiotics. The CVM emphasizes appropriate and judicious use of antibiotics and is working on methods for evaluating this. Information on antibiotic use is gathered via a number of methods and the CVM is working on additional methods of evaluation, including ways to measure on-farm use data. The CVM is collaborating with the USDA on CARB issues, including potential to tap into the NAHMS program to collect information on on-farm antibiotic use data.

CVM will announce a call for proposals for collecting on-farm antibiotic use information.

CVM is working closely with pharmaceutical companies on compliance with the Veterinary Feed Directive (VFD). They are also distributing information, including education and technical assistance, to the general public, veterinarians and others via a variety of different routes.

CVM has an online question/answer system at askcvm@fda.hhs.gov. Questions are categorized and collated and trends in question queries are evaluated and addressed.

AAVLD Vet-LIRN participating laboratories are supportive of the Vet-LIRN program and appreciate the infrastructure funding.

FDA is working on cooperative agreement call for proposals for Food Safety Modernization Act (FSMA) training efforts. States are working on systems for conducting FSMA business. States will have options on conducting inspections and continual guidance will be released on FSMA regulations. FDA is operating a technical assistance network for education and outreach.

**Animal Agriculture Coalition**

The primary role of Animal Agriculture Coalition (AAC) is to advocate for federal funding that all members can support. Recent AAC activities include holding quarterly meetings with Food and Drug Administration (FDA), Center
for Veterinary Medicine (CVM) Deputy Commissioner Mike Taylor to discuss data collection strategies related to the topic of antibiotic resistance.

Combating Antibiotic-Resistant Bacteria (CARB), $1.1 million was authorized in the budget last year, but appropriation was only $700,000; the animal arm of APHIS received no funding last year; AAC lobbying for animal-based funding this year, but not optimistic; focus is on how/why antibiotics are used in U.S. agriculture rather than only what volume is used across a given sector – latter misrepresents the issue; NPPC is collaborating with poultry, bovine, swine sectors to evaluate this issue; NAHMS studies may serve as a vehicle for data collection since these results can be kept confidential – if this data collection method can be implemented soon enough, reports obtained before and after Guidance 213 implementation could be compared and conclusions could be drawn.

**Swine Influenza surveillance.** Pork industry is trying to secure new funding; current funds will be exhausted after this year; SIV surveillance program has served as a model for other disease surveillance programs; swine industry is trying to move away from "stovepipe" diagnostics and toward sample collection from each step in production process/decision of which tests to run would happen at the diagnostic laboratory level. Initially, the diseases being tested for would not change in order to adhere to the "don’t test until you know what to do with the results" rule of thumb.

**Swine disease testing.** In general, feral swine surveillance is important but must remain diligent about keeping this disease data separate from that of the U.S. domestic swine population; current challenge, only a handful of diagnostic laboratories across the country are testing for swine diseases, and resulting statistics may not provide an accurate national picture of emerging or foreign animal diseases (i.e. North Carolina diagnostic laboratory does not perform much swine testing even though it’s a significant industry in that state); important to ensure that SAHOs receive laboratory results in a timely manner.

**NAHLN messaging.** In 2002, industry bought into the National Animal Health Laboratory Network (NAHLN) system because all laboratories within the network would be able to communicate (bidirectional) seamlessly, but this has not happened to date. It’s important to fix this issue, and the initiative to do so is currently being led by the swine industry.

**Horse slaughter.** The general public is 85% opposed to this; American Horse Council is still split on the issue so it does not have a current position; there is no current push to ban this practice but the defunding mechanism has worked well to prevent it in the U.S.

**USDA-ARS**
Steven Schaffer and Cyril Gay

- **Budget:** FY17: 18 million increase ($1.16B from $1.14B for 2016)
- **3 priorities:**
  - Antimicrobial resistance - Combatting Microbial Resistance (CARB) – part of the President’s strategy
REPORT OF THE COMMITTEE

- Agencies involved: APHIS/FSIS/ARS/NIFA
- Microbial ecology – gut and ruen microbiome looking at feed efficiency and also resistance
- Alternatives to antibiotics
  - Climate change
  - Water availability / sustainability
- Details of budget:
  - FADs – 7M in budget (most to Plum Island, and subsequently to Kansas)
  - AI – 3M
- Capital Investment Strategy: priorities assigned to update infrastructure based on need
  - ARS fully funding modernization of Southeast Poultry Research Laboratory
- NBAF
  - Growth of 9 scientists to 20
  - Expansion of diseases to 7 classes of diseases
  - Will have BSL-4 capability
  - Biological development module (allows countermeasures for vaccine)
  - Entomology section for arboviral diseases
    - Zoonotic disease
    - Vector borne emergency
  - Construction compete in 2020, with expected occupancy in 2022 after certification
- Workforce for National Bio and Agro-defense Facility (NBAF):
  - The 7M for FAD will help hire and train prior to opening.
  - Will have capability to develop processes for mitigation/response to emergency threats that can be shared with commercial companies to scale up

ARS Action Plan:

7 components
1. Diagnostics
2. Vaccines
3. Biotherapeutics
4. Alternatives to antibiotics
5. Disease management systems
6. Animal disease models
7. Farm Biosecurity measures

Department of Homeland Security
The Committee next welcomed representatives from the Department of Homeland Security (DHS), including Marvin Meinders, Jamie Johnson, and Roxanne Brooks Motroni. They provided an update on progress with the
National Bio- and Agro- Defense Facility (NBAF). Construction is continuing, with continued funding support to move the project forward.

Other program updates were discussed including their agricultural defense programs, passive surveillance projects, foreign animal disease vaccine research, and other emergency preparedness exercises.

The Committee then recessed for the day, and resumed meetings on Wednesday, March 16 at the National Cattlemen’s Beef Association (NCBA) office. It was noted that the Washington D.C. metro system was closed this day, making travel difficult in the city.

FSIS

The meeting started at 8:30 a.m. at the National Cattlemen’s Beef Association (NCBA) office with introductions. Representing USDA-FSIS was Rachel Edelstein, Deputy Assistant Administrator, from the Office of Policy and Program Development who joined the meeting via a conference call. She reported they are the office that started the new program for inspections of Siluriformes, which includes catfish. She also reported they provide approval of international import equivalent issues, standards, and ingredient use.

Edelstein started with the reporting of new USDA-FSIS policies including:

- Food Safety Assessments (FSA) – FSIS has inspectors doing FSA’s at facilities and this will now involve Enforcement Investigation and Analysis Officers (EIAO) that do more focused food safety reviews through record reviews and observations of plant procedures and may conduct sampling. All reporting by inspectors and EIAO’s is through a new electronic reporting system. FSIS is using public health risk evaluation methodology, which is different than the FSA. From August 2015 through February 2016, they conducted 391 complete FSA’s. They also have the Incident Investigation Team (IIT) for use in an outbreak to supplement the FSA.

- Raw or partially cooked tenderized beef products – these products must now be labeled that they are mechanically tenderized, including the facilities name and validated cooking instructions. These will go into effect May 17, 2016. This rule was published because they saw numerous outbreaks (~6) since 2000. The primary products they are concerned about are steaks and roasts.

- Salmonella and Campylobacter standards for chicken parts, including comminuted chicken and turkey parts – hope to reduce salmonella illnesses about 50,000 per year through collection of more samples on a more frequent basis. The threshold standards for positives were provided.

REPORT OF THE COMMITTEE

- Beef products analysis – In 2014, sampling and testing for E. coli, Salmonella, and analyzing findings on ground beef products and trim.

- Salmonella standards - now transitioning from a 52-day collection of samples to a more routine weekly sampling and testing. In addition, looking at establishments and categorizing:
  - Category 1 – have one-half or less positives than the rest of the establishments
  - Category 2 – have more than one-half but are still meeting the standards
  - Category 3 – not meeting the standards

- HACCP validation changes – found many establishments have not validated their Hazard Analysis Critical Control Points (HACCP). Initial validation includes two components – scientific support and technical part of in plant validation by measurable data. Because some plants had not done this, it resulted in some of the outbreaks. As a result, FSIS issued new guidance May 14, 2015.

  A question was posed about small state licensed plants that new standards will not put small state plants out of business. Rachel said FSIS does recognize meeting the requirements by small processors and consider it sufficient if they meet the standards on one product rather than having to validate for every single one. In addition, FSIS is working on additional outreach through webinars before implementation in small processing facilities in April.

- New best practices guidance for controlling Listeria in retail – final version came out in June 2015 for food processing by retailers to prevent contamination through risk assessment (sanitation, prevention of cross contamination, temperature controls). Rachel reported 83% of cases associated with deli meats at retail.

- Record keeping regulations (December 2015) – all official establishments and retailers of ground beef must include an establishment and lot number, date and time of production of each lot, plus date and time equipment has to be cleaned and sanitized. Rule effective June 2016 and needed for traceability of product if there’s a problem.

- Non-ambulatory veal calves proposed rule – proposal to remove the provision to allow rest and to go to condemnation, euthanasia, and prompt disposal if non-ambulatory or disabled. She will send the rate of non-ambulatory to USAHA.

- Fish program update – catfish is defined as an amenable species by the Secretary. Ante-mortem and post-mortem inspection does not apply and custom and farm slaughter do not apply to fish per the 2008 Farm Bill. In 2014, the Farm Bill removed catfish, making it all Saliruforme fish and are now amenable species. On March 1, 2016,
FSIS inspectors at establishments killing fish and at processing plants, will be monitored on a quarterly basis to prevent misbranding of products; full enforcement to take place September 1, 2017. All other countries will need to meet USDA requirements.

There was a question on directive 10,010.2 on rationale for selling of product only to FSIS plants for a product that is labeled as adulterated and not being able to go to state approved plants with requirements at least equal to FSIS plants. This is a lower cost product and a competitive disadvantage to smaller state processing plants. This is a restricted use or contaminated product and as an agency they want to verify the product is adequately processed. FSIS can do this if it is Federal to Federal but not if Federal to State plants and they can access the records to verify. Meeting with FSIS adjourned at 9:30 a.m.

**USDA-NIFA**

The Committee next meet with USDA, National Institute for Food and Agriculture (NIFA). Danielle Tack joined the group in person, while Drs. Gary Sherman and Adele Turzillo joined by telephone.

- NIFA Fact Sheet 2016.pdf
- NIFA_FY2017_President’s_Budget.pdf
- NIFA 2-page 2017 budget table with animal highlights ver-final-1.docx

Danielle Tack, is new to NIFA and is working with the Veterinary Medicine Loan Repayment Program (VMLRP) and National Animal Health Laboratory Network (NAHLN) for NIFA and assisting Gary Sherman with the new Veterinary Services Grant Program (VSGP). Adele Turzillo, responsible for NIFA animal health and production portfolio that totals over $150 million currently, spoke on the following items:

- Reviewed the 2-page NIFA 2017 budget table that had been distributed electronically
- President’s proposal for Agriculture and Food Research Initiative (AFRI) includes an increase of $350M with $325M of that in mandatory funds
- NIFA recommended the Food and Agriculture Defense Initiative (FADI) line increase to $10M (any increase would be shared with the plant network and not just go to the NAHLN)
- Called the attention of the group to opportunities for animal agriculture in organic outreach.

Tack reported on the VMLRP:

- 2015: 137 applications (7 renewal), 49 offers (in 26 states), 48 awards (5 renewals) representing $4.5M in 24 states with new awardees and two states with renewals
- Cumulative: 996 applications, 340 offers, 285 awards (27 renewal) representing $30M.
Review of shortage area nominations from SVs set for week of March 21st with posting of results posted in early April

Program is looking at how to get the need area announcements out sooner to benefit potential applicants, especially fourth year vet students looking for first jobs post-graduation.

Gary Sherman provided the following updates:

Veterinary Services Grant Program (VSGP):

- $2.5M available that cannot be carried over – reason for the quick implementation with late initial appropriation for program and expiration of funding on September 30, 2016
- Many qualified entities under VSGP
- Two major parts of the program:
  - Rural Practice Enhancement Grants: veterinarians and veterinary entities for equipment, supplies, overhead, support staff salaries (animal health technicians (AHTs) in Designated Shortage Situations that are rural (all type 2 and some type 1); exact details on this still under development.
  - Education: non-degree programs/certificates, individual courses; can include registration costs.

AFRI Request for Applications (RFA) (coming in April):

- Explore new research initiatives funding “Transformative” includes disasters for the first time.
- Success rate has recently been 30% - normal for most NIFA initiatives is 8-10%.

NAHLN-NVSL

The group next welcomed Sarah Tomlinson to provide an overview of National Animal Health Laboratory Network (NAHLN) activities and initiatives. Several fronts are moving forward with the NAHLN in continuing their efforts in surveillance. Tomlinson shared a handout with participants.

USDA-APHIS-VS

The Committee next welcomed Jack Shere and several of the Veterinary Services (VS) leadership team to the meeting, with some joining by telephone.

Shere began the discussion with leadership transition – Shere is currently Acting Deputy Administrator for VS since replacing John Clifford. Shere’s vision for VS is to pursue to completion the VS reorganization goals with a focus on domestic issues and industry/state partnerships – reaffirm these in order to reach goals:

1. Put decision-making at lowest organizational level within VS
   a. recent sector meetings reflected this as Directors spoke rather than senior executives
2. Build stronger boots-on-the-ground resources
GOVERNMENT RELATIONS

a. VS has lost 200 employees since 2010 – workforce must be rebuilt in order to meet emergency response expectations
   i. personnel gaps will be selectively filled
   ii. employees will focus more on their particular area(s) of expertise vs. being expected to be “jacks of all trades”
   iii. some term hires will become full time employees of VS
   iv. succession plan will be put in place since >45% of VS workforce is eligible for retirement
   v. senior leadership positions will be filled from within whenever possible through implementation of the veterinary medical officers (VMO) careers program
      1. to be advertised in April 2016
      2. first class will consist of internal VMOs and new hires
      3. they will rotate through multiple diagnostic laboratories as well as other focus areas
   vi. scholarship programs
      1. Saul T. Wilson – most recipients are not in VS leadership positions; retention rate is 60%
      2. Daniel E. Salmon – professional development of non-veterinarians (ex-administrators and AHTs) for leadership positions in those areas
      3. 1890 – program directed toward African American veterinarians
      4. Internships

3. Emergency preparedness/select agent
   a. First time a budget initiative has been put forward focusing on this – current version of the President’s budget has a new emergency preparedness line item without an offset
   b. Select agents will receive new focus – if funding received, VS will work on rebuilding select agent program support
   c. Select agent proposed rule – recommends removal of Brucella spp. – comment period deadline is March 25, 2016.

NAHLN messaging – a successful outcome is possible, but all parties (laboratories, states, etc.) have to agree how funding will be utilized; determining an actual budget line item amount is important and would be helpful; system has to be applicable for all scenarios and expandable if it is to be funded by federal money.
Highly Pathogenic Avian Influenza (HPAI) testing at National Poultry Improvement Plan (NPIP) laboratories – industry is interested in being able to do this; Shere has told industry that they have to define their plan for this in order for it to be considered (current “plan” too ambiguous) – industry is working on this, will vote on it at the annual NPIP conference, will introduce a resolution at annual USAHA meeting, and will ensure that poultry industry members are there to vote in favor of it. Important to have quality assurances in place for all regulatory disease testing; discussions on this issue must involve industry, VS, states and laboratory diagnosticians.

VS budget – 2016 budget is at least level funded and might be slightly higher; CA funding will not be cut this year; budget highlights include:
1. VS pilot project of leasing vehicles rather than purchasing them
2. 2016 aquatic animal health is level funded from 2015
3. Avian health - $55.34 million in 2016; will be $55.59 million in 2017
   a. All FAD PReP documents related to HPAI have been amended to reflect the difference between indemnity (only paying for birds) and compensation (paying for everything else – cleaning and disinfection (C&D), depopulation, etc.)
4. Cattle health – 2017 proposed is increased by $500,000 over 2016
   a. May 16, 2015 is deadline for TB/Brucellosis proposed rule comments
5. FMD vaccine bank
   a. cost of antigen has gone up considerably
   b. VS would like to increase the National Veterinary Stockpile (NVS) budget line item from $1.4 million to $2.8 million (Mexico and Canada also planning to double their funding support)
   c. VS wants to store vaccine products with the manufacturers and rotate stock five years.

2015 USAHA Resolution 13 – publish final scrapie rule in 2016. Alicia Naugle stated that comment period is closed and they are working to get it out as soon as possible.

Combating Antibiotic-Resistant Bacteria (CARB) – VS has plans in place to meet President’s objectives, but without adequate funding, difficult to implement; going forward, National Animal Health Monitoring System (NAHMS) studies will serve as a vehicle to collect data; ideally VS would prefer to do continuous surveillance rather than complete point surveys only, as the former will better enable accurate conclusions to be drawn; must evaluate the links between usage data, health events on those same farms, and resistance trends in order for accurate conclusions to be reached.

Resolutions 6 and 14 – USDA should electronically capture identification (ID) on imported Mexican horses in a searchable database; standard operation procedure (SOP) has been developed for capture; import center staff currently being trained; implementation of training/SOP at U.S. border
ports will occur summer 2016; no additional equipment is needed and it will be done for all international imports, not just those from Mexico.

Bluetongue virus (BTV) – global range has been expanding since 1990s; currently there is no domestic strategy for disease management, which makes international/export policy development difficult; VS is in process of developing a surveillance plan.

The Johne’s program was discussed, however currently there is no money allocated and no current plans to bring it back. Any changes to this path should be driven by the industry.

The Committee was adjourned following the presentations from APHIS-VS.
REPORT OF COMMITTEE ON IMPORT, EXPORT AND INTERNATIONAL STANDARDS

Chair: Dr. Linda C. Glaser
Vice Chair: Dr. Mo Salman

Bobby Acord, NC; Celia Maria Antognoli, CO; Mohit Baxi, ON; Bob Bokma, MD; Joyce Bowling-Heyward, MD; Charles Brown II, WI; Stan Bruntz, CO; Bruce Carter, IA; Rod Chitty, IA; John Clifford, DC; Karen Conyngham, TX; Michael David, MD; Ron DeHaven, CA; Ignacio dela Cruz, MP; Jacques deMoss, MO; Adis Dijab, AL; Larry Elsken, IA; Conrad Estrada, VA; Anna Claire Fagre, CO; William Fales, MO; John Fischer, GA; Katherine Flynn, CA; Mallory Gaines, CO; Julie Gard, AL; Donna Gatewood, IA; Cyril Gay, MD; Paul Gibbs, FL; Linda Glaser, MN; Gail Golab, IL; Tony Good, OH; Kristin Haas, VT; Keith Haffer, SD; Percy Hawkes, UT; Rick Hill, IA; Robert Hilsenroth, FL; Donald Hoenig, ME; Dudley Hoskins, VA; Brad Hoxit, NC; Marv Jahde, KS; Annette Jones, CA; Susan Keller, ND; Bruce King, UT; Elizabeth Lautner, IA; Randall Levings, IA; Linda Logan, TX; Travis Lowe, MN; Kevin Maher, IA; Bret Marsh, IN; Brittany McCauslin, NZ; Shirley McKenzie, NC; Sara McReynolds, ND; David Meeker, VA; Emily Meredith, VA; Antone Mickelson, WA; Gay Miller, IL; Eric Mohlman, NE; Sandra Norman, IN; Kristen Obbink, IA; Kenneth Olson, IL; Elizabeth Parker, TX; William Pittenger, MO; John Ragan, VA; Tim Richards, HI; Paul Rodgers, WV; James Roth, IA; Mo Salman, CO; David Scarfe, IL; Travis Schaal, IA; Shawn Schafer, OH; Charly Seale, TX; Laurie Seale, WI; Sheryl Shaw, WI; Rosemary Sifford, NC; Kathryn Simmons, DC; Jonathan Sleeman, WI; Fred Soltero, PR; Matthew Stone, NZ; Manoel Tamassia, NJ; Susan Tellez, TX; Peter Timoney, KY; Alberto Torres, AR; Paul Ugstad, NC; Charles Vail, CO; Mark Walter, PA; James Watson, MS; Patrick Webb, IA; Roger Weigle, WI; Richard Willer, HI; Brad Williams, TX; Mary Anne Williams, TX; William Wilson, KS; Josh Winegarner, TX; Nora Wineland, MO; David Winters, TX; Richard Winters, Jr., TX; Cindy Wolf, MN.

The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel, Greensboro, North Carolina from 12:30 to 5:45 p.m. There were 34 members and 22 guests present. Dr. Linda Glaser unfortunately could not attend the meeting in person but she was on the phone for the entire meeting. Dr. Don Hoenig supported the organization of the meeting. Appendix A depicts the agenda for the meeting. Presentations and reports are summarized below; some of the presentations as per agreement with the speakers are included as attachments.

Summary of 2016 OIE General Session

John Clifford, USDA-APHIS-VS; World Organization for Animal Health (OIE)

Dr. John Clifford presented the outcome from the 84th General Session of the OIE which was held May 22-28, 2016, in Paris, France. Clifford indicated that there were 144 of the 180 OIE Member countries and territories, as well as observers from 41 regional and international
IMPORT, EXPORT AND INTERNATIONAL STANDARDS

organizations attended the meeting. There were close to 800 registered attendees. The OIE is the body recognized by the World Trade Organization (WTO) for standard-setting in animal health. The OIE develops and establishes the health standards for the safe trade of animals and animal products and makes recommendations for the overall well-being of animals.

The Delegation from the United States for the 84th OIE General Session was the highest number in the history of participation of USA in OIE. Members of the U.S. delegation attending the 84th General Session from USDA/APHIS were:

- Dr. Jack Shere, Chief Veterinary Officer, and Deputy Administrator, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)
- Dr. John Clifford, Chief Trade Advisor, and U.S. OIE Delegate, USDA-APHIS-VS
- Dr. Michael David, National Director, National Import Export Services (NIES), International Animal Health Standards Services, USDA-APHIS-VS
- Dr. Beverly Schmitt, Director, National Veterinary Services Laboratories (NVSL), USDA-APHIS-VS, and President of the OIE Biological Standards Commission
- Dr. Mark Davidson, Associate Deputy Administrator, NIES-USDA-APHIS-VS
- Dr. Jacek Taniewski, Director, Export Animals, NIES-USDA-APHIS-VS
- Dr. Karen Sliter, Regional Manager, APHIS, International Services, Brussels, Belgium

Representatives attending from other U.S. government agencies were:

- Dr. Bettye Walters, Office of the Director, International Programs, Center for Veterinary Medicine, U.S. Food and Drug Administration
- Dr. Michelle Colby, Agricultural Defense Branch Chief, Science and Technology Directorate, Department of Homeland Security (DHS)

Association and industry representatives who accompanied the U.S. delegation were:

- Dr. Boyd Parr, President-elect, U.S. Animal Health Association (USAHA)
- Dr. Patrick Halbur, President-elect, American Association of Veterinary Laboratory Diagnosticians (AAVLD)
- Dr. Paul Sundberg, Executive Director, Swine Health Information
- Dr. Elizabeth Parker, Chief Veterinarian, Institute for Infectious Animal Diseases
- Dr. Kathy Simmons, Chief Veterinarian, National Cattlemen’s and Beef Association (NCBA)
REPORT OF THE COMMITTEE

- Dr. Liz Wagstrom, Chief Veterinarian, National Pork Producer’s Council
- Dr. Gail Golab, Chief Advocacy and Public Policy Officer, American Veterinary Medical Association (AVMA)
- Dr. Jamie Jonker, Vice-President, Scientific and Regulatory Affairs, National Milk Producers Federation
- Dr. Guillermo Zavala, Director of Veterinary Services, USA Poultry and Egg Export Council

The President of the World Assembly, Dr. Bothe Michael Modisane, welcomed the OIE delegates, invited ministers, representatives from international organizations and other guests to the 84th General Session. Dr. Modisane stressed that the four pillars of the 6th Strategic Plan – solidarity, standards development, transparency, and scientific rigor – were being taken from concepts and principles into action and implementation.

Two international organizations (the World Farmer’s Organization and the European Commission), Ministers of Agriculture and other high level officials from several of the Member countries (France, Bolivia, Botswana, Guinea, Ghana, Nepal, Namibia, Russia, China, Jordan, Pakistan, Panama, Kenya, Turkmenistan and Canada) were invited to attend the opening ceremonies and share some remarks.

Dr. Monique Eloit, Director General of the OIE, highlighted both the administrative and technical activities of the organization during the 2015 calendar year. She described her plans to implement the four core pillars of the 6th Strategic Plan. For the pillar on Standards and the pillar on Scientific Expertise, Dr. Eloit wants the OIE to develop clear and rigorous procedures for selecting candidates to serve both on the OIE Specialist Commissions and on the various technical ad hoc Groups that are convened. The OIE wants to establish a pool of experts that would include not only those available from existing Reference Centers, but also from universities and other institutions. For the pillar on Transparency, the OIE recognizes that it needs to provide better access to the available data in the World Animal Health Information System (WAHIS) system, and to better use (analyze) such data thus making it more useful. In addition, the OIE will seek to establish an e-learning platform to train focal points on-site on the effective and appropriate use of the WAHIS system. The OIE also plans to reconsider how the existing information on its web site and on its paper publications can be more accessible and useful. Finally, for the pillar on Solidarity, the OIE wants to optimize the use of existing technologies to enhance the role of the Regional Commissions, further develop the Performance of Veterinary Services (PVS) tool such that it can also be used by any Member country for self-evaluation, revisit its policies to improve equity of vaccines availability (FMD, PPR and rabies), and maximize and strengthen its relationship with the various (70+) international and regional organizations with which it has an agreement for mutual benefit.
Two technical items were presented at this year’s General Session. The first Technical Item presented was:

1. **Economics of Animal Health: Direct and Indirect Costs of Animal Disease Outbreak.**  
   *(Presented by Dr. Jonathan Rushton)*

This presentation was based on responses to an OIE questionnaire/survey sent out to all the Member country delegates. The results of the survey indicated an interest of Member countries to use economics in animal health, however, data is very sparse to conduct any meaningful analysis. The presenter concluded that this gap in data needs to be corrected so that good economic analysis can be done and provide greater value to animal health decision making. To correct this gap, he recommended that:

- Veterinary education, at all levels, include training on the use of economics in animal health and welfare;
- A pilot project be done to estimate the global burden of animal diseases;
- A pilot project be done to collect and summarize data on the costs of national veterinary services.

The Second Technical Item presented was:

2. **Combating Antimicrobial Resistance (AMR) through a One-Health Approach: Actions and OIE Strategy** *(Presented by Jean-Pierre Orand)*.

The presenter noted the threat that AMR presents to both public and animal health, and stressed the need to address the concern through a One-Health approach – the responsible and prudent use of antibiotics requires a collaborative and concerted effort by both animal and human health authorities. Several recommendations were made by resolution including that the OIE continue working closely with the World Health Organization (WHO) and Food and Agriculture Organization (FAO) through a One-Health approach, the OIE provide guidance on alternatives to the use of antimicrobial agents, and the OIE continue to promote the responsible and prudent use of antimicrobial agents.

The Head of the OIE Animal Health Information Department presented the most significant animal health events occurring during 2015. The Web-based system for disease notification — or WAHIS — provides the platform for reporting animal disease events. All OIE animal health information reported by Member countries is available through the OIE database known as the WAHID (World Animal Health Information Database). The Head of the Department noted some trends on the following four terrestrial animal diseases:

- Lumpy skin disease (LSD) – the disease is spreading from southern parts of the world north towards Europe. It was observed that climate
change may be a predictor of the spread of vector borne diseases such as LSD.

- Blue tongue virus (BTv) – 24% of the Member countries reported at least one serotype of BTv.
- Highly pathogenic avian influenza (HPAI) – 23% of Member countries reported at least one event of HPAI during 2015.

Dr. Clifford then indicated his role in APHIS-VS after he had stepped down as the APHIS Deputy Administrator for VS. He maintained his role as the U.S. delegate to OIE and coordinates USDA activities with OIE as well as promoting U.S. agriculture international trade through enforcement of the trade rules.

Transboundary Risk of Disease Spread by Feed Ingredients- A Proposed Model
Scott Dee, Pipestone Applied Research

Dr. Dee, Director of Pipestone Applied Research (PAR), a business unit which conducts collaborative research efforts with production companies across North America comprising approximately 1.5 million sows, presented a model to be used for assessing the risk of transboundary diseases through feed ingredients. This research project is conducted with a team of researchers from various institutions as presented with the following names: Gordon Spronk (Pipestone Applied Research, Pipestone Veterinary Services, Pipestone, MN), Eric Nelson (Diego Diel, Travis Clement), Aaron Singrey, Fernando Bauermann, Michele Mucciente, Jane Hennings (Animal Disease Research and Diagnostic Laboratory, Department of Veterinary and Biomedical Sciences, South Dakota State University, Brookings, SD), Cassandra Jones, Roger Cochrane (Department of Grain Science, Kansas State University, Manhattan, KS), and Gilbert Patterson (Department of Veterinary Public Health and Preventative Medicine, University of Minnesota, St. Paul, MN). The aims of this project are: 1) to model if foreign animal diseases could survive in feed ingredients shipped from Asia to the USA; 2) evaluate whether two potential chemical compound to be used for mitigation to reduce risk. The project is built on the Swine Health Information Center pathogen matrix, ten foreign animal diseases (FAD) viral pathogens were identified as significant risks to the U.S. swine industry. Due to the inability to work with these actual agents, we used “surrogate viruses”, which allowed us to study closely related and structurally similar viruses, but not the actual FAD pathogens. The designated FAD and the selected surrogate were as follows: food-and-mouth disease virus (FMDV), Seneca virus A, classical swine flu virus (CSFV), bovine virus diarrhea virus, pseudorabies virus (PRV), bovine herpesvirus-1, African swine flu virus (ASFV), vaccinia virus, Nipah virus, canine distemper virus, swine vesicular disease virus, porcine enterovirus, vesicular exanthema virus, and feline calici virus. Other selected pathogens (porcine reproductive and respiratory syndrome virus (PRRSV) 174, porcine circovirus type 2 (PCV2) and vesicular stomatitis virus did not require surrogates. Using a model previously validated to study the risk of
contaminated feed ingredients for the transboundary spread of porcine epidemic diarrhea virus (PEDV) (Dee et al. 2016), we selected feed ingredients known to be imported from China to the USA based on the U.S. Government Harmonized Tariff Schedule (hs.usitic.gov). These included organic and conventional soybean meal, soy oil cake, distiller's dried grains with solubles (DDGS), lysine, choline, vitamin D, pork sausage casings, and several pet foods (dry and moist). Ingredients were inoculated with representative surrogates (5g ingredient and 100 uL virus). Controls consisted of complete feed inoculated with surrogate or saline (negative control) as well as stock virus alone (positive control) in the absence of feed matrix. The design involved non-treated control ingredients, along with two mitigants: SalCURB-treated ingredients and MCFA-treated ingredients. These samples were then incubated in an environmental chamber for 37 days programmed using actual temperature and percent relative humidity ata recorded during a journey from China to the U.S. (Beijing to Shanghai to San Francisco to Des Moines) in December 2012 through January 2013 (SeaRates.com). Samples were tested by polymerase chain reaction (PCR), virus isolation (VI) and bioassay for porcine surrogates or on primary cells for surrogates of non-porcine origin at two days Post Inoculation (DPI) (Beijing), 8 DPI (Shanghai), 25 DPI (San Francisco) and 37 DPI (Des Moines) to represent specific points in the model.

Dr. Dee reported the progress from the initial stage of this project. Testing of the FMDV, CSFV and PRV surrogates has been completed. Preliminary data indicate the survival of the FMDV surrogate variable analysis (SVA) and the PRV surrogate (BHV-1) at all points during the 37 day shipping period from China and into the U.S. Both surrogates survived in conventional soybean meal and soy oil cake, while SVA also survived in lysine, pet food, Vit D, complete feed and casings. Both positive controls (SVA and BHV-1 stock virus) did not survive. In contrast, the CSFV surrogate (BVDV) appeared to be less stable and did not survive the 37-day journey, independent of ingredient. It did, however, survive until the samples theoretically entered the port of San Francisco (25 DPI) in conventional soybean meal and moist dog food.

Dr. Dee indicated that under the conditions of this study, these preliminary results suggest that contaminated feed could serve as vehicles for FAD introduction to the U.S., supporting our previous results which focused on PEDV. Phase 2 has begun, consisting of surrogates for ASFV, vesicular exanthema virus and Nipah Virus along with PRRSV.

Reference:

FDA and APHIS Regulations Associated with the Import of Animal Feed, Ingredients, and Feed Containers
Mike Murphy, Food and Drug Administration (FDA)
Dr. Murphy, presented the role of FDA and APHIS in regulating the animal feed and ingredients. Regulation of Animal Feed is mainly under the FDA role as part of the Federal Food Drug and Cosmetic Act (FFDCA). The FDA regulates feed under the adulteration and misbranding provisions of the FFDCA (Sec 402 and 403) -- the feed is to be safe and properly labeled. FDA cooperates with the states individually, and via the Association of American Feed Control Officials (AAFCO). Now approximately seventy percent of FDA’s feed inspections are performed by state agencies through contracts, partnerships and cooperative agreements. There are 4,962 feed mills not licensed by FDA (this number includes many ingredient manufacturers); 882 medicated feed mills licensed by FDA; 530 pet food manufacturers, 264 renderers, 209 salvagers, 996 human food processors (this number also includes some ingredient manufacturers). The American Feed Industry Association (AFIA) estimates 183 million tons total feed produced in the U.S. in 2015 (or roughly 7.3 million semi-truck loads of product).

Feed inspection work is done by FDA and state personnel. Currently about 350 FDA and 400 state personnel doing feed inspections for FDA. Few are full-time feed inspectors. State inspections, if done for FDA, usually done under FDA authority and process. Work is tracked by FDA. State feed control programs do a great deal of other work under their own authority, to meet their own objectives. Foreign Inspections for the feed program are only conducted in a small number of foreign inspections under our work plan. These foreign facilities may be inspected for cause.

**APHIS Update on the risk assessment for the importation of fetal bovine serum:**

Adis Dijab, USDA-APHIS-VS

Dr. Dijab, presented the role of APHIS in the importation of various animal products. The Foreign Animal Diseases of NIES is concerned that affect trade due to the following diseases: bovine spongiform encephalopathy (BSE), Newcastle disease (ND), highly pathogenic avian influenza (HPAI), African horse sickness (AHS), foot-and-mouth disease (FMD), classical swine fever (CSF), swine vesicular disease (SVD), and African swine fever (ASF). The agencies involved are: USDA-APHIS-VS-NIES, U.S. Customs and Border Protection (CBP), U.S. Food and Drug Administration (FDA), U.S. Fish and Wildlife Service (FWS), USDAAPHIS Plant Protection and Quarantine (PPQ), and USDA Food Safety Inspection Service (FSIS). The USDA-APHIS-VS-NIES regulates importation of certain animal origin materials into the U.S. Authority taken from 9 CFR. The CBP Agricultural Specialists enforce APHIS-VS-NIES import regulations at ports of entry. In addition, documents are reviewed and inspected. Some animal products are not regulated; USDA-APHIS-VS-NIES does not regulate the animal feed containers. Commercial shipments require a valid VS Import Permit and associated foreign government zoo-sanitary certificate. Permit restrictions and associated zoo-sanitary certifications are based upon the material type.
IMPORT, EXPORT AND INTERNATIONAL STANDARDS

(meals, offals, etc.), species of origin, and country of origin/processing. Vast majority of permits require the ingredients to be heat treated prior to importation to mitigate for diseases of concern.

Foreign facilities producing/handling rendered material (“meals”, digests, hydrolysates) require an annual inspection to demonstrate absence of comingling with prohibited material. The presentation can be found on the Committee page at www.usaha.org.

Dr. Dijab showed some brief statistics on animal feed ingredient import permits:

- 260 commercial import permits for animal feed ingredients
- 25% of permits are for ingredients from Australia/New Zealand
  - this source is >80% of ruminant meal permits
- 33% of permits are for ingredients from Canada
  - Non-ruminant rendered material
  - Offals (non-rendered) of all species
- 15% of permits are for ingredients from South America
  - Mainly fish/shellfish meal
- 15% of permits are for ingredients from the E.U.
  - Fish/shellfish meal, avian, porcine ingredients
- 4 active permits for ingredients from China

The European Union’s Measures to Control African Swine Fever and the Spread of Lumpy Skin Disease
Francisco Reviriego, European Commission

Dr. Reviriego presented a comprehensive detail of the current situation of African swine fever (ASF) and lumpy skin disease (LSD) including the most current history of these two diseases with introduction to the E.U. The presentation can be found on the Committee page at www.usaha.org.

Global Health Security Agenda – Impacts on U.S. Livestock Health from APHIS perspective
Joseph Annelli, USDA-APHIS-VS-SPRS

Dr. Annelli presented the outline of the global health security agenda (GHSA) and the role of APHIS and national animal health program in this initiative. The presentation can be found on the Committee page at www.usaha.org.

Report on Global ASF Research Alliance Workshop in September 2016
Luis Rodriguez, USDA-ARS

Dr. Rodriguez, reported on the most recent workshop of the Global African Swine Fever (ASF) Research Alliance that was conducted in September 2016. The presentation can be found on the Committee page at www.usaha.org.
Economic Impact of Foreign Animal Diseases in North America:
Stephanie Shwiff, USDA-APHIS, National Wildlife Research Center (NWRC)
Dr. Shwiff, presented an economic model to estimate the impact of foreign animal diseases in North America. The presentation can be found on the Committee page at www.usaha.org.

Outcome of National Assembly FMD Vaccination Strategy Forum
Susan Keller, North Dakota Board of Animal Health
Dr. Keller summarized the outcome from the discussion at the National Assembly (NA) on the availability of foot-and-mouth disease (FMD) vaccine for the USA in case an outbreak is reported. The message was clear that there is a full agreement among the State Veterinarians for building reliable and practical FMD control strategy if the virus is introduced to the USA. The strategy should include sufficient vaccine bank with the ability to apply the vaccine in effective way.

Committee Business:
Two resolutions were presented for approval by the committee members. The first resolution is related to the importation of cervids from Manitoba, Canada. The second resolution is to endorse the increased funding in the 2017 federal budget for USDA to support an optimized foot-and-mouth disease (FMD) vaccination bank. Both resolutions were passed without any negative vote. The two resolutions can be found in the Committee on Nominations and Resolution report.

The committee approved the adoption of a new name for this joint committee to reflect the mission below. The new name is Global Animal Health and Trade (GAHT).

The modified mission was discussed by the committee members through email messages during the last few months is “The purpose of this committee is to contribute to both the USAHA and AAVLD in international trade and its link to the health aspects of livestock and their production by: educating and creating an awareness among the membership of these organizations on key global, animal health and trade issues; proactively identifying critical issues in the international arena; enhancing the organization’s understanding, response, and decision-making ability in these areas; and, enabling both organizations to more effectively use this information to improve their strategies, operation, and, ultimately, improve global animal health and security. The ultimate goal from these activities is to foster dialogue and cooperation with and between members of the private sector of the livestock industries, U.S., and state government regulatory officials, and the scientific community, on the problems and opportunities in the global trade of livestock and their products.”

The meeting was adjourned at 5:45 p.m.
REPORT OF THE USAHA COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS

Chair: Dale Grotelueschen, NE
Vice Chair: Patrick Long, OR

Helen Acland, PA; Chris Ashworth, AR; Danelle Bickett-Weddle, IA; Charlie Broaddus, VA; Charles Brown II, WI; Beth Carlson, ND; Karen Conyngham, TX; Stephen Crawford, NH; Susan Culp, TX; Bud Dinges, TX; Edward Dubovi, NY; Roger Dudley, NE; William Edmiston, TX; Anita Edmondson, CA; James England, ID; James Evermann, WA; Kent Fowler, CA; Robert Fulton, OK; Donna Gatwood, IA; Timothy Goldsmith, MN; Dale Grotelueschen, NE; Keith Haffer, SD; Thomas Hairgrove, TX; Rod Hall, OK; Timothy Hanosh, NM; Percy Hawkes, UT; Carl Heckendorf, CO; Linda Hickam, MO; Dennis Hughes, NE; David Hunter, MT; Annette Jones, CA; Paul Jones, AL; Bruce King, UT; Diane Kitchen, FL; Randall Larson, IA; John Lawrence, ME; James Leafstedt, SD; Scott Leibsle, ID; Rick Linscott, ME; Coleman Locke, TX; Pat Long, NE; Janet Maass, CO; Chuck Massengill, MO; Patrick McDonough, NY; Shelley Mehlbacher, VT; Emily Meredith, VA; Mendel Miller, SD; Richard Mock, NC; Igor Morozov, KS; Peter Mundschenk, AZ; Sherrie Nash, MT; Cheryl Nelson, KY; Kathleen Orloski, CO; Elizabeth Parker, TX; Jeanne Rankin, MT; Grant Rezabek, OK; Tim Richards, HI; Julia Ridpath, IA; Jonathan Roberts, LA; Keith Roehr, CO; Michael Sanderson, KS; Bill Sauble, NM; Dennis Schmitt, MO; Kathryn Simmons, DC; Ben Smith, WA; Justin Smith, KS; Diane Stacy, LA; Nick Striegel, CO; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Susan Tellez, TX; Robert Temple, OH; Brad Williams, TX; William Wilson, KS; Cindy Wolf, MN.

The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 12:30-5:30 p.m. There were 20 members and 53 guests present. A meeting overview, including the mission statement of the Committee, housekeeping and resolution instructions were covered at the beginning of the session. Members and guests present introduced themselves.

Presentations and Reports

BVD Subcomittee Report
Julia Ridpath, NADC-ARS-USDA

This presentation included an update on Hobi-like virus and its prevalence as well as a brief review of recent peer reviewed publications. Studies suggest use of present BVDV vaccines may not result in cross protection against Hobi-like virus for cattle. An update focused on a CVB memo regarding immune suppression concerns related to BVDV vaccines was presented.

Fetal bovine serum biosecurity continues to be an issue. Further activity to address these concerns was discussed.
Recap of NIAA BVD Forum
Robert Stout, Kentucky Department of Agriculture

Bovine Viral Diarrhea (BVD) affects all segments of the beef and dairy industries and presents a variety of challenges to producers. NIAA dedicated an entire day at its 2016 annual meeting to address various aspects of BVD. A panel of seven individuals presented on subjects ranging from science to economics to regulation. Highlights from the forum were presented to the committee.

Trichomonas Subcommittee Report
Carl Heckendorf, Colorado Department of Agriculture
Bud Dingess, Texas A&M University

This report included a review of previously held discussions at the Subcommittee meeting and included information about the subsequent presentations in the Committee meeting. Discussions about a possible interlaboratory comparison focused on sample pooling test results were presented. Plans are currently not in place to carry out this proposal.

2016 T. foetus Interlaboratory Comparison
Tim Hanosh, New Mexico State University
Suzanna Leckman, Rocky Mountain Regional Laboratory

With the absence of Federal oversight or a National Trichomonas Standardized Proficiency, there is a continued interest from the Western States Livestock Health Association (WSLHA) to assess the consistency between laboratories in their ability to detect T. foetus in cattle. An interlaboratory comparison was first conducted in 2014 between 18 laboratories from 16 states. In 2016, a second interlaboratory comparison was conducted between 21 laboratories. Laboratories tested In-Pouch panels consisting of 20 samples created by Biomed Diagnostics. After testing, laboratories were asked to voluntarily provide information such as temperature upon arrival, incubation time before processing, extraction method and polymerase chain reaction (PCR) method. Sixteen of the 21 laboratories provided this information. Pouches were inoculated with smegma to simulate a field sample. Ten of the 20 pouches were inoculated with concentrations of 10, 50, 100, 200 and 1000 cells in duplicate pouches. Panels were shipped overnight to receiving laboratories. Of the 21 laboratories that received pouches, seven laboratories identified all positive pouches as PCR positive; 13 laboratories identified all but one of the positive samples as PCR positive and 16 laboratories identified 8 out of 10 positive pouches as PCR positive. This interlaboratory comparison demonstrates a positive step towards open dialog and collaboration among Trichomoniasis’s laboratories and state animal health officials.
Alternate Diagnostic Sampling Technique for Tritrichomonas Foetus in Cattle
Grant Dewell, Iowa State University

The presentation included a review of general sampling techniques including scraping, brushing, washing and swabbing. Presentation discussed challenges associated with diagnostic sample collection for *Tritrichomas Foetus*. A new sample collection technique was presented along with changes required to accommodate this new technique with presentation of previously published data validating use of 16 ply gauze sponge applied to the penile surface and placement into transport media pouches. Also discussed was laboratory handling of the resulting sample.

Results from the NAHMS Dairy 2014 Study
Jason Lombard, NAHMS

The presentation highlighted important issues in the U.S. dairy industry and covered multiple topics addressed during USDA’s National Animal Health Monitoring System (NAHMS) Dairy 2014 study. The study was conducted in the Nation’s top 17 dairy States and included information from over 1,200 dairy operations. Topics included 1) Use of veterinarians, 2) Antimicrobial use, 3) Cow evaluation component that included lameness scoring, hock scoring, and body condition scoring, 4) Milk/milk filter and fecal testing for foodborne pathogens, including *Salmonella*, *Listeria*, and *Campylobacter*, and 5) An 18-month longitudinal study focused on preweaned heifer calves.

Update on Plans for NAHMS 2017 Beef-Cow/Calf
Jason Lombard, NAHMS

This presentation included a history of beef cattle cow/calf and feedlot studies, a study process review, results and resulting priorities of needs assessment surveys, objectives for the 2017 study, as well as timelines for the NAHMS 2017 Beef-cow/calf study.

NAHMS Bison 2014 Study
Kathe Bjork, USDA-APHIS-VS STAS, CEAH
Margaret Parker, Kelly A. Patyk, Steven Sweeney, Center for Epidemiology and Animal Health, USDA-APHIS

Summary:

In 2014, the U.S. Department of Agriculture National Animal Health Monitoring System (NAHMS), with assistance from the National Agricultural Statistics Service (NASS), conducted the first national study of health and management practices used on U.S. ranced-bison operations. The study was conducted to acquire baseline information in response to industry concerns about *Mycoplasma bovis* in ranced-bison herds. The study questionnaire was developed with stakeholder participation and consisted of seven sections focusing on inventory, additions, removals, and death loss;
operation management; biosecurity; reproduction; diseases, parasites, and health management; disease testing practices; and outreach.

The questionnaire was mailed to 2,886 operations across all 50 states; the response rate for this mail-only questionnaire was 29.6%. Many operations had multiple reasons for raising bison. Nearly 70 percent (69.3 percent) of all operations were involved in bison cow-calf production. Approximately one-third raised bison for seedstock production (37.2 percent) or kept bison as a hobby or pasture pet (34.4 percent). Other reasons for raising bison included feedlot (15.8 percent of operations), agritourism/ecotourism (15.7 percent), and conservation (14.4 percent).

Health problems present in bison on operations included internal parasites (19.0 percent of operations), diarrhea (13.3 percent), problems with being off feed/weight loss (9.2 percent), eye lesions (8.2 percent), and pneumonia/respiratory problems (6.3 percent). Primary causes of death included parasitism (5.3 percent of operations), other respiratory illness/pneumonia (4.3 percent), digestive illness (2.0 percent), malignant catarrhal fever (0.9 percent), and Mycoplasma bovis (0.7 percent). Additional results on health management and biosecurity practices will be presented. The study was conducted by NAHMS under its designation as a statistical unit under the Confidential Information Protection and Statistical Efficiency Act.

Committee Business

A motion was made and passed unanimously to approve the bovine viral diarrhea virus (BVDV) and Tritrichomonas Subcommittee reports.

Resolution proposal: Laboratory Approval for Regulatory Diseases
A motion, as amended was passed unanimously to support the proposed resolution as amended. Changes are reflected in the final resolution.

The meeting was adjourned.
Helen Acland, PA; Sara Ahola, CO; Joyce Bowling-Heyward, MD; Becky Brewer-Walker, AR; Charlie Broaddus, VA; Stan Bruntz, CO; Craig Carter, KY; Stephen Crawford, NH; Wendy Cuevas-Espelid, GA; Susan Culp, TX; Glenda Davis, AZ; Brandon Doss, AR; Edward Dubovi, NY; Roger Dudley, NE; Dee Ellis, TX; William Fisch, FL; Katherine Flynn, CA; Rusty Ford, KY; Kent Fowler, CA; Tony Frazier, AL; Robert Gerlach, AK; Paul Gibbs, FL; Nita Grause, IA; Kristin Haas, VT; Rod Hall, OK; Steven Halstead, MI; Timothy Hanosh, NM; Greg Hawkins, TX; Carl Heckendorf, CO; Michael Herrin, OK; Linda Hickam, MO; Russell Iselt, TX; Marv Jahde, KS; Beth Johnson, KY; Bruce King, UT; Don Knowles, WA; T.R. Lansford, TX; Donald Lein, NY; Chuck Lewis, IA; Mary Lis, CT; Kevin Maher, IA; Scott Marshall, RI; Patrick McDonough, NY; Barry Meade, NC; Linda Mittel, NY; Kenton Morgan, MO; Peter Mundschenk, AZ; Lee Myers, GA; Alecia Naugle, MD; Cheryl Nelson, KY; Jeffrey Nelson, IA; Sandra Norman, IN; Eileen Ostlund, IA; Boyd Parr, SC; Jeanne Rankin, MT; Grant Rezabek, OK; Jonathan Roberts, LA; Keith Roehr, CO; Dennis Schmitt, MO; Andy Schwartz, TX; Michael Short, FL; David Smith, NY; Justin Smith, KS; Diane Stacy, LA; Robert Stout, KY; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Peter Timoney, KY; Josie Traub-Dargatz, CO; Susan Trock, GA; Jeff Turner, TX; Charles Vail, CO; James Watson, MS; Cliff Williamson, DC; Ernest Zirkle, NJ.

The Committee met on October 17, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 1:00 - 6:00 p.m. There were 32 members and 22 guests present. The meeting was chaired by Dr. Andy Schwartz and vice chair Dr. Katie Flynn. The mission statement was reviewed and the Committee determined changes were not necessary. Responses to the 2015 resolutions were discussed.

Presentations and Reports

Contagious Equine Metritis (CEM) and Import Issues
Rachel Cezar, USDA-APHIS, National Import Export Services (NIES)

Background on CEM Data
APHIS started collecting information regarding horses imported and contained at CEM state-quarantine facilities via excel spreadsheets around the end of 2012.
This CEM report being presented will cover:
- Imported mares and stallions from FY2015 to FY2016
REPORT OF THE COMMITTEE

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<td>1,035</td>
<td>160</td>
<td>1,195</td>
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<tr>
<td>2016</td>
<td>1,255</td>
<td>168</td>
<td>1,423</td>
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- 2016 Top 10 Exporting Countries: Germany, Netherlands, Belgium, U.K., Ireland, France, Portugal, Poland, Spain, Sweden
- Number of CEM Quarantine Import Horses per state for 2016
  - Florida: 387
  - New Jersey: 245
  - Kentucky: 232
  - California: 174
  - New York: 73
  - Maryland: 71
  - Oregon: 70
  - Virginia: 69
  - Ohio: 45
  - Rhode Island: 33
  - North Carolina: 12
  - Wisconsin: 5
  - Colorado: 3
  - Tennessee: 3
  - Georgia: 1

- Approved States and Number of Facilities
  - Number of Facilities per State - Each state has its own operating procedure. Some states have a limited number of permanent facilities while others are on an as needed basis for individual use, often depending on funding. These States address importations by private individuals. The latter States do not accept outside mares or stallions for quarantine.

Federal Laboratory Oversight
- Training of qualified laboratory personnel who receive and culture swabs is a regulatory requirement.
- This training is overseen and provided by National Veterinary Services Laboratory (NVSL).
- APHIS has updated the guidance memo “Approval of and Requirements for Laboratories to Conduct Tests for Contagious Equine Metritis” - VS Guidance 15202.2
  - This document replaces VSG 15202.1, which is rescinded
  - Valid through 9/14/2016 to 8/30/2019

Federal Program Oversight
- CEM coordinator conference calls held annually.
- APHIS has modified the spreadsheet template for uniformity of reporting
- APHIS provides an annual report of the CEM Import Program to the state animal health officials and equine stakeholders.
- USDA offers CEM training for those managing state CEM programs.
• CEM coordinator training is tentatively planned for March 2017 at the University of California, Davis.
• A course was held at New Bolton Center in October 2015.

Federal Quarantine Facilities Oversight
• APHIS animal import centers (AICs) work closely with the States to ensure that Permit for Movement of Animals (VS 1-27 forms) are returned to the AICs within 24 hours of arrival of horses at the CEM quarantine facilities.
• This serves to monitor transport and verifies arrival at state quarantine facilities.

Equine Health International Movement Regulation Changes
• APHIS has developed a workplan that will amend portions of the regulations for horse importation.
• We are now working with the APHIS Regulatory Development staff on the revised regulatory language.
• The revisions will be published as a proposed rule and open for public comments.
• The revisions will include general language to allow import under High Health Status High Performance Horse (HHP) guidelines from the OIE.
• Specifics of the HHP implementation will not be in the regulations, but rather will be in guidance documents.
• Further revisions may include:
  o Increasing the time horses are allowed to be temporarily exported to CEM regions from 60 days to 90 days.
  o Amending and streamlining the requirements for importing horses from Canada.

Equine Infectious Anemia (EIA): Concept for Federal Regulations
Alecia Naugle, USDA-APHIS-VS

APHIS-VS would like to assess the level of stakeholder support for the publication of an EIA proposed rule and we are seeking feedback on these regulatory concepts for EIA control.

Existing EIA Regulations: The States currently regulate most aspects of EIA control in the United States. State regulations vary. Federal regulations and associated policy documents are limited to movement restrictions of EIA reactors and the approval of EIA testing laboratories.

Support for Federal EIA Regulations: Over the last ten years, the U.S. Animal Health Association (USAHA) and National Institute for Animal Agriculture (NIAA) have passed eight resolutions or recommendations supporting the strengthening of Federal EIA regulations. VS convened an
EIA Discussion Group in 2015. Many group members showed enthusiasm to strengthen EIA control with the foundation being Federal regulations. They recognized that EIA test forms are an important form of equine identification and the lack of uniformity is problematic. Several prominent equine industry groups recently asked VS to consider a proposed EIA rule.

**Proposed Rule for EIA Control:** In light of the changing epidemiology of the disease and evidence of significant support, VS is again considering publishing a proposed rule for EIA control. The proposed rule would be performance-based and allow for changes without rulemaking or amending the CFR. The proposed rule would:

- Require a standard (12 months) EIA testing interval for all equine in interstate transit;
- Require use of the VS 10-11 test form or VS approved alternate forms that contain identical data fields;
- Require USDA Category II accreditation of veterinarians submitting samples;
- Require submission of all non-negative samples to National Veterinary Services Laboratories (NVSL);
- Centralize laboratory result and monthly data reporting to VS (and States);
- Clarify and standardize laboratory approval requirements; and
- Further define exposed equines to include epidemiological connections.

This regulation would codify existing EIA control practices, provide Federal authority, and provide comprehensive national standards. It would lay the regulatory ground work and have flexibility for future control options based on epidemiology, diagnostic tests, or disease status. This proposed rule would negate certain interstate agreements allowing exemptions to testing and would supersede some State regulations with a more frequent testing interval.

**Nonregulatory solutions:** Are also being considered by VS to compliment the proposed EIA rule and to further strengthen EIA control.

*Please provide your feedback on the concepts in this document by December 31, 2016 to: vs.sprs.equine.health@aphis.usda.gov*

**Racing Quarter Horse - Equine Piroplasmosis**

Angela Pelzel- McCluskey, USDA-APHIS-VS

Since November 2009, more than 314,000 domestic U.S. horses have been tested for equine piroplasmosis (EP) through active surveillance and movement testing. To date, 331 EP-positive horses (321 *Theileria equi*-positive, 10 *Babesia caballi*-positive) have been identified through this surveillance. These positive horses are unrelated to the 2009-2010 *T.equi* outbreak on a Texas ranch where 413 positive horses were identified in connection with the outbreak and natural tick-borne transmission on the
ranch was documented to have occurred over at least 20 years and has since been eradicated. Of the 331 positive horses identified through active surveillance, 280 were Quarter Horse racehorses, 13 were Thoroughbred racehorses, and 32 were horses previously imported to the United States before August 2005 under the complement fixation test. The epidemiology investigations conducted in all of these cases have indicated no evidence of tick-borne transmission and the cases in racehorses specifically have involved iatrogenic transmission as the method of spread.

So far in 2016, 17,507 domestic U.S. horses were tested for EP with the identification of 68 horses positive for *T. equi*. Sixty-seven (67) were Quarter Horse racehorses and one horse was an Azteca mare suspected to have been illegally moved from Mexico. The Quarter Horse racehorses were participating in sanctioned racing, unsanctioned racing, or both and one of these horses was found to be dually infected with both *T. equi* and equine infectious anemia (EIA). The majority of these horses were found as clusters of positives associated with the same trainer and/or owner and epidemiology investigations conducted have implicated iatrogenic transmission (needle/syringe/IV equipment reuse, blood transfusions, contamination of multi-use drug vials, etc.) as the primary method of transmission in all Quarter Horse racehorse cases identified in 2016.

All EP-positive horses are placed under State quarantine and the horse owners are offered four options for long-term management under state/federal regulatory oversight: 1) life-time quarantine, 2) euthanasia, 3) export from the country, or 4) long-term quarantine with enrollment in the APHIS- VS and ARS treatment research program. In February 2013, APHIS-VS established a policy to release horses previously infected with *T. equi* which had completed the official treatment program, been proven cleared of the organism by a series of methods over time, and were test negative on all available diagnostics. Of the 331 positive horses identified, 172 have either died or been euthanized, 19 have been exported, and 103 have been enrolled in the treatment program. Thirty-one (31) of the horses enrolled in the treatment program have met all of the test-negative requirements and have been released from quarantine. From the Texas ranch outbreak, 163 horses were enrolled in the treatment research program and have completed treatment with more than 140 horses having met all test-negative requirements and are eligible for release. Successful results from the treatment research program were previously reported by Ueti et al. in “Re-emergence of the Apicomplexan *Theileria equi* in the U.S.: Elimination of Persistent Infection and Transmission Risk” published in *PLoS One*, September 2012.

Given that the primary high-risk population for EP over the past several years has been determined to be limited to Quarter Horse racehorses, targeted surveillance in this population is critical to identifying positive cases quickly and mitigating further iatrogenic spread of the disease. While annual surveillance for EP was previously conducted at levels of approximately 75,000 horses per year in 2010 and 2011, surveillance numbers since that
time have been dropping annually and now hover around 20,000 horses tested per year. Additionally, while there were once 11 states with EP test requirements to enter sanctioned racetracks in 2010, there are now only four states with an EP test requirement to enter tracks. This decline in surveillance testing in the high-risk population hinders the goal of early detection and is likely to lead to further disease spread over time. Additional industry support and involvement is needed at this juncture to: 1) increase EP surveillance in Quarter Horse racehorses and, 2) assist in educational outreach to prevent the poor biosecurity practices which have led to continued spread by iatrogenic means in this population.

**Vesicular Stomatitis Update**  
Angela Pelzel- McCluskey, USDA- APHIS- VS

The 2015 vesicular stomatitis virus (VSV) outbreak in the United States occurred from April 29, 2015 to March 4, 2016. A total of eight hundred twenty-three (823) VSV-affected premises (New Jersey serotype) were confirmed or suspected in eight (8) U.S. states; Arizona (36 premises in 3 counties), Colorado (441 premises in 36 counties), Nebraska (38 premises in 10 counties), New Mexico (52 premises in 13 counties), South Dakota (50 premises in 7 counties), Texas (4 premises in 4 counties), Utah (56 premises in 8 counties), and Wyoming (146 premises in 10 counties).

The World Organization for Animal Health (OIE) removed vesicular stomatitis from the international list of reportable diseases as of January 1, 2015. APHIS-VS held a national-level VSV after-action review in January 2015 to review the response to the 2014 outbreak and to examine future VSV response actions in light of OIE’s delisting of the disease. Overall conclusions from the meeting included: 1) a VSV control strategy is still needed to prevent movement of infectious animals and to secure both interstate and international trade during an outbreak; 2) VSV must remain reportable to State and Federal officials to implement this control strategy; and 3) while existing regulatory response protocols in cloven-hooved species must be maintained to rule out other diseases such as foot-and-mouth disease, response to equine cases can be appropriately modified to reduce the impact on State and Federal resources.

Based on these conclusions and other recommendations, USDA-APHIS-Veterinary Services (VS) and State Animal Health Officials (SAHOs) employed a modified response in the 2015 outbreak. New measures included a reduction in the quarantine period based on viral shed from affected animals, activation of VSV-approved NAHLN laboratories to assist in testing of affected equine species, and flexibility to use accredited veterinarians for sample collection in equine species and management of affected premises. Feedback from affected States on the modified approach was positive, especially with regard to the reduced quarantine period and the use of accredited veterinarians, both of which significantly reduced the impact on State and Federal resources while maintaining the necessary infection control strategy.
Although state and federal animal health officials were prepared to implement the successful response strategies employed in 2015 for a 2016 outbreak season, to date there have been no cases of VSV confirmed in the U.S. during the expected 2016 season.

**Update on the National Animal Health Monitoring System (NAHMS) Equine 2015 Study**

*As of September 16, 2016*

Josie Traub-Dargatz, Colorado State University and USDA-APHIS-VS, Center for Epidemiology and Animal Health

Study objectives for the NAHMS Equine 2015 study were developed based on the results of a needs assessment survey conducted in 2014. Summarized results are available at: [http://www.aphis.usda.gov/nahms](http://www.aphis.usda.gov/nahms). The 28 states selected to participate in the study represented approximately 70% of equine operations and equids in the United States. NAHMS equine study results will be reported by region:

- **Northeast**: Connecticut, Delaware, Maryland, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Wisconsin
- **Southeast**: Alabama, Florida, Kentucky, North Carolina, Tennessee, Virginia
- **South Central**: Arkansas, Kansas, Missouri, Oklahoma, Texas
- **West**: Arizona, California, Colorado, Montana, Oregon, Wyoming

**Study Objectives:**
- Estimate the occurrence of owner-reported lameness and describe practices associated with the management of lameness.
- Describe health and management practices associated with important equine infectious diseases.
- Describe animal health related costs of equine ownership.
- Evaluate control practices for gastrointestinal parasites.
- Evaluate equines for presence of ticks and describe tick-control practices used on equine operations.
- Create a serum bank for future studies

**Phase I of study**

Representatives from the National Agricultural Statistics Service (NASS) administered the first questionnaire—which focused on general equine health and management practices—through in-person interviews with equine operators during May through July 2015. A total of 3,997 equine operations were selected by NASS for participation, of which, 2,612 were able to be contacted. Of those contacted, 1,920 (73.5%) completed the Phase I questionnaire.
Results of Phase I will be available in the report “Baseline Reference of Equine Health and Management, 2015,” which is currently being reviewed by the NAHMS technical editor. The report includes estimates on population, health management and events, diagnostic testing, biosecurity, and movement and disposition of equids removed from operations. Once finalized, the report will be posted on the NAHMS Web Site. In addition, a hard copy of the report will be sent to equine operators that requested one during the NASS interview. A limited number of hard copies will be available upon request for other stakeholders.

**Phase II of study**

The start of Phase II was postponed until May 1, 2016, due to the USDA’s Veterinary Services’ mandatory response to the 2015 highly pathogenic avian influenza outbreak. Phase II data collection, with the exception of operator-submitted fecal samples to be used for parasite testing, will be completed by October 15, 2016. Participating operations were visited by veterinary medical officers or animal health technicians who administered an in-depth questionnaire, conducted a biosecurity assessment, performed equid tick examinations and collected biologic samples.

Of the 1,920 operations that completed Phase I of the study, 943 (49.1%) agreed to be contacted for participation in Phase II.

Preliminary information based on records entered into NAHMS database as of September 16, 2016:

**Questionnaire status**

- 264 operations have completed the Phase II questionnaire

**Biologics status**

- Serum bank—samples from 206 operations and 1,569 equids
- Tick examinations conducted on 167 operations and 1,109 equids—58 operations had one or more equids with ticks present; ticks from 178 equids were submitted for identification
- *Salmonella* testing—on 147 operations and 1,003 equids
- Biosecurity assessment—conducted on 177 operations
- Parasite testing (pre- and post-deworming samples tested)—conducted on 139 operations
- Complete sets of fecal samples for parasite testing (pre- and post-deworming) from 750 equids have been completed

**Acknowledgements**

I would like to thank the NASS study coordinator and the NASS enumerators who visited and collected data for Phase I of this study. In addition, I would like to thank the USDA-APHIS-VS and State personnel for their efforts in collecting questionnaire data and biologic samples for Phase II of the study, the NAHMS equine study team and others at NAHMS who contributed to the study, and the laboratory personnel involved in testing biologic samples. I would like to acknowledge that FDA’s Center for
Veterinary Medicine provided funding for the portion of the study investigating internal parasites. A special thanks goes to the equine operations that participated in the study.

**Equine Disease Communication Center Update**

Bailey McCallum, Equine Disease Communication Center

The Equine Disease Communication Center (EDCC) works to protect horses and the horse industry from the threat of infectious diseases in North America. The communication system is designed to seek and report real-time information about disease outbreaks similar to how the Centers for Disease Control and Prevention alerts the human population for diseases in people. Ultimately, frequent and accurate information about disease outbreaks improves horse welfare and helps to prevent negative economic impact that can result from decreased horse use and transport due to a fear of spreading infection and enforced quarantine.

Working in cooperation with state animal health officials and the United States Department of Agriculture, the EDCC seeks information about current disease outbreaks from news media, social media, official state reports and veterinary practitioners. Once information is confirmed, it is immediately posted on the website [http://equinediseasecc.org](http://equinediseasecc.org) and an email message is sent to all states, horse organizations and the USDA. Daily updates are posted until each outbreak is contained or deemed no longer a threat. Facebook and Twitter are also used to communicate alert information.

Alerts and updates on current disease outbreaks are listed on the alert page [http://equinediseasecc.org/outbreaks.aspx](http://equinediseasecc.org/outbreaks.aspx) and include the date listed, disease name, location and current status (Figure 1). Specific premises are not named, but the general location by town, county and state is listed. When locations, events or horses are at risk, they are to be listed. Updates are to be posted as they are received.

As part of the National Equine Health Plan, one of EDCC’s goals is to provide information about endemic and foreign diseases. Links are available for specific information about diseases, vaccination, and biosecurity, and contact information for state animal health officials and the USDA are available on the website.

**2016 Disease Cases Reported (as of October 3rd, 2016):**

202 alerts posted since January 1st, 2016.

213 outbreaks reported since January 1st, 2016

- Eastern Equine Encephalitis: 62 cases reported (FL, SC, NC, VA, TN, NJ, LA, TX, NY, WI, MI)
- Equine Herpesvirus: 18 quarantines reported (TX, NM, NY, NE, WI, FL, MD, PA, VA, SC, IL, GA, CA, AZ, WA)
- Equine Infectious Anemia: 9 quarantines reported (CO, PA, FL, NY, OK)
- Equine Influenza: 2 quarantines reported (WV, CA)
- Piroplasmosis: 4 cases reported (NM, TN, UT)
REPORT OF THE COMMITTEE

- Potomac Horse Fever: 3 cases reported (FL, WV)
- Rabies: 4 cases reported (AZ, FL, OK)
- Strangles: 19 quarantines reported (FL)
- West Nile Virus: 92 cases reported (NV, NE, WA, OK, FL, MN, NY, CO, WI, ND, ID, CA, TX, UT, KY, OR, MT, WY, OH, Ontario-CAN, AZ, WV)

The IDOHC committee requested a budget outline of the EDCC to be presented at next year’s committee meeting.

American Horse Council Update,
Cliff Williamson, American Horse Council

The American Horse Council (AHC) is a Washington, D.C. based association that represents over 120 equine organizations before Congress and the federal regulatory agencies. AHC member organizations include breed registries, national and state equine associations, state horse councils, recreational associations, and organizations representing race tracks, horsemen, horse shows, veterinarians, farriers, rodeos, and other equine-related stakeholders.

The AHC also includes individual horse owners and breeders, veterinarians, farriers, trainers, professional, amateur, and recreational riders, and commercial suppliers. Individually, and through our organizational members, the AHC represents several hundred thousand horse owners and others involved in all sectors of the horse industry.

Current Efforts of the AHC

Obviously, a healthy horse is critical to the economic viability of the horse industry and the sporting, recreational, and social benefits it provides to the country. The AHC takes seriously its role in providing education for the equine industry. This ranges from providing news and legislative updates, to industry wide health initiatives such as the National Equine Health Plan and the development of new educational webinars. An important aspect of our efforts is our annual meeting, held in Washington D.C. Respecting the increased profile of equine health, the AHC has committed to expanding the time we dedicate to disease and health issues, including additional meeting time specifically for Health and Regulatory Committee discussions and a panel discussion focused on biosecurity efforts within the industry.

The American Horse Council’s Health and Regulatory Committee have participated in the development of comments for numerous USDA regulatory efforts and rule changes this year. The AHC commented on the APHIS EIA Discussion Group, the 2016 APHIS Equine Operational Plan, and OIE’s Working Equid Welfare Rule to name a few. The committee was also heavily involved in the industry’s contributions to the APHIS Administrator’s Sector meeting in the spring. The AHC has also reestablished connections with the National Institute of Food and Agriculture (NIFA) as well as the Agricultural Research Service (ARS) in an effort to promote and grow the opportunities for equine specific research.
The following are a few examples of the efforts the AHC are currently undertaking on behalf of equine health.

**2017 Economic Study of the Horse Industry**

According to the *Economic Impact of the Horse Industry in the United States*, a study done for the American Horse Council by Deloitte Consulting, LLC, the horse industry has an annual $102 billion impact on the U.S. economy and supports 1.4 million jobs. There are 9.2 million horses in the U.S. 4.6 million Americans are involved in the industry, including nearly 2 million horse owners. Forty-five states have more than 20,000 horses; thirty-five states have more than 100,000. The industry is built on the agri-business of breeding, raising, training, and using horses.

The AHC is in the selection process for a 2017 economic impact study. It’s been ten years since the last study, which captures not only the economic effects of all the segments of the horse industry, but also provides invaluable demographic data and insights into the professions and related industries that are impacted by equine ownership. The study enables the equine industry to educate the public, the media and elected officials on the industry’s economic size, impact, and importance. The AHC has reached out to State Animal Health Organizations (SAHO’s), state horse councils, and veterinary schools in an effort to draw attention to the invaluable data that can be collected for their respective efforts. We are seeking pledges and contributions to fund the study presently and hope to begin work in spring 2017.

**Operation Gelding**

The Operation Gelding program provides materials, guidance, and support to organizations nationwide to host no- and low-cost gelding clinics for owners who may not otherwise be able to afford to have their stallion castrated. Unintentional breeding contributes to the unwanted horse population, with costs of more than $2,000 per horse to rescue facilities for the annual care of unwanted foals. Since 2010, 107 clinics, run by more than 300 volunteers, have been hosted in 29 states and have resulted in 1,348 stallions gelded.

The Unwanted Horse Coalition (UHC) received a $100,000 grant from the DeWitt Fund of the Community Foundation for Monterey County (CFMC) to support Operation Gelding. As a result of this grant, along with recent grants from the National Horsemen’s Benevolent and Protective Association and the American Association of Equine Practitioners, the number of stallions gelded will almost double by 2018.

The UHC will be seeking veterinarians who are willing to partner with organizations in their local areas to host a gelding clinic before September 2017. Guidelines for 2017 clinics will be available soon, and organizations can apply now for clinics to be held in 2016.

**Proposed Horse Protection Act Regulations (HPA)**

As many of you know, the U.S. Department of Agriculture’s (USDA), Animal and Plant Health Inspection Service (APHIS) has proposed changes to the regulations governing enforcement of the Horse Protection Act.
The AHC strongly opposes soring and believes action must be taken to stop the soring of "big lick" Tennessee Walking Horses, Racking Horses and Spotted Saddle Horses. However, the AHC is concerned that certain provisions of the proposed rule from APHIS-Animal Care are too broadly written, not sufficiently defined, and could cause confusion for the horse show industry. Like all industries, the horse show industry requires clarity in any regulatory regime that impacts its operation. Soring is a problem that is well defined and limited to a very specific segment of the walking horse industry and any new regulations should reflect this fact.

The AHC strongly believes USDA should explicitly limit all new provisions to Tennessee Walking Horses, Racking Horses, and Spotted Saddle Horses, mirroring the Prevent All Soring Tactics (PAST) Act. Making this change will address most concerns the horse industry has with the proposed rule and will fulfill the purpose and intent of the HPA.

The AHC wants to be clear, many of the proposed changes to the HPA regulations are needed, such as replacing the ineffective Designated Qualified Person (DQP) program with a new independent inspection program. Additionally, because of a long history of utilizing action devices, stacks, weighted shoes, and foreign substances to sore horses, a ban of these items on Tennessee Walking Horses, Racking Horses, and Spotted Saddle Horses is justified and needed.

However, the AHC believes it is equally important that any new regulations be narrowly focused on the problem of soring and do not inadvertently impact or unnecessarily burden other segments of the horse show industry that have no history of soring horses.

Other AHC Activities

In addition to its work important to the health and welfare of the industries’ horses the AHC continues its work on a wide range of legislative and regulatory issues including taxes, immigration, public lands and agricultural policy that are important to the economic health of the industry.

American Association of Equine Practitioners Update

Grant B. Rezabek, Oklahoma State University

The American Association of Equine Practitioners (AAEP) reactivated the Infectious Disease Committee in the summer of 2016 to serve as a standing committee of the AAEP to be a partner and resource.

- Subcommittees objectives for 2016 include:
  - Support Equine Disease Communication Center (EDCC)
  - Update and develop new Infectious Disease Control Guidelines
  - Update and develop new resources for Biosecurity, working in collaboration with other industry stakeholders

The AAEP convention will be held December 3-7, 2016 in Orlando, Florida and state animal health officials (SAHOs) are encouraged to attend. There will be an in-depth Infectious Disease Management session on December 6th from 1:00-5:00 p.m.
Additionally, a standing committee of the AAEP is the Welfare Public and Policy Council. The following issues are being worked on by the committee:

- Soring Issues in Walking and Gaited horses
- Racing Medication
- Carriage Horse Industry
- Endurance Horse Riding
- Chuck wagon racing
- Double Decker trailers
- Lay teeth floaters

The AAEP is working collaboratively to address the health of the equine.

Serological Diagnostic of Antibodies Against *Borrelia burgdorferi* and Equine Herpesvirus Type 1 in Horses Using Multiplex Assays

Bettina Wagner, Department of Population Medicine and Diagnostic Sciences and Animal Health Diagnostic Center, College of Veterinary Medicine

Antibody detection in biological samples has been traditionally performed by different serological diagnostic assays. For example, the classical method for measuring antibodies against the Lyme pathogen *Borrelia burgdorferi* is ELISA followed by confirmatory Western blotting, while antibodies against equine herpesvirus type 1 (EHV-1) are mostly determined by serum neutralization testing. These assays typically use whole pathogens or pathogen extracts for total antibody detection. Serological multiplex assays allow the simultaneous quantification of antibodies to multiple analytes or antigens. Multiplex assays also offer improved analytical sensitivity, a wide linear quantification range, and can provide an assay matrix for antibody isotype differentiation. The Lyme Multiplex assay is based on three specific antigens of *B. burgdorferi*, called outer surface protein A (OspA), OspC and OspF, which are differentially expressed by the pathogen depending on the host and infection stage. The Lyme Multiplex assay provides quantitative results for antibodies to each of the Osp antigens in a single test run. Moreover, the results offer an advanced test interpretation that can distinguish between early and chronic infection, and can identify infection in vaccinated animals. The results can be used to make treatment decisions by considering the infection stage of the horse. They also allow a follow up on treatment success, evaluate the success of vaccination, and can help to identify severe outcomes of Lyme disease such as neuroborreliosis in horses. The new EHV-1 multiplex assay uses different glycoprotein antigens of EHV-1 for antibody detection. The assay has been validated against and highly correlates with EHV-1 serum neutralization testing. The EHV-1 multiplex assay allows for antibody isotyping and consequently can evaluate if ‘protective’ T helper 1 (Th1)-associated isotypes are dominating the immune response of a horse or if host immunity is shifted towards a Th2-associated antibody pattern. The assay can be used to accurately quantify
antibodies against EHV-1 in serum of vaccinated or naturally infected horses. In summary, serological multiplex assays provide a new approach for quantitative antibody detection and offer an opportunity for advanced interpretation of humoral immunity in infected and vaccinated horses.

This work has been supported by the Harry M. Zweig Memorial Fund for Equine Research and by Assay Development Funds from the Animal Health Diagnostic Center at Cornell University.

Laboratory Quality Standards, Why Does it Matter?
Grant B. Rezabek, Oklahoma State University

- American Association of Veterinary Laboratory Diagnosticians (AAVLD) Accreditation Requirements: Version 2016-07
  a. 36 Laboratories in U.S./Canada
  b. Primarily State Agriculture or Academic (Veterinary Medicine or Veterinary Science Departments)
  c. Evaluated critically on a variable cycle, constant re-evaluation and improvement, moving forward to uniform live-time reporting.
  d. Meets standards of OIE ISO 17025 as a minimum to ensure international cooperation for movement

- Demonstration of current OIE test recognition for important equine diseases: specific discussion on CEM and EIA testing.

- Quality System/Quality Monitoring:
  a. The key feature of laboratory operation that ensures reliable, reproducible results.
  b. Includes a wide variety of policies including: ethics, confidentiality, document control, training, subcontracting, monitoring, test validation, test development, reporting results, etc.
  c. Specific example of monitoring refrigerators in an accredited laboratory environment.

- Description and definition of diagnostic test verification, testing by methods comparison and true test validation. Reported AAVLD requirements for test validation.

- Reminder of the National List of Animal Reportable Diseases (NLRAD). Discussion of some changes affecting equine and that the program remains open for comment period.
Equine Disease Forum Summary
Katie Flynn, California Department of Food and Agriculture

The Equine Diseases Forum was held on January 19-21, 2016 in Denver, Colorado. The forum was a first-time event that brought together eighty-six (86) equine industry professionals, including equine organization leaders, veterinarians, representatives of equine health care companies and regulatory animal health officials, to gain a better understanding of equine disease issues. The objectives of this unique forum were to provide the latest updates on equine health disease threats, to identify potential solutions for addressing current equine health risks and to enhance equine industry communications on equine health issues. Through participation in this forum, State and Federal animal health officials gained unique insight to the equine industry’s views on equine health, which will ultimately enhance communications and future collaborations about equine disease control. The Equine Disease Forum white paper, presentations and discussions can be found at http://www.animalagriculture.org/equineforum.

The following equine health challenges and concerns pertinent to regulatory officials were identified during the forum:

- The horse industry is recognized to be a diverse, multi-segmented industry. However, there is a lack of consistent and universal horse census and economic data about the horse industry, which is ultimately leading to a limited understanding of equine demographics in the United States.
- There are increasing threats of disease outbreaks due to movement and commingling of horses of unknown disease status. Depending on the disease agent involved, the impacts of a disease may include loss of use of the horse(s), death of affected horse(s), placement of restrictions on equine movements, costly treatment, impacts of implementation of additional biosecurity and preventative measures, trade implications, and other economic impacts.
- Current disease control measures are no longer adequate. Advancing equine health will require new methodologies, enhanced communications, and collaboration.
- Challenges faced by State Animal Health Officials (SAHOs) include an increased number of equine disease outbreaks, limited equine expertise of staff in some states, limited funding for equine programs, limited Federal authority for certain equine regulatory diseases of concern, limited traceability of equines, and limited ability to efficiently communicate with all segments of the equine industry.
- The equine industry plays an important role in protecting equine health by being the eyes and ears of the equine population. When disease is observed, it is critical to contact State and Federal officials to make them aware of suspected reportable diseases and to alert animal health officials of equine industry concerns. Equine industry stakeholders, including horse owners and private practitioners,
should engage with State and Federal officials to provide expertise, experience, and industry perspective at the local level; to obtain the latest information on equine regulatory disease information for dissemination; and to discuss best practices to protect equine health.

- To advance equine health, equine industry leaders can promote and practice biosecurity, educate fellow industry members about equine health issues, support Federal regulations to ensure consistent management of equine diseases across the U.S., and to implement industry-wide disease prevention measures.

- Primary equine health regulatory concerns include the limited ability to control disease (untested equine populations, illegal horse movements, lack of funding for testing and tracing, and lack of traceability which contribute to disease spread) and the inability to provide adequate outreach to the segmented equine industry (difficult to reach every horse owner, and the speed of social media vs. the speed of government agency outreach).

- During an equine disease outbreak, there is need for immediate transparency, notifications, clear guidance, and updated public information on the outbreak to enable informed decision-making at all levels.

- Biosecurity plans are not one-size fits all; there is a need for premises and event-specific plans to address identified risks. Horse owners and event organizers should work with their private practitioner and SAHOs to evaluate the risks on the premises in order to develop the most suitable infectious disease control plan for the premises or event.

- Equine traceability is a priority of the equine industry. The current identified traceability issues include a lack of traceability, lack of individual identification, and lack of documentation of movements. Movement requirements set by the state of destination vary from state to state, which leads to confusion and concern within the equine industry. The variation of enforcement of interstate movement regulations, due to decreasing state funding and personnel resources, also places the equine populations at risk for potential disease introduction and spread.

- The lack of a centralized database for microchip information is a current challenge for equine microchipping for identification. Presently there are various repositories for equine microchip data to include the microchip company, breed registries, discipline registries, and private veterinary clinic records. The industry needs a mechanism for timely access to microchip data for tracing a diseased animal or reuniting a displaced animal with its owner after a natural disaster.

- Current interstate movement issues include determining the role and value of a health certificate dated within 30 days of movement to a horse being moved, the need for industry collaboration with
compliance, incentive for the horse industry/owner to track horse movement, and how best to add value to a veterinary inspection (e.g., health certificate).

• Illegal movement of horses is of great concern to the equine industry. Specifically, horses illegally entering the U.S. from Mexico pose a significant disease risk for equine infectious anemia (EIA) and piroplasmosis, which are prevalent in Mexico. Additionally, risks for introduction of foreign animal diseases are posed when horses from other countries are routed through Mexico and enter the U.S. illegally (or sometimes even legally).

• Interstate movement documentation of horses is critical for traceability during a disease outbreak or natural disaster. However, the documentation is only as good as the accuracy of the information recorded. Current paper-based systems are often inefficient or ineffective for timely tracing of animals. Utilization of existing and future technology is necessary for advancing the traceability of the equine population in the U.S.

• The reliability of current serological tests performed on horses imported into the U.S. should be reviewed to confirm that they are optimal, based on their test associated characteristics (e.g., sensitivity and specificity), to ensure that test negative horses are free from disease at the time of temporary or permanent importation.

Attendees discussed next steps and action items for animal health officials and the various equine stakeholders to advance the health of the U.S. equine population. Highlighted below are suggestions for consideration by regulatory officials.

State Animal Health Officials

• States to solicit assistance from local equine industry stakeholders to identify and address the equine health issues of the industry and their regulatory importance.

• Potential feedback mechanisms for In-State communications include the State Veterinarian and state-level equine advisory committees/councils. Outreach mechanisms include newsletters, social media, disease reports and presentations.

• SAHOs can be more proactive in addressing influenza concerns by ensuring more reliable reporting of incidents so changes in number of cases can be documented.

• Each State to designate an equine subject matter expert, who can be the state point of contact for the equine industry.

Federal Animal Health Officials

• Development of Federal rule to address current deficiencies in the control Equine Infectious Anemia.

• Develop outreach to increase industry awareness of Equine Infectious Anemia and the current high risk populations in the U.S.
• Identification and evaluation of possible surveillance streams for Equine Infectious Anemia testing of the currently untested population in the U.S.
• Harmonization of performance horse import requirements by different countries is a work in progress. Facilities used for post-arrival quarantine in the U.S. should be reviewed for their ability to afford the opportunity to maintain adequate exercise of performance-fit sport horses while in quarantine.
• Federal communications should include industry feedback mechanisms and USDA output mechanisms. Output mechanisms include newsletters, social media, disease reports and presentations.
• Designate a Federal animal health official equine subject matter expert in each District as a point of contact for industry stakeholders and SAHOs.
• USDA to host State/Federal animal health official equine conference calls on a routine basis to discuss current equine regulatory health issues.

While the forum succeeded in bringing together experts from diverse backgrounds to discuss advancing equine health, participants and organizers understood that these efforts are an initial step forward and must lead to further dialogue and cooperative efforts to achieve the goals shared by the many stakeholders. National Institute for Animal Agriculture (NIAA) and USAHA will continue to provide leadership to establish a platform to facilitate collaborations for identifying and helping to implement solutions for advancing equine health in the future. A second Equine Forum focusing on Advancing Equine Identification and Traceability will be held in January 2017.

For additional information including the 2016 Equine Disease Forum White Paper and presentations visit http://www.animalagriculture.org/equineforum

State Veterinarian Equine Regulatory Survey Results
Katie Flynn, California Department of Food and Agriculture

In July 2016, state veterinarians were sent a survey regarding state equine regulatory health issues. The impetus for the survey was the concerns voiced by equine industry stakeholders during the 2016 Equine Disease Forum held in Denver, Colorado. Specific concerns were state variations in equine reportable diseases and equine interstate movement requirements; the lack of communication and collaboration by regulatory animal health officials with the equine industry; and the industry lack of understanding or knowledge of state regulatory authority. The survey objective was to obtain state-specific information on their equine reportable disease list, equine regulatory authorities, disease-specific testing requirements and methods, frequency of communications with equine stakeholders, and the extent of state animal health official collaboration with the equine industry.
The survey asked state veterinarians to categorize equine diseases of interest as Not Reportable, Reportable Actionable or Reportable Monitored. Forty-nine (49) states completed the survey; two (2) states only responded Reportable or Not Reportable. Below is a summary table of the responses by disease.

<table>
<thead>
<tr>
<th>Reportable Disease</th>
<th>Not Reportable</th>
<th>Reportable Actionable</th>
<th>Reportable Monitored</th>
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</tr>
<tr>
<td>Equine Infectious Anemia</td>
<td>0</td>
<td>42</td>
<td>0</td>
</tr>
<tr>
<td>Equine Influenza Virus</td>
<td>27</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Equine Viral Arteritis</td>
<td>8</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>Equine Viral Arteritis Carriers</td>
<td>12</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>34</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Lyme Disease</td>
<td>37</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Pigeon Fever (Corynebacterium)</td>
<td>37</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Potomac Horse Fever</td>
<td>32</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Rabies Cases</td>
<td>1</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>Rhinovirus Infection</td>
<td>34</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>36</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Strangles Carriers</td>
<td>36</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Strangles Cases</td>
<td>34</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Vesicular Stomatitis</td>
<td>0</td>
<td>41</td>
<td>2</td>
</tr>
<tr>
<td>West Nile Encephalitis</td>
<td>4</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>Western Equine Encephalitis</td>
<td>2</td>
<td>14</td>
<td>18</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

These survey results illustrate the variation in state equine reportable disease lists, which was identified by the equine industry as a challenge. For example, strangles is not reportable in thirty-six (36) states, reportable actionable in six (6) states, and reportable monitored in eight (8) states.

To address the identified challenge of locating state equine reportable disease information, the individual state reportable disease survey data and link to the state reportable disease list was provided to the Equine Disease Communication Center (EDCC) (http://equinediseasecc.org/). The EDCC is an industry-funded initiative information resource for horse owners to obtain disease information and outbreak alerts.

The second parameter assessed in the survey was state equine regulatory authorities, more specifically, equine disease authority, equine welfare authority and equine facility registration or inspection authorities. As predicted, states have disease authority over equine entities in the state. However, non-disease authorities varied. For example, some state veterinarians have equine welfare authority and a few have registration or inspection authority for equine premises. The below table summarizes the non-disease authority of state veterinarians over equine entities.

<table>
<thead>
<tr>
<th>None/NA</th>
<th>Welfare Authority</th>
<th>Required Registration with State</th>
<th>SAHOs routine visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racetracks and Affiliated Facilities</td>
<td>13</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Rodeos and Rodeo Type Events</td>
<td>4</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>Public Equine Events</td>
<td>3</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Equine Rescues</td>
<td>9</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>Equine Boarding Facilities</td>
<td>8</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Equine Breeding Farms</td>
<td>7</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Public Equine Auctions</td>
<td>3</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>Equine Veterinary Clinics</td>
<td>12</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>EIA USDA Approved Labs</td>
<td>13</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Laboratories Performing Equine Diagnostics Tests</td>
<td>25</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>
The third parameter evaluated in the survey was State mode and method of communications. During the 2016 Equine Disease Forum, state animal health officials recognized the need for increased communication with the equine industry, however, the lack of state funding and personnel restrict their ability to meet these needs. The below table illustrates the number of states that update websites and social media sites when necessary, such as when an equine regulatory disease case is confirmed.

<table>
<thead>
<tr>
<th>Mode</th>
<th># states</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website</td>
<td>48</td>
</tr>
<tr>
<td>Facebook</td>
<td>31</td>
</tr>
<tr>
<td>Twitter</td>
<td>26</td>
</tr>
<tr>
<td>Blog</td>
<td>9</td>
</tr>
<tr>
<td>Newsletter</td>
<td>17</td>
</tr>
<tr>
<td>Email Distribution Veterinarians</td>
<td>40</td>
</tr>
<tr>
<td>Email Distribution Industry</td>
<td>30</td>
</tr>
</tbody>
</table>

Communication is key to addressing equine regulatory issues. As evidenced by the survey, states are utilizing various methods to communicate with the equine industry.

The fourth parameter evaluated by the survey is industry and regulatory collaboration. One recommendation from the 2016 Equine Disease Forum was for states to solicit assistance from local equine industry stakeholders to identify and address the equine health issues of industry and their regulatory importance. The survey indicates sixteen (16) states currently have an equine industry advisory board/council/committee to seek input from on equine regulatory health issues for the state. Additionally, the Forum participants recommended states designate an equine subject matter expert to be the industry point of contact in the designated state. The survey reveals that currently sixteen (16) states have a designated equine veterinarian or specialist to handle all equine issues.

The last parameter addressed by the survey was state testing requirements for equine infectious anemia, equine viral arteritis, and equine piroplasmosis. The following chart outlines the equine infectious anemia state test requirements.
Four (4) states currently require equine piroplasmosis testing for entry to racing Quarter Horse tracks. One (1) state requires equine viral arteritis (EVA) testing for stallion import, four (4) states require EVA test for semen import into the state, and one (1) state requires EVA test for breeding premises. The 2016 Equine Disease Forum participants voiced concern about the increased incidence of EP in racing Quarter Horses and EVA in the general equine population. Based on the survey result, there is limited required surveillance testing of equine for movement purposes.

In summary, the survey validates the concerns raised by the industry stakeholders during the 2016 Equine Disease Forum. Advancing equine health will require further State Veterinarian communication and collaboration at the local, state and national level.

The Role of Animal Health Officials in Equine Biosecurity
Katie Flynn, California Department of Food and Agriculture

The Equine Herpes Virus-1 (EHV-1) outbreak, associated with the Western National Cutting Horse Event in Ogden, Utah in May 2011, increased awareness and need for biosecurity measures at equine events. Biosecurity practices are those measures intended to prevent the introduction and spread of infectious disease agents on a premises. As demonstrated by the 2011 EHV-1 Outbreak, an infectious disease incident can have devastating effects on the horse industry. Based on lessons learned from this incident, the horse industry has taken great strides in highlighting the need for enhanced biosecurity.
Although there are overarching general principles of biosecurity for equine facilities, a unique detailed biosecurity plan should be tailored to each individual premises and event. There is no one-size fits all plan since each horse and each premises have unique disease risks. Additionally, the saying “the devil is in the details” is extremely true for a biosecurity plan. A biosecurity plan is only as effective as the weakest link. For example, a very detailed plan may require all grooms to wash their hands after handling each group of horses. If nine (9) of the ten (10) grooms wash their hands, but one (1) does not, then the individual not following the plan can introduce and spread a pathogen.

The good news is there is a heightened awareness of the impact of disease outbreaks and the need for prevention. The industry is now embracing the need for biosecurity and industry leaders are sharing the message and providing new resources and tools for biosecurity. Advancing equine health through the implementation of biosecurity relies on collaboration and communication among all stakeholders, including state animal health officials. The United States Equestrian Federation (USEF) took the first step. Effective December 1, 2017, all USEF competitions must have an equine isolation protocol in place. The ultimate goal would be for competitions to have a complete biosecurity plan that centers on the isolation protocol. Additionally, USEF is encouraging event management and event veterinarians to consult with the state animal health officials before an event to obtain input and feedback. It is therefore important for state animal health officials to promote key biosecurity concepts when being contacted as a resource for biosecurity information.

There are numerous biosecurity measures that can be implemented to prevent disease introduction and spread. However, the following key concepts should be at the core of all plans:

- Monitoring the health of the horses
- Isolating all sick animals
- Limiting horse-to-horse contact
- Limiting horse-to-human contact
- Avoid sharing of equipment
- Avoiding use of communal water troughs.

Application of these biosecurity concepts with a horse health management program focusing on vaccination, cleaning and disinfecting, parasite control and vector control will advance the health and protection of the equine population.

The internet has a wealth of biosecurity resources available for the horse industry. State Animal Health Officials (SAHOs) can promote biosecurity by directing individuals to reputable sites for more information. The Equine Disease Communication Center (EDCC) (www.equinediseasecc.org) site biosecurity tab has the majority of the biosecurity resources and is destined to be the one-stop shop site of the future. Below is a list of additional websites which contain brochures, guidelines, and videos on the subject.
Horse Owner Biosecurity Resources

- **USDA-APHIS Info Sheet**

- **Equine Biosecurity Risk Calculator (Equine Guelph)**

- **Equine Biosecurity Principles and Best Practices Guide (Alberta Veterinary Medical Association and Alberta Equestrian Federation)**

- **Biosecurity On The Road Article (The Horse.com)**

- **Infographic: Protecting Your Horse From Disease**

Biosecurity Videos

- **www.thehorse.com videos**
  - Choosing a Disinfectant for Barn Use
  - Stall Cleaning and Disinfection Part 1
  - Stall Cleaning and Disinfection Part 2
  - How to clean/disinfect Horse Equipment
  - How to Clean and (not quite) Disinfect Leather
  - How to Clean/Disinfect Water Buckets and Troughs
  - How to Quarantine a New Horse

- **Biosecurity Tips for Horse Farms- Dr. Scott Weese**
- **Infectious Diseases and Biosecurity Lecture by Dr. Paul Morley**

Premises Level Biosecurity

- **Biosecurity Guidelines – American Association of Equine Practitioners**

- **Basic Equine Facility Biosecurity for Horse Owners and Horse Professionals**
  - Horse Farm Biosecurity: Animal Health Australia
  - Biosecurity Toolkit for Event Managers
    - [https://www.cdfa.ca.gov/ahfss/Animal_Health/Equine_Biosecurity.html](https://www.cdfa.ca.gov/ahfss/Animal_Health/Equine_Biosecurity.html)

Ultimately, the roles of the state animal health official in fostering equine biosecurity are collaboration and communication. Industry-wide acceptance
and implementation of biosecurity measures will assist in controlling and preventing equine diseases of regulatory importance.

Committee Business:

Committee business session included discussions on the continuance of subcommittees, the USDA-APHIS-VS National Reportable Animal Disease List, and the Emergency Animal Disease and Preparedness and Response Plan.

Three resolutions and two recommendations were presented.

**RECOMMENDATION 1:**
EQUINE IDENTIFICATION FORUM FOR EQUINE INDUSTRY STAKEHOLDERS

**BACKGROUND INFORMATION:**
In light of recent disease outbreaks and industry traceability challenges, equine identification and traceability has been the topic of industry interest. During the 2016 Equine Disease Forum, co-hosted by the USAHA and the National Institute for Animal Agriculture (NIAA), the audience of industry stakeholders proposed hosting a forum to discuss ways to advance equine identification and traceability.

**RECOMMENDATION:**
The Infectious Diseases of Horses Committee requests the United States Animal Health Association (USAHA) Executive Committee co-host with the National Institute of Animal Agriculture (NIAA) an Equine Identification Forum for equine industry stakeholders.

**RECOMMENDATION 2:**
NATIONAL EQUINE DISEASE COMMUNICATION CENTER

**BACKGROUND INFORMATION:**
The United States horse industry is unique in the livestock sector for its broad diversity of activities in all regions of the country and the world. Horses involved in business, sport, recreation, entertainment, gaming, and environmental support add to the agribusiness economic engine. In addition to an annual economic impact of over $102 billion, the equine industry produces other public benefits, including recreation, exercise, working animals, stress reduction and entertainment.

The horse industry is at continuous risk of a disease outbreak of such proportion as to widely imperil the health of horses and threaten the economic viability of the industry. The economic burden of equine disease outbreaks may include costs incurred associated with movement restrictions, enhanced testing, disease-specific treatment requirements, cancellation of equine events and equine mortality. Effective management of equine infectious disease incidents requires preplanning and communication between all entities involved in monitoring and protecting horse health, including individual owners, venue managers, industry associations, State
REPORT OF THE COMMITTEE

Animal Health Officials (SAHOs) and United States Department of Agriculture, Veterinary Services (APHIS-VS). A June 2010 Impact of Equine Diseases workshop, co-hosted by VS and the American Horse Council (AHC), highlighted the need for the equine industry to have a comprehensive national equine health plan (NEHP) outlining the prevention, diagnosis and control of equine infectious disease and the responsibilities and roles of the APHIS-VS, SAHOs, practicing veterinarians and individual horse owners. The AHC subsequently developed a NEHP framework document. One part of the NEHP is the need for a comprehensive national Equine Disease Communication Center (EDCC) for providing accurate, real-time information on equine infectious diseases to regulatory officials and all segments of the industry to control disease and optimize equine health. The American Association of Equine Practitioners (AAEP) in conjunction with the AHC devised a plan and initiated creation of the infrastructure for an EDCC. In January 2016, the EDCC became fully functional with a website and call in number. Between January 1 and August 1, 2016, there have been 123 disease alerts posted regarding 77 disease outbreaks. SAHOs have supported the EDCC by providing notification of confirmed disease cases in their states. For the EDCC to be effective, continued communication and collaboration between VS, SAHOs and the horse industry is essential.

RECOMMENDATION:

The Committee on Infectious Diseases of Horses requests the United States Animal Health Association (USAHA) Executive Committee to consider a nominal sponsorship of the EDCC to demonstrate SAHO acknowledgement of the importance of the EDCC.
REPORT OF THE USAHA COMMITTEE ON JOHNE’S DISEASE
Chair: David Smith, NY
Vice Chair: Elisabeth Patton, WI

Bruce Addison, MO; Paul Anderson, MN; Richard Breitmeyer, CA; Charles Brown II, WI; Todd Byrem, MI; Michael Collins, WI; Stephen Crawford, NH; Ria de Grassi, CA; Anita Edmondson, CA; William Fales, MO; Kathy Finnerty, MA; Keith Forbes, NV; Mallory Gaines, CO; Robert Gerlach, AK; Stephane Guillossou, NJ; Linda Hickam, MO; Donald Hoenig, ME; David Hunter, MT; Carla Huston, MS; Marv Jahde, KS; Jamie Jonker, VA; Susan Keller, ND; John Lawrence, ME; Donald Lein, NY; Tsang Long Lin, IN; Mary Lis, CT; Gene Lollis, FL; Travis Lowe, MN; Chuck Massengill, MO; Jay Mattison, WI; Sara McReynolds, ND; Antone Mickelson, WA; Eric Mohlman, NE; Jeffrey Nelson, IA; Dustin Oedekoven, SD; Kenneth Olson, IL; Lanny Pace, MS; Elizabeth Parker, TX; Boyd Parr, SC; Elisabeth Patton, WI; Janet Payeur, IA; Suelee Robbe-Austerman, IA; Paul Rodgers, WV; Allen Roussel, Jr., TX; Patty Scharko, SC; Andy Schwartz, TX; Kathryn Simmons, DC; Shri Singh, KY; David Smith, NY; Julie Smith, VT; Rebecca Smith, IL; Scott Stuart, CO; Tahnee Szymanski, MT; Robert Temple, OH; Brad Thurston, IN; James Watson, MS; Robert Whitlock, PA; Ching Ching Wu, IN.

The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 12:30-4:30 p.m. There were 14 members and seven guests present.

Presentations and Reports

- **Johne’s Update from National Cattlemen’s Beef Association** - Kathy Simmons, NCBA
- **Johne’s Disease Control-What Happens When We Get It Wrong** - Belinda Thompson, Cornell University
- **NVSL Johne’s Disease Fecal Proficiency Test Results** - Kevin Stokes, USDA-APHIS-VS, National Veterinary Services Laboratory (NVSL)
- **NVSL Johne’s Serology Proficiency Test Results** - Jeffrey Nelson, USDA-APHIS-VS, National Veterinary Services Laboratory (NVSL)
- **Status of Johne’s Disease Control in the US as presented at the 13th International Colloquium on Paratuberculosis** - Ken Olson, American Association of Mycobacterial Diseases
- **MDA AAMD Update** - Ken Olson, American Association of Mycobacterial Diseases

**Johne’s Disease Control-What Happens When We Get It Wrong**
Belinda Thompson, Cornell University

Dr. Thompson’s presentation reviewed several herd case examples of Johne’s testing efforts which may not be contributing to progress in
controlling Johne's disease or serve as an example of a failure to apply appropriate Johne's control management practices.

Learning objectives:
1. Participants should understand the limitations of serology tests performed on serum or milk samples in characterizing animals infected with *Mycobacterium avium* subsp *paratuberculosis* (MAP)
2. Participants will learn how individual animals contributing to heavy environmental contamination might influence testing results over time
3. Participants will have an opportunity to review whole herd test examples

Herd 1: Low prevalence herd example
   This herd has participated in long-term Johne’s management and testing and is concerned about recent increases in test positive animals

Herd 2: Bulk tank milk ELISA test negative
   This herd has participated in ELISA bulk tank testing for Johne’s detection. The herd bulk tank tested negative on several occasions. Cow mortality consistent with clinical Johne’s disease was investigated. Whole herd testing was performed to evaluate prevalence of MAP shedding.

Herd 3: Small purebred cow calf herd test results

Herd 4: Commercial cow calf herd with purchased untested bulls introduced

**NVSL Johne’s Serology Proficiency Test Results**
Jeffrey Nelson, USDA-APHIS-VS, National Veterinary Services Laboratory (NVSL)

Dr. Nelson reported on NVSL’s Johne’s Disease Serological and Milk Enzyme-Linked Immunosorbent Assay (ELISA) Proficiency Test results. Thirty-Seven (37) laboratories participated in the milk ELISA proficiency test. Of these laboratories, 33 were located in the U.S. A total of 53 individuals participated. Fifty-one (51) individuals used the IDEXX ELISA and two used the ThermoFisher ELISA. All milk ELISA participants passed the proficiency test. Seventy-one (71) laboratories participated in the serology ELISA proficiency test. Of these laboratories, 62 were located in the U.S. A total of 84 individuals participated. Seventy-Four (74) individuals used the IDEXX ELISA, nine used the ThermoFisher ELISA, and one used the Zoetis ELISA. The percentage of individuals that passed the proficiency test using the different ELISAs was 96%, 89%, and 100%, respectively.

**Status of Johne’s Disease Control in the US as presented at the 13th International Colloquium on Paratuberculosis**
Ken Olson, American Association of Mycobacterial Diseases (AAMD)

The report, originally presented at the 13th International Colloquium on Paratuberculosis (ICP) provided a brief overview of U.S. Johne’s Disease Control and Prevention in four areas:
JOHNE’S DISEASE

- National Efforts
- Research Efforts
- State Programs
- Industry Programs

While direct funding for the Johne’s program has been eliminated at the national level, components do remain in place. They include:

- Interstate movement restrictions of animals positive for Johne’s Disease.
- Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program. The program standards were last updated September 1, 2010.
- The USDA National Veterinary Services Laboratories (NVSL) provides milk and serum enzyme-linked immunosorbent assay (ELISA), fecal culture and fecal PCR proficiency testing. In 2015 – 7 Canadian, 4 European Union, 1 New Zealand, 1 Australian and 48 USA laboratories were in the program.
- The USDA Center for Veterinary Biologics continues evaluation, approval, licensure and monitoring of diagnostic test kits for Johne’s Disease

The Mycobacterial Diseases of Animals Multistate Initiative provides a national network of research workers on the disease. Funding is currently limited, but they are pursuing additional avenues of funding, USDA-ARS also continues an active research effort.

State programs have declined significantly due to funding cuts; however, efforts are ongoing in several states. The New York State Johne’s Disease Control Program was identified as one example of an ongoing program. It operates as part of the New York State Cattle Health Assurance Program and follows the national program standards. State funding is provided. The focus is on farm owners working with veterinarians to craft herd health programs that are tailored to each herd’s own goals and resources.

2015 statistics: 70 beef herds, 590 dairy herds, 14 mixed beef and dairy herds and eight small ruminant and captive cervid herds were in the program.

On the Industry side three efforts are ongoing:

The Dairy Herd Information System and their Quality Certification Services make testing available to producers across the country. Milk ELISA testing is offered as an option with milk production testing. Training on certified milk ELISA sampling is provided with 50 laboratory technicians and over 300 field technicians currently certified. They also have a Laboratory ELISA Proficiency Program with 13 U.S. certified laboratories and two Canadian certified laboratories.

Producer programs that address herd health, with Johne’s as a component of them include the National Dairy FARM Program that is coordinated by National Milk Producers Association and offered by cooperatives. On the beef side, the Beef Quality Assurance Program is
coordinated by the National Cattlemen’s Beef Association and offered by state associations.

MDA AAMD Update
Ken Olson, American Association of Mycobacterial Diseases (AAMD)

The Mycobacterial Diseases of Animals (MDA) multi-state initiative carries on from Johne’s Disease Integrated Program (JDIP) and is focused on two mycobacterial disease complexes - paratuberculosis (Johne’s disease; JD) and the tuberculosis complex of diseases (TBc; i.e. bovine tuberculosis). The initiative includes five objectives:

Objective 1: Increase understanding of the epidemiology and transmission of Mycobacterial diseases in animals, including predictive modeling;
Objective 2: Develop and implement new generations of diagnostic tests for JD and TBc;
Objective 3: Improving our understanding of the biology and pathogenesis of Mycobacterial diseases, as well as the host response to infection;
Objective 4: Develop programs to evaluate and develop new generations of vaccines for JD and TBc; and,

Extension/Outreach: Develop and deliver education and outreach material related to JD and TBc in electronic and print form

Highlights for the MDA in 2016 include:
• Members of the team coordinated a workshop in Rabat, Morocco for the Bill and Melinda Gates Foundation on “Accelerating bTB Control in Developing Countries”
• The event drew 40 experts from 16 countries in North and South America, Europe, Asia, and Pacifica
• After Action Report is almost complete
• Includes three need areas, seven topic areas and six strategies
• GRAbTB is operational
• Working on plans for a Joint MDA meeting with Mexico
• Explore interface with other programs

The American Association of Mycobacterial Diseases is a new 501(c)(3) not-for-profit organization formed to: “To assist producer groups, researchers, regulators, and funding agencies by promoting scientific research, education and extension activities in developing and implementing science based solutions for the prevention and control of mycobacterial diseases”. Highlights for the year included:
• 501(c)(3) status being granted by Internal Revenue Service (IRS)
• JDIP repository serum, milk and fecal samples are available for sale and are being used
JOHNE’S DISEASE

- Communications including meetings with ten trade publication editors during World Dairy Expo and making information available to attendees
- Hosted interest session at 2016 American Dairy Science Association (ADSA) American Society of Animal Science (ASAS) Joint Annual Meeting
- 4th Annual Meeting will be December 4, 2016 with Conference of Research Workers in Animal Diseases (CRWAD) in Chicago
- Working on plans for a Joint MDA meeting with Mexico

It was suggested that MDA Community, JD and TB Committees need to help refine strategy and prioritize tactics for addressing Johne’s and TB by identifying:

- What is slowing progress in disease control? (Technology? Biology? Resources?)
- What are the key inflection points?
- Do we have a strategy to address potential public health concerns for MAP and bTB?
  Roles of ARS, APHIS, Academia, Industry, Global Alliances?

Committee Business:
The Committee discussed proposed reorganization of USAHA committees, relative to impact on Johne’s Disease. After discussion, all committee members present were in support of the concept.
REPORT OF THE USAHA COMMITTEE ON LIVESTOCK IDENTIFICATION
Chair: William Brown, KS
Vice Chair: Kevin Maher, IA

Sara Ahola, CO; Marianne Ash, IN; James Averill, MI; Rich Baca, CO; Bill Barton, ID; Karen Beck, NC; Richard Breitmeyer, CA; Paul Brennan, IN; Becky Brewer-Walker, AR; Charlie Broadus, VA; William Brown, KS; Nancy Brown, KS; Robert Cobb, GA; Matt Cochran, TX; Michael Coe, KS; Francisco Collazo, FL; Karen Conyngham, TX; Michael Costin, IL; Susan Culp, TX; Bud Dinges, TX; Brandon Doss, AR; Anita Edmondson, CA; James England, ID; Kathy Finnerty, MA; Glenn Fischer, TX; Tony Forshey, OH; Robert Fourdraine, WI; Kent Fowler, CA; Kendra Frasier, KS; Tony Frazier, AL; Mallory Gaines, CO; Chelsea Good, MO; Tony Good, OH; Alicia Gorczyca-Southerland, OK; Rod Hall, OK; Steven Halstead, MI; Neil Hammerschmidt, MD; Nephi Harvey, UT; Greg Hawkins, TX; Bill Hawks, DC; Burke Healey, CO; David Hecimovich, WA; Carl Heckendorf, CO; Julie Helm, SC; Kristi Henderson, IL; Linda Hickam, MO; Bob Hillman, ID; Donald Hoenig, ME; Joseph Huff, CO; Dennis Hughes, NE; John Huntley, AZ; Russell Iselt, TX; Marv Jahde, KS; Jamie Jonker, VA; Susan Keller, ND; Bradley Keough, KY; Bruce King, UT; Diane Kitchen, FL; Eileen Kuhlmann, MN; T.R. Lansford, TX; James Leafstedt, SD; Brad LeaMaster, OR; Mary Lis, CT; Jim Logan, WY; Gene Lollis, FL; Kevin Maher, IA; Bret Marsh, IN; Stu Marsh, AZ; David Marshall, NC; Michael Martin, SC; Rose Massengill, MO; Jay Mattison, WI; Gretchen May, WI; Paul McGraw, WI; Thomas McKenna, MA; Sara McReynolds, ND; Shelley Mehlenbacher, VT; Emily Meredith, VA; Ronald Miller, PA; Mendel Miller, SD; Louis Neuder, MI; Kenneth Olson, IL; Greg Onstott, MO; Elizabeth Parker, TX; Boyd Parr, SC; William Pittenger, MO; Barbara Porter-Spalding, NC; Valerie Ragan, VA; John Ragan, VA; Jeanne Rankin, MT; Justin Roach, OK; Keith Roehr, CO; Susan Rollo, TX; Margaret Rush, MD; Larry Samples, PA; Bill Sauble, NM; David Scarfe, IL; Shawn Schafer, OH; David Schmitt, IA; Stacey Schwabenlander, MN; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Craig Shultz, ID; Richard Sibbel, IA; Kathryn Simmons, DC; David Smith, NY; Justin Smith, KS; Diane Stacy, LA; Robert Stout, KY; Nick Striegel, CO; Scott Stuart, CO; Tahnee Szymbanski, MT; Manoel Tamassia, NJ; Beth Thompson, MN; Tracy Tomascik, TX; Jeff Turner, TX; Alex Turner, CO; Mark Walter, PA; John Walther, LA; James Watson, MS; Patrick Webb, IA; Kyle Wilson, TN; Thach Winslow, WY; David Winters, TX; Cindy Wolf, MN; Marty Zaluski, MT; Glen Zebarth, MN; Ernest Zirkle, NJ.

The Committee met on Tuesday, October 18, 2016, at the Sheraton Greensboro Hotel, Greensboro, North Carolina from 8:00 a.m. – 12:00 p.m. There were 86 attendees, 53 members, and 33 nonmembers. The meeting was chaired by Dr. William Brown and vice chair Kevin Maher.

Animal Disease Traceability Update
Neil Hammerschmidt, USDA-APHIS-VS
Traceability Performance Measures – 2nd Comparison to National Baseline Values

The Animal Disease Traceability (ADT) program was established to improve the ability of Federal, and State and Tribal animal health officials to trace livestock in the event of an animal disease outbreak. Ongoing implementation of this
LIVESTOCK IDENTIFICATION

performance-based program is measured through a specific set of four (4) traceability performance measures (TPMs). These TPMs are based on activities that are typically associated with the administration of trace (trace-back or trace-forward) investigations. These four activities are utilized because they can be uniformly measured regardless of the complexity of the trace and measure a State’s ability to properly administer, record and retrieve documents pertaining to official livestock identification and interstate movement.

Two values are measured for each TPM. The “Percent (%) Successful” value represents the percentage of time the information was successfully retrieved for each activity, while the “Time” value reflects the average lapsed time it took the State to complete each activity. When recording the lapsed time, the start time is when the State is notified of the official identification number and the end time is when the State finds the information to answer the question posed by the TPM.

The following table provides the comparison of the second year results to the national baseline values established in 2014 and the first year comparison. The lapsed time decreased for all four TPMs in both the first and second year comparisons. The total number of trace records assigned, or initiated, and the number of traces completed are used to reflect the frequency with which information was successfully retrieved to answer the question posed by each TPM. Improvement for successfully completed TPMs has been achieved from the national baselines values for all four TPMs. However, there is minimal change from the first comparison to the second for TPMs 2, 3 and 4 while there was significant increase in the frequency of successfully completed exercises for TPM 1.

The emphasis placed on record keeping systems, particularly electronic systems, to retrieve data associated with the TPMs has resulted in a favorable trend demonstrating improved traceability completion time and, for the most part, a greater number of TPMs successfully completed. It is important to acknowledge
that the data used for the national baseline values reflects time to retrieve information prior to the implementation of the ADT program. For the first year comparison, event records from 2012, 2013, and 2014 were primarily selected and for the second year comparison, event records were selected from 2013, 2014 and 2015. While the first two comparisons are based on records that are much more current, which alone would likely make those records more readily available, the overall trends shown by the TPM values indicate progress has been achieved.

**Monitoring and Enforcement**

APHIS concentrated on outreach and education the first year after publication of Part 86 with phased in enforcement beginning in 2014 for repeat offenders. The Monitoring and Compliance reference document provides guidelines for standardizing the process of enforcement actions that APHIS may take when violations occur including, consultations, letters of information and initiation of Investigative and Enforcement Services investigations. ADT staff monitor the number of actions taken per year related to violations of Part 86, which as of April 2016 also include State enforcement actions taken in regard to Part 86 and any related to their own traceability regulations. There was a shift in enforcement actions from 2015 to 2016 away from consultations and letters of information to an increasing number of Investigative and Enforcement Services' (IES) investigations.

**Collection of ID at Slaughter**

APHIS is committed to improving the rates of collection of identification and correlation to the carcass at slaughter plants. In addition to its value to ADT, proper administration of identification at the slaughter plants significantly impacts disease programs and surveillance efforts. APHIS will support, advise, or otherwise assist FSIS as requested to achieve these goals.

APHIS will be implementing several measures to improve collection and correlation of identification at slaughter plants including:

1. Training VS personnel on the use of the finalized ADT slaughter inspection forms to standardize field inspection of plants related to collection/correlation of identification (ID) to carcass through disposition;
2. Determining the procedures for ID collection/correlation to carcass through disposition utilized by top 40 plants to see which systems are most widely utilized and most successful;
3. AIC’s and VS field personnel will continue to work directly with individual plants to address questions and obstacles to collection/correlation of ID;
4. Review of tuberculosis (TB) granuloma slaughter submissions to determine trends in ID collection or lack thereof from individual plants and reach out to successful plants through field personnel to determine best practices that may be applied to others and to assist VS field personnel with targeted outreach to plants regarding cases where DNA microsatellite test results indicated that tissue/hair associated with the identification devices did not match the lesioned tissue submitted;
5. In addition to the current practice of tissue matching for all M. bovis histo compatible lesions submitted from slaughter, Cattle Health Center (CHC) will work with NVSL to perform random tissue matching on non histo
compatible lesions to more closely monitor proper correlation of ID to the carcass.

**Ultra High Frequency (UHF) Demonstration Projects**

In FY 2014, APHIS provided funds to support UHF demonstration projects through the administration of eight cooperative agreements with the States of California/Hawaii (joint agreement), Colorado, Florida, Michigan, Montana, Oklahoma, Tennessee and Wisconsin. The objective of these projects was to evaluate UHF technology to document its potential merit for the collection of official livestock identification and animal health information to support disease traceability and animal disease control programs. Funding was awarded to projects that included cattle as the primary focus, targeting areas in the cattle industry that are most common or frequently practiced so that the outcomes would have the potential to impact a significant portion of the industry.

Overall the UHF tags and technology worked very well and as expected. The projects indicated that the UHF technology has certain advantages over low frequency radio-frequency identification (RFID) tags, in particular the read rate and read distance increase the potential of reading the animals’ official identification numbers at the speed of commerce. Impediments to successful integration included utilizing the improper equipment for the production setting or environment, unfamiliarity with the equipment to ensure continued function at the speed of commerce, and lack of incorporation of appropriate software to achieve maximum benefit and efficiency of UHF technology. It is apparent that successful utilization of UHF tags will be driven by the industry for management and marketing purposes. The utilization of UHF technology is likely to advance and grow as more fine-tuning of the equipment and tags is achieved. Continued use of the technology by 14 of the 32 (44%) participants, two of which already used low frequency RFID, is a good indicator that investment in UHF technology is feasible in some environments.

**Swine Industry ID Update**

Patrick Webb, National Pork Board

The codification of a mandatory identification for swine moving interstate occurred October 14, 1988. The section of code, 9 CFR 71.19 served the industry well however, as the industry evolved, producer leaders started to realize that a mandatory pre-harvest traceability system was going to be important to the future. In 2003, the pork industry was supportive of efforts by National Institute for Animal Agriculture (NIAA) and USAHA to task USDA with leading the development of a mandatory livestock identification system. As a result, USDA APHIS developed the U.S. Animal Identification Plan which became the National Animal Identification System (NAIS). In 2004, the pork industry developed the swine identification (ID) program standards to be compliant with what was proposed in the NAIS and in 2005, began to implement the standards and continued implementation as the NAIS was sunset and replaced with the Animal Disease Traceability program and final rule in 2015. The Swine ID program standards are based on how pigs are currently identified and moved today. The program standards are consistent with the federal and state codes of regulations and they use the nationally standardized premises identification number (PIN) as the foundation for standardized animal
identification and record keeping for swine. To support implementation, the industry worked with USDA to develop Official PIN Tags to identify market breeding stock and the ability to verify PIN’s and render barcodes for use in production and movement records, bills of lading, and for use with diagnostic laboratory submissions. The standards have been integrated into Pork Quality Assurance Plus® Program’s educational materials.

The CFR’s definition of a Swine Production System plays a central role in deciding what types of identification can be used. Swine moving within a swine production system are eligible to use group / lot identification. Swine that are comingle outside of a production system are required to be identified with unique official identification. In both cases, detailed movement records are required to be captured and held for three years.

Since the ADT rule became effective in March 11, 2013 there have been some unintended consequences that have caused some confusion regarding the identification of breeding stock moving interstate for breeding purposes. In commercial production breeding gilts are raised and moved as group/lots for breeding purposes. The only time that they are comingle outside of a production system is when they enter harvest channels. Historically all States have accepted an ear tag bearing a PIN and a producer’s own unique livestock production numbering system as official identification for breeding swine moving interstate for breeding purposes. The regulatory authority for this method of identification is defined in 9 CFR 71.1 within the term Premises Identification Number. After the ADT rule this method of identification did not meet the definition of an Official Ear Tag as defined in the CFR so there was some question as to its continued use. The industry worked with USDA to address this issue and USDA provided clarification to the States that this type of tag is approved by the Administrator as an official method to uniquely identify breeding stock in interstate commerce for breeding purposes.

Sheep and Goat Industry Update
Cindy Wolf, University of Minnesota, College of Veterinary Medicine

Since 2001, significant portions of the sheep and goat industries have adopted identification (ID) as mandated by the National Scrapie Eradication Program. This program provides producers with ID options including eartags, registration tattoos, and program-compliant electronic implants placed in approved sites. Compliance has been positively affected by the availability of these options. Publication of the revised scrapie rule is expected soon. It is anticipated that the new rule will help close the existing gaps in traceability. The industry perspective is that the existing choices of program-provided eartags will assist with better compliance as new classes of sheep and goats will be required to be identified in transit and in commerce.
Traceability Challenges with Current Implementation/Use of Electronic ID in Horses
Angela Pelzel-McCluskey, USDA-APHIS-Veterinary Services (VS)

A short series of case studies was presented to demonstrate the varied outcomes of recent attempts to trace equine microchips. Overall conclusions of these experiences were:

- Given that there are multiple parties responsible for keeping records in the life of an equine microchip, a failure to keep or properly transfer records at any single step yields a permanent dead end to the trace.
- The best outcomes for tracing equine microchips to date have been achieved when the end information is maintained by breed registries or equine industry groups.
- Having to trace stepwise starting at the manufacturer is time consuming, although the manufacturers have done a great job maintaining their data and providing the information when needed. These delays could have significant impacts when the reason for the tracing is related to a disease outbreak.
- There is a clear need for an online microchip look-up tool for equine chips that will at least provide the name/phone number of the final entity that retains the data on that chip (similar to what is used for small animal lost/found).

Overview of the Challenges/Hurdles with Equine ID; Current and Future View Relative to Equine ID
Billy Smith, American Paint Horse Association

Mr. Smith presented the Paint Associations comparison of registry numbers to Quarter Horse and Appaloosa. He discussed trends in the registered horse population and rebrand issues of the industry and association. Concerns were discussed about the lack of database and system compatibility and integration as well as consistency with EID types and reading technology options. Market demographics of horse ownership, including their primary concerns/needs were highlighted.

A panel discussion then occurred following the above species group presentations by the preceding presenters:

A Livestock Market Panel Discussion occurred to address several topics, with the following participants:

- Jennifer Houston (TN)
- Darrell Ford (AR)
- Jim Santomaso (CO)
- Brandy Ferguson (VA)
- Lawson Roberts (VA)
This was a panel of livestock market operators from various states that explored the challenges and opportunities for livestock markets within the realms of the animal traceability rule. Several topics were explored including:

- Successes and challenges you have had with animal identification.
- What changes, if any, did you have in implementing the 2013 federal ADT rule requiring tagging for dairy cattle and beef cattle more than 18 months of age moving between states?
- Have you incorporated electronic tags? If so, how did it go? If not, why not?
- If ADT was to be expanded to require tagging feeder cattle, how would this affect your business?
- Looking ahead, what do you vision for animal traceability in the U.S. and your market in the next 10-20 years?
- Other questions from the audience.

The second panel addressed several topics and issues relative to animal traceability and consisted of State Animal Health Officials, State Animal Disease Traceability Coordinators, and industry representatives. ADT State Compliance Panel Participants:

**SAHOs**
- Paul McGraw (WI)
- Charlie Hatcher (TN)

**ADT Coordinators**
- Alicia Gorczyca-Southerland (OK)
- Kendra Frasier (KS)
- Alex Turner (CO)

**Industry leaders**
- Billy Smith (Exec. Dir. American Paint Horse Association)
- Gary Ross presented by Thach Winslow (WY)

**Topics Discussed:**

- State compliance discussion and procedures (SAHO and/or state ID coordinators)
- State ADT cooperative agreements examples of acceptance of various forms of ID
- Distribution of RFID Tags – what works and does not work in tag distribution
- Expressed concerns of slow adoption of EID and reader use by producers, veterinarians
- What do you vision for animal traceability in the U.S. and your state in the next 5, 10, and 20 years?
Committee Business:

New business resulted in a motion from Dr. Cindy Wolf, titled: ‘Continued USDA Provision of Plastic Scrapie Program Eartags to Sheep and Goat Producers’.

The motion received a second and was approved by the Committee as a resolution.

No further action occurred during the business meeting. The meeting adjourned at 12:25 p.m.
The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 12:02 p.m. until 2:45 p.m. There were 38 members and 30 guests present.

Presentations and Reports

Farm Bill and Legislative Update
Barb Powers, Colorado State University

American Association of Veterinary Laboratory Diagnosticians (AAVLD) worked with Brad Mollet to obtain $5 million for National Animal Health Laboratory Network (NAHLN) in the FY2016 budget. AAVLD has had to suspend Brad’s time and needs to raise donations to support lobbying efforts. AAVLD developed Friends of the Laboratories on the AAVLD website to facilitate collection of donations to support lobbying efforts. The Association needs to raise approximately $10,000 to support these efforts. Continuing to work with Gina Luke at American Veterinary Medical Association (AVMA) to address some challenges restricting funding to only Center for Veterinary Medicine (CVM)-associated NAHLN laboratories. If approved, this would eliminate funding to approximately half of the NAHLN laboratories since they are not affiliated with a CVM.

National Pork Producers Council (NPPC) Update
Liz Wagstrom, NPPC

Working for adequate funding for Foot and Mouth Disease (FMD) vaccine bank and mandatory funding for NAHLN diagnostic laboratories to support FMD
diagnostics. NPPC is seeking $30 million for the NAHLN laboratories in addition to funding to support foreign animal disease response. Animal agriculture has historically been poorly represented in mandatory spending in the USDA budget. This emphasis is the importance of gaining mandatory funding and new dollars.

**Update in NAHLN Codification**
Sarah Tomlinson, USDA-APHIS-NAHLN

National Animal Health Laboratory Network (NAHLN) restructure – Based on 2012 NAHLN Concept Paper. There is now a 3-tier structure (Levels 1, 2, 3) – all received infrastructure funding based on the level of participation. Codification is moving forward. The work plan has been finalized and submitted through APHIS management. The next step is submission to Office of Management and Budget (OMB) for approval to be followed by drafting the program standards. The program standards will be circulated for stakeholder comment.

**Antimicrobial Resistance Project**
Beth Harris, U.S. Department of Health & Human Services (HHS)

Antimicrobial Resistance Project is part of the President’s National Strategy for Combatting Antimicrobial Resistant Bacteria (CARB). USDA’s plan (involving National Animal Health Monitoring System (NAHMS) and longitudinal studies, Veterinary Accreditation Program, and One Health) addresses each of the five CARB goals. USDA has finalized a survey of veterinary diagnostic laboratories to assess current practices and developed a pilot project targeting Veterinary Diagnostic Laboratories (VDLs) that includes recommendations of anti-microbial resistance (AMR) testing.

**National List of Reportable Animal Diseases (NLRAD)**
Sarah Tomlinson, USDA-APHIS-NAHLN

The framework document has recently been released for comment. It incorporates Standard Operating Procedures (SOPs), laboratory role in NLRAD, NLRAD communication, data management and confidentiality issues (including intellectual property concerns). NLRAD as designed is divided into Monitored and Notifiable lists. Laboratory role: joint working group formed to develop detailed implementation plan for NLRAD and emerging diseases in the laboratories. Included discussions of case definitions, timelines and triggers for reporting and information sharing.

**Electronic Messaging**
Sarah Tomlinson, USDA-APHIS-NAHLN

Nineteen laboratories (18 NAHLN + National Veterinary Services Laboratory (NVSL) are actively messaging. They can receive messaging for ten diseases (Influenza A Virus in Avian Laboratories (IAV-A), Influenza A Virus of Swine Laboratories (IAV-S), African swine flu (ASF), bovine spongiform encephalopathy (BSE), classical swine fever (CSF), foot and mouth disease (FMD), porcine epidemic diarrhea virus (PEDV), pseudorabies virus (PRV),
vesicular stomatitis virus (VSV). Goals for 2017 include: expand number of laboratories that can message, expand messaging to include scrapie and antimicrobial resistance (AMR) data, support National List of Reportable Animal Diseases (NLRAD) implementation, integration with other internal Veterinary Services (VS) systems, and enhance utility of messaging standards. Four hundred thirty-nine thousand messages were received in FY16. The key issue remaining is reporting messaging data back out to the submitting Veterinary Diagnostic Laboratories (VDLs); still not able to make that work.

NAHLN Support of Outbreak Testing
Christina Loiacono, USDA-APHIS-VS-NVSL

- Surveillance: bovine spongiform encephalopathy (BSE) (4 laboratories), classical swine fever (CSF) (41 laboratories), Influenza A Virus of Swine Laboratories (IAV-S) (38 laboratories), pseudorabies virus (PRV) (14 laboratories), Scrapie (19 laboratories), highly pathogenic avian influenza (HPAI) (19 laboratories) -- OTHERS
- HPAI/LPAI testing support through the local NAHLN laboratories; also involved in wild bird surveillance.
- Quality Management System Support training – 14 trainings since 2010 (542 participants)
- Expanded proficiency testing available through the NAHLN portal includes NAHLN and APHIS regulatory testing
- Exercises and Drill Working Group – provide informational webinars and develop preparedness drills
- Methods Technology Working Group – implement new membership structure to be more inclusive (core and general membership). Completed methods comparison projects and reviewed validation dossiers.

2017 priorities for NAHLN
- Complete codification of the NAHLN
- Implementing pilot activities for National List of Reportable Animal Diseases (NLRAD) and antimicrobial resistance (AMR)
- Increase electronic messaging
- Complete validation projects

Livestock Industry Use of Electronic VDL Data
Maryn Ptaschinski, National Pork Board

Ptaschinski addressed how a major swine integrator utilizes laboratory data to make production decisions. The efficient transmission and aggregation of Veterinary Diagnostic Laboratories (VDL) diagnostics with production data and the capability to share that data on a permissioned basis internally and externally is greatly facilitated through the use of electronic means. She described how her production company utilizes the AgConnect technology to visualize information from disparate databases on a single dashboard and the enhanced passive surveillance capabilities achieved by real-time on-farm data capture using the bovine embryonic fibroblast (BEFS) technology.
Committee Business:
The Committee passed two new resolutions, which were submitted to the Committee on Resolutions. With no other business, the meeting was adjourned.
REPORT OF THE COMMITTEE ON NOMINATIONS AND RESOLUTIONS
Chair: Stephen Crawford, NH

J Lee Alley, AL; Philip Bradshaw, IL; Richard Breitmeyer, CA; Jones Bryan, SC; Clarence Campbell, FL; Joe Finley, TX; Thomas Hagerty, MN; Steven Halstead, MI; Tim Hanosh, NM; Bob Hillman, ID; Donald Hoenig, ME; Bruce King, UT; Maxwell Lea, Jr., LA; James Leafstedt, SD; Donald Lein, NY; Bret Marsh, IN; David Marshall, NC Michael Marshall, UT; Richard McCapes, CA; Paul McGraw, WI; Doug Meckes, NC; David Meeker, VA Lee Myers, GA; John Ragan, MD; Glenn Rea, OR; David Smith, NY; Scott Stuart, CO; H. Wesley Towers, DE; Max Van Buskirk, PA; Richard Willer, HI; Larry Williams, NE; Ernest Zirkle, NJ.

**Nominations**

**OFFICERS**

PRESIDENT…………………………………………………… Boyd H. Parr, Columbia, SC
PRESIDENT-ELECT.............................................. Barbara C. Determan, Early, IA
FIRST VICE-PRESIDENT................................. Kristin M. Haas, Montpelier, VT
SECOND VICE-PRESIDENT................................. Martin A. Zaluski, Helena, MT
THIRD VICE-PRESIDENT................................. Paul J. McGraw, Madison, WI
TREASURER.................................................... Annette M. Jones, Sacramento, CA

**DISTRICT DELEGATES**

NORTHEAST........ Guy Hohenhaus, Maryland; Belinda Thompson, New York
NORTH CENTRAL..........Louis Neuder, Michigan; Paul Brennan, Indiana
SOUTH................................. L. “Gene” Lollis, Florida; Eric Jensen, Alabama
WEST.................................Bill Sauble, New Mexico; H. M. Richards, III, Hawaii

**Resolutions**

RESOLUTION NUMBER: 1 APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT

SUBJECT MATTER: Veterinary License Reciprocity in Emergencies

BACKGROUND INFORMATION:

Large-scale animal emergency disasters can occur during events such as hurricanes, floods, fires, and disease outbreaks. These events have often exhausted in-state resources requiring states to reach out to other states and national organizations to assist in response and recovery efforts. The veterinary community has organized itself sufficiently in recent years to respond to such requests for assistance. A limiting factor in fulfilling requests for assistance is the lack of a standardized means of addressing reciprocal licensure during emergencies. Inconsistencies in states’ licensing board processes as well as
refusal of some boards to recognize out-of-state licenses during emergencies has led to delays in providing assistance when critically needed.

Nationally, there are two professional and legal means for addressing this issue. First, the Emergency Management Assistance Compact (EMAC) is a congressionally ratified mutual aid compact that legally establishes a national system to facilitate the deployment of resources across state lines during an emergency or disaster. To date, all fifty states, the District of Columbia, Puerto Rico, Guam, and the United States Virgin Islands are EMAC members. EMAC is state law; therefore, in most cases, a licensing board does not supersede state law. The state emergency management agencies (EMAs) within the EMAC Member States are responsible for the implementation of EMAC. Second, request of licensed veterinary professionals via non-EMAC processes such as Memoranda of Agreement (MOA) between state emergency management and recognized entities or organizations allows for specific requirements for deployment to be outlined in advance which streamlines the license reciprocity processes. These means are both effective and protective due to the national veterinary licensure examination and continuing education requirements in place to ensure continuity and standardization of the practice of veterinary medicine in the United States. The American Veterinary Medical Association (AVMA) Model Veterinary Practice Act has a provision allowing for emergency licensing of out-of-state veterinarians. This language could be adapted for state use.

RESOLUTION:

The United States Animal Health Association urges the American Association of Veterinary State Boards to develop and distribute to veterinary state boards a position statement supporting processes that enable veterinary medical personnel to operate under reciprocal veterinary medical licensure when emergency assistance is requested by their state and is in accordance with state emergency management laws, regulations, and guidelines.

RESOLUTION NUMBER: 2 APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
SUBJECT MATTER: Radiological Incident Response and Resources
BACKGROUND INFORMATION:

With more than 100 fixed nuclear facilities nationwide, states must be prepared to assist citizens in the event of a site emergency. Public health and other partners will look to animal/agricultural responders for resources needed for service animals and pets. State animal/agriculture emergency planners have identified a severe lack of these resources and therefore a serious gap in our national animal response capability.

Since October 2006, the Pet Evacuation and Transportation Standards (PETS) Act has required local and state emergency plans to include citizens with service animals and pets before, during, and after disasters of all types. Citizens evacuated during a radiation emergency event arriving at reception centers with their service
animals and pets will require triage, radiation monitoring, external decontamination, and post-decontamination services and support. Trained personnel, standardized protocols and equipment (including personal protective equipment) must be in place to provide these services. Because only a very limited number of persons have received animal decontamination training at both state and federal levels, resources would be immediately overwhelmed in a disaster.

The United States Department of Health and Human Services and National Disaster Management System (HHS/NDMS) have proven experience at the development and maintenance of personnel resources such as the National Veterinary Response Team (NVRT) to assist states. We believe HHS/NDMS/NVRT provides the ideal solution to fill this critical response gap by development of the following resources: caches of equipment to include mobile animal decontamination portals; personnel teams with current training in animal decontamination techniques; and delivery of guidance and standardized training that can build local response capability to assist animal/agricultural and public health emergency responders and citizens at local, state and federal levels.

The Federal Emergency Management Agency (FEMA) Radiological Emergency Preparedness (REP) Program coordinates the national effort to provide state, local, and tribal governments with relevant and executable planning, training, and exercise guidance and policies necessary to ensure that adequate capabilities exist to prevent, protect against, mitigate the effects of, respond to, and recover from incidents involving commercial nuclear power plants. Following a request from the American Veterinary Medical Association (AVMA) in 2014 to suggest that the REP Program utilize available pet decontamination guidelines to expand the REP program guidelines, the January 2016, REP Program Manual states “FEMA encourages offsite response organizations to plan for the reality that in an emergency, many evacuees will arrive at reception centers with their pets” and “no specific guidance on the radiological monitoring and decontamination of household pets currently exists.”

The United States Department of Homeland Security Science and Technology Directorate is capable of performing research that could produce scientific data that could be used to develop best practices for animal decontamination.

This Resolution was originally addressed to the Department of Health and Human Services in 2014, stating: “The United States Animal Health Association urges the Department of Health and Human Services to develop and maintain personnel, equipment, and training resources, especially those needed for pet and service animal decontamination, to supplement state animal response in radiation emergencies and all-hazards events.” The issue is as relevant in 2016 as it was in 2014.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Homeland Security (DHS), Science and Technology Directorate, to develop and perform research to produce data related to effective methods of animal decontamination in radiological events. Furthermore, DHS is urged to coordinate with the Federal Emergency Management Agency (FEMA) Radiological
Emergency Preparedness (REP) Program to apply this data toward development of best practices for decontamination of animals. Lastly, USAHA urges DHS and FEMA REP to partner with the Department of Health and Human Services National Disaster Management System/National Veterinary Response Team programs to develop and deliver training courses to fill the gaps in nuclear event response capabilities that currently exist in local and state jurisdictions.

RESOLUTION NUMBER: 3    APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
SUBJECT MATTER: Resource Typing for Animal Emergency Response
BACKGROUND INFORMATION:

The Post-Katrina Emergency Management Reform Act guided the Federal Emergency Management Agency (FEMA) to reach an “understanding with non-federal officials” on standards for credentialing of personnel and typing of response resources. Maintenance of the National Incident Management System (NIMS), as required under Department of Homeland Security (DHS) Presidential Directive 5 (HSPD-5), included establishment of the National Integration Center (NIC) which has the responsibility for standards and credentialing.

Beginning in 2007 and meeting regularly for more than five years, the FEMA Animal Emergency Response Working Group (AERWG) produced volumes of collaborative work products which included descriptions, specifications, and training requirements for at least 25 critical individual animal emergency response (AER) positions and several AER teams. The group included animal/agriculture emergency managers and responders with experience in disasters across the United States along with other national resource typing experts. The entire body of AERWG work, much of which had been vetted nationally, was never published.

Various groups, including state animal health officials, have worked independently to create AER resource typing guidelines for disaster events. The Southern Agriculture and Animal Disaster Response Alliance (SAADRA), a 13-state planning and coordination group formed in 2006, expanded the FEMA “508-1” list with detailed descriptions of 11- Type II through IV animal emergency response teams. Later, SAADRA and the National Animal Rescue and Sheltering Coalition (NARSC), an organized alliance of national animal responders, modified some of the team specifications. In 2014, the National Association of State Animal and Agriculture Emergency Programs (NASAAEP), a national group of animal and agriculture emergency managers appointed by chief state animal health officials in every state, amicably discussed a plan with the NIC Coordinator to begin a project of revising and accepting typing standards for these critical resources.

It is understood that a full inventory of AER resources will likely remain a living document requiring periodic revision. An example of this is the discovery of the need for a Case Manager position that surfaced in a recent animal disease event. We need to move forward to adopt resource typing guidelines to improve our national response capabilities.
RESOLUTION:
The United States Animal Health Association urges the Federal Emergency Management Agency (FEMA) National Integration Center (NIC) to do the following:

- Publish and announce a temporary endorsement of the 11-typed animal emergency response (AER) teams created by the Southern Agriculture and Animal Disaster Response Alliance and the National Animal Rescue and Sheltering Coalition in place of the currently published FEMA 508-1;
- Assemble a small team of AER subject matter experts, including former Animal Emergency Response Working Group (AERWG) members, to revise the AERWG draft products within a 6-month timeframe; and
- Implement a system to allow revision of AER resources, as needed, every 3 years.

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RESOLUTION NUMBER: 4, 21 and 26 Combined

APPROVED

SOURCE: COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
COMMITTEE ON IMPORT, EXPORT AND INTERNATIONAL STANDARDS
COMMITTEE ON BIOLOGICS & BIOTECHNOLOGY

SUBJECT MATTER: National Foot-and-Mouth Disease Preparedness

BACKGROUND INFORMATION:
Foot-and-Mouth Disease (FMD) is the most contagious and economically destructive disease of livestock. An FMD event in the United States will have severe, profound and long-lasting negative impact on the United States agriculture and general economy. The United States Department of Agriculture (USDA) estimates that economic losses due to an FMD event in the United States will range from $15 billion to $100 billion per year (Source: USDA FMD Vaccination Policy in the United States, September 2014). Recent experiences in the United States with foreign animal disease outbreaks (porcine epidemic diarrhea virus (PEDv) and H5 type high pathology avian influenza (HPAI)) underscore the need for preparedness in dealing with high consequence animal disease impacting agriculture. In collaboration with animal agriculture stakeholders, allied industry, academia, State and other Federal agencies, the USDA continues to progress on FMD preparedness and response planning.

Previously applied FMD disease mitigation through culling-to-control methods are not considered effective and practical for the scale and advancement of the United States livestock industry. Emergency FMD vaccination control measures with effective elimination strategies are the most viable option for minimizing the economic impact of the disease. Should FMD become endemic after an outbreak in North America, control of the disease with vaccination will likely assure some level of continuity of business for United States livestock producers.

The September 2014 USDA FMD Vaccination Policy states the following:

The goal (of this Policy) is to advance preparedness by facilitating discussion, if not consensus, among our many partners to identify what level of preparedness is adequate and cost effective when considering:
Procuring and maintaining a sufficient amount of vaccine for a large-scale emergency vaccination effort is extremely costly.

Vaccine quantity currently available to USDA is sufficient to respond to a small, focal outbreak in an area that is not livestock-dense.

FMD virus strains are sufficiently different so vaccinating against one strain may not protect against different strains, even if they are related.

FMD vaccine cannot be currently produced in the United States (21 U.S.C. 113A). The current vaccine antigen concentrate (VAC) held by the North American FMD Vaccine Bank must be shipped abroad to be finished into vaccine.

VAC currently held by the North American FMD Vaccine Bank is intended to be shared by the United States, Canada, and Mexico. For VAC currently held by the North American FMD Vaccine Bank, the vaccine manufacturers can produce 2.5 million doses in 21 days upon receiving the VAC. For additional vaccine (created from a master seed and not currently stored as VAC), vaccine production can take as long as 14 weeks.

In working with our stakeholders, USDA-APHIS believes that an efficient, overall approach to protect the Nation’s livestock industry in an FMD outbreak can be developed. Although the vaccination aspect of preparedness presents unique challenges, these can be overcome with adequate advance planning and consideration of the capabilities and opportunities that public-private partnerships and cost-sharing can afford.

RESOLUTION:

The United States Animal Health Association urges the United States Secretary of Agriculture, in concert with the appropriate agencies, to include a request for funding in the Fiscal Year 2018 budget to develop an optimal Foot-and-Mouth Disease (FMD) Vaccine Bank and to create an FMD Preparedness and Response Plan that supports continuity of business within the United States animal agriculture industry should a large scale, multi-state, multi-strain FMD outbreak occur. The development of this budget should be informed by the criteria set forth in the United States Department of Agriculture (USDA) Sources Sought Notice (Solicitation Number: AG-6395-S-16-0086) issued by the USDA on March 14, 2016.

The request submitted should be adequate to fund expansion of existing FMD virus antigen stockpiles to allow for production of sufficient quantities of FMD vaccine by capable vaccine manufacturers to produce 25 million doses in a timely fashion of each of the top 10-13 FMD virus strains recommended by the FMD World Reference Laboratory (WRLFMD) for FMD vaccine banks in FMD-Free countries.

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RESOLUTION NUMBER: 5  APPROVED
SOURCE: COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
SUBJECT MATTER: Termination of the American Veterinary Medical
Association’s Veterinary Medical Assistance Team Program and
Participation in Disaster and Emergency Response

BACKGROUND INFORMATION:
The American Veterinary Medical Association (AVMA) website provides this
historical data: “VMAT was founded in 1992 in the aftermath of Hurricane Andrew
which caused significant damage in Florida and inflicted heavy losses on animals
and the veterinary infrastructure. In 1993, the AVMA signed a Memorandum of
Understanding (MOU) with the United States Department of Health and Human
Services (HHS), making VMAT part of the Federal Response Plan (now the
National Response Framework) as part of the National Disaster Medical System
(NDMS). In 1994, the AVMA entered into an MOU with the United States
Department of Agriculture, making VMAT available to respond in the event of an
animal health emergency.

Over the years, VMAT members provided on the ground veterinary support
during a number of disasters and emergencies including the Hurricanes Katrina,
Rita and Wilma in 2005 and the World Trade Center Attacks in 2001 as well as
many other events.
In 2008 the federal law changed, and the public-private partnership was dissolved.
This led to the creation of two distinct veterinary response programs: The National
Veterinary Response Teams (NVRT), part of NDMS at HHS, and the AVMA’s
VMAT program. These organizations collaborate, communicate and cooperate with
each other on issues related to animal emergency preparedness and response.
MOUs between the AVMA and HHS signed in 2008 and 2012 highlight the
relationship.

With the change in the federal law, VMAT’s program evolved. The current
VMAT program focuses on state-level response. AVMA VMAT teams are available
to deploy at the request of the state to assist in animal emergency response and
deploy within the state's incident command structure. VMAT has three missions: 1)
Providing on-the-ground assessment of veterinary infrastructure following a
disaster. Reports provided by VMAT volunteers in the field can be utilized by State
emergency response officials to direct resources to impacted areas. 2) Augmenting
state veterinary response resources to provide veterinary care to animals affected
by a disaster. 3) Providing training on a wide range of veterinary disaster response
topics to veterinary response organizations, veterinary medical associations, veterinary
students and other related organizations through the VMAT U program.”

In June of 2016 the AVMA Committee on Disasters and Emergency Issues
(CDEI) were tasked with making recommendations to the AVMA Executive Board
regarding re-organization of the VMAT teams in order for the board to have
background material. Termination of the program was not recommended although
changing from a response unit to a preparedness unit was recommended due to
the large number of states and local jurisdictions that have their own animal
response teams.
On September 22, 2016, VMAT team members and CDEI committee members were notified by the Chief Executive Officer of the AVMA, Dr. Janet Donlin, that the Executive Board was discontinuing the VMAT program over a 12-18 month period of time.

RESOLUTION:
The United States Animal Health Association (USAHA) recommends that the American Veterinary Medical Association (AVMA) Board of Directors reestablish the Veterinary Medical Assistance Team program as a veterinary educational resource for veterinarians assisting animals in disasters by providing training and exercises to help build state and local capacity, by providing incident support as subject matter experts and, finally, promoting business continuity planning and disaster recovery for veterinarians.

USAHA recommends that the AVMA Committee on Disasters and Emergency Issues continue to be an active partner in animal disaster preparedness.

RESOLUTION NUMBER: 6, 13, 29, 34, and 42 Combined
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND CAMELIDS
COMMITTEE ON INFECTIOUS DISEASES OF HORSES
COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK
COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: Laboratory Approval for Regulatory Diseases
BACKGROUND INFORMATION:
Laboratories performing animal surveillance testing are integral to establishing the health status of the national herds and flocks as well as individual animals destined for export. Currently, the United States Department of Agriculture has no authority to restrict laboratories from conducting foreign animal disease diagnostic testing on livestock and poultry samples. For example, one private laboratory in the United States is advertising Polymerase Chain Reaction (PCR) testing for all of the following Foreign Animal diseases: African swine fever, African horse sickness, avian influenza, classical swine fever, foot and mouth disease, nipah virus, newcastle disease virus, pestes des petits ruminants virus, rinderpest, rift valley fever, contagious equine metritis, glanders, piroplasmosis, and surra.

Additionally, there is limited state authority or oversight over laboratories conducting diagnostic testing for diseases of regulatory importance on samples obtained from livestock and poultry. The same laboratory conducting the above listed foreign animal disease tests offers PCR tests for equine infectious anemia, brucellosis, infectious bursal disease, influenza, Johnes disease, pseudorabies, Q fever, rabies, West Nile Virus and vesicular stomatitis. Other private laboratories are promoting new diagnostic testing modalities for diseases of regulatory importance such as chronic wasting disease.
REPORT OF THE COMMITTEE

There is no requirement that the tests offered by unregulated laboratories are approved and validated to accurately assess infection status, nor are there requirements that tests offered by unregulated laboratories conform to national regulatory testing requirements. Diagnostic tests, especially PCR, are difficult to perform and a small deviation from standards could potentially result in a false positive or false negative test result. The practitioner or producers are likely not aware of these difficulties in performing the test or the potential regulatory ramifications of a false test result reported to state animal health officials. Ultimately, the inability to prescribe laboratory testing standards necessary for ensuring the health of livestock and poultry, places animal agriculture in the United States at significant risk.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services to restrict foreign animal disease diagnostic testing to laboratories approved by the USDA and to take regulatory enforcement action against non-approved laboratories conducting testing for foreign animal diseases. If USDA doesn’t currently have authority for these actions, USAHA urges USDA to take measures to establish those authorities.

Additionally, the USAHA recommends state animal health officials assess state authority or oversight over laboratories conducting diagnostic testing for diseases of regulatory importance on samples obtained from livestock and poultry.

RESOLUTION NUMBER: 7, 9, 11 and 24 Combined APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH SURVEILLANCE AND INFORMATION SYSTEMS
USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY NETWORK
COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
COMMITTEE ON BIOLOGICS & BIOTECHNOLOGY
SUBJECT MATTER: Sustained Fiscal Year 2017 Funding for the United States Department of Agriculture, Animal and Plant Health Inspection Service / Influenza A Virus – Swine Surveillance Activities

BACKGROUND INFORMATION:

Economic losses due to influenza A virus in swine (IAV-S) infections are substantial and a global problem, ranking among the top three major health challenges in the swine industry. In addition, IAV-S continues to be a concern to public health and the poultry industry.

The United States Department of Agriculture (USDA) began a surveillance system in 2009 to better characterize the genetic diversity of IAVs of swine. Data from this surveillance system have revealed tremendous genetic diversity across IAV-S isolates. This diversity creates great challenges for effective vaccination
control programs. The need for next generation swine influenza vaccines that elicit broader cross-protection has never been greater.

The IAV-S Surveillance Program has collected and characterized virus isolates from swine since it was initiated in 2009. The program supports both animal and public health objectives. Program goals include monitoring the evolution of the virus, providing isolates for research and the development of diagnostic reagents, and updating diagnostic tests and vaccine Master Seed stocks. Importantly, the information gained from the surveillance system has benefitted our human health counterparts at the United States Department of Health and Human Services (HHS), Centers for Disease Control and Prevention (CDC) by providing sequence data from isolates identified in inter-species spillover events.

Following the human vaccine model, IAV-S vaccine backbones could be approved by the USDA, Animal and Plant Health Inspection Service (APHIS), Center for Veterinary Biologics (CVB) to permit timely updates with new and relevant hemagglutinin (HA) and neuraminidase (NA) for vaccine seed strains. These backbones should exhibit high yield growth properties as well as attenuating mutations in the case of live attenuated influenza vaccine. Commercial vaccine manufacturers may select viruses based on HA and NA sequences from the surveillance system or from their own internal surveillance data for their customers. Viruses from the USDA IAV-S surveillance repository are readily available for this purpose.

CDC funds were provided for an initial pilot influenza surveillance project in 2008. Additional surveillance activities were funded by allocations from the HHS to USDA-APHIS as one-time, no year funds under the authority of the Supplemental Appropriations Act of 2009 for pandemic influenza preparedness and response. Those funds will run out in Fiscal Year 17. This surveillance system is the best system in the world and has contributed greatly to understanding the influenza status in swine in the US and provides an incredibly valuable public health resource for the CDC.

RESOLUTION:

The United States Animal Health Association requests the 115th United States Congress to appropriate and the Secretary of Agriculture to allocate a minimum of $10 million of mandatory funding in future United States Department of Agriculture, Animal and Plant Health Inspection Service budgets for influenza A virus in swine surveillance as part of a comprehensive and integrated swine disease surveillance program.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 8    APPROVED  
SOURCE: AAVLD/USAHA COMMITTEE ON aquaculture  
SUBJECT MATTER: Quality Assurance Training for Aquatic Animal Laboratories  

BACKGROUND INFORMATION:  
Pathogen testing is a legal requirement for transport, export and management of aquatic animals in many jurisdictions within the United States and beyond. It is critical that the results of this testing be accurate, credible and beyond reproach. Currently, many laboratories performing this testing have little or no quality assurance/quality control programs in place and no training available. Many smaller state, federal or tribal laboratories feel they do not have the resources to accomplish accreditation through World Organization for Animal Health (OIE) or International Organization for Standardization (ISO) 17025.

A grassroots effort has been initiated through the Fish Health Section (FHS) of the American Fisheries Society (AFS) to create and implement a voluntary, multi-tiered approach for quality assurance, based largely on Chapter 3 of the FHS/United States Fish and Wildlife Services Blue Book, as well as key ingredients of other accreditation programs. A standing committee consisting of several state, federal and private partners has created the first Tier (pre-qualification) which was announced in January 2016. The second Tier (recognition) is under development. The committee is exploring ways to partner with other agencies with ongoing programs to help further this effort.

RESOLUTION:  
The United States Animal Health Association encourages the United States Department of Agriculture, Animal and Plant Health Inspection Service and the National Animal Health Laboratory Network to provide support and initiate quality management training for the American Fisheries Society (AFS), Fish Health Section (FHS) Quality Assurance Initiative which can be provided at regional meetings of the aquatic diagnostic testing community (e.g., AFS-FHS annual meeting, Eastern Fish Health Workshop, and Western Fish Disease Workshop).

RESOLUTION NUMBER: 10    APPROVED  
SOURCE: USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY NETWORK  
SUBJECT MATTER: Laboratory Requirements for Program Disease Testing  

BACKGROUND INFORMATION:  
Quality assurance for animal disease laboratory testing and electronic messaging of diagnostic results are of critical importance for maintaining and enhancing the state of preparedness for actively managing diseases of high consequence to United States (US) animal health. Quality assured test results and seamless (electronic) connectivity of information between diagnostic laboratories and the appropriate state and federal veterinary medical agencies are needs of 21st century US animal agriculture.
RESOLUTION:
The American Association of Veterinary Laboratory Diagnosticians (AAVLD) and the United States Animal Health Association (USAHA) recommend that a working group inclusive of representation from AAVLD, USAHA, the United States Department of Agriculture, and the United States Food and Drug Administration (FDA) be formed to provide a formal review and subsequent recommendation for implementation of minimum quality and reporting requirements of laboratories responsible for conducting diagnostic testing associated with determination of animal disease status under the various USDA and FDA programs. The resulting review and recommendations for consideration should be provided to each of the contributing organizations prior to the 2017 Annual Meeting of USAHA and AAVLD.

RESOLUTION NUMBER: 12 and 14 Combined
APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: State Animal Health Official and Submitting Veterinary Diagnostic Lab Access to Veterinary Diagnostic Laboratory Records Reported from the National Animal Health Laboratory Network Labs and the National Veterinary Services Laboratory to the United States Department of Agriculture’s Laboratory Messaging Service
BACKGROUND INFORMATION:
The United States Department of Agriculture’s (USDA) Laboratory Messaging Service (LMS) is a database application that serves as the centralized point of receipt for electronic veterinary diagnostic records being reported from veterinary diagnostic labs (National Animal Health Laboratory Network (NAHLN) labs) to the USDA. LMS also receives test results being reported from cases forwarded from NAHLN labs to the USDA, National Veterinary Services Laboratory (NVSL) for further diagnostic testing. Significant advances have been made in the NAHLN’s ability to electronically transfer (message) veterinary diagnostic records from NAHLN labs and NVSL to LMS. These stepwise improvements in connectivity between veterinary diagnostic laboratories (VDLs) and USDA represent great progress towards establishing seamless and scalable systems of reportable disease veterinary diagnostic information transfer between US VDLs and veterinary medical officials. However, USDA does not currently have an effective application for providing state animal health officials electronic access to the veterinary diagnostic laboratory records received into LMS that have originated from animals or farm sites in their respective states. Similarly, NAHLN labs do not have electronic access to diagnostic results from case submissions in which they forward onto NVSL for further testing. Permissioned access solutions are needed to bridge this gap in connectivity that exists between the USDA’s LMS, state animal health officials, and veterinary diagnostic laboratories.
RESOLUTION:
The American Association of Veterinary Laboratory Diagnosticians (AAVLD) and the United States Animal Health Association (USAHA) encourage the United States Department of Agriculture (USDA) to develop an application that provides state animal health officials electronic access to veterinary diagnostic laboratory records originating from animals or farm sites in their respective states that have been reported from National Animal Health Laboratory Network Labs or USDA, National Veterinary Services Laboratory (NVSL) to USDA’s Laboratory Messaging Service. Similarly, AAVLD and USAHA encourage USDA to provide veterinary diagnostic laboratories electronic access to diagnostic results from case submissions in which that same veterinary diagnostic laboratory has forwarded onto NVSL for further testing.

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RESOLUTION NUMBER: 15 and 45 Combined
APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
COMMITTEE ON PARASITIC AND VECTOR BORNE DISEASES
SUBJECT MATTER: Equine Infectious Anemia and Equine Piroplasmosis
Testing of Racing Quarter Horses

BACKGROUND INFORMATION:
Racing Quarter Horses have been identified as a high-risk population of horses which pose a significant risk to the health of the national equine population. Since 2009, there have been 268 racing Quarter Horses confirmed positive for equine piroplasmosis (EP), with 56 of the 268 confirmed since October of 2015. The 56 positive horses were located all across the country including in the states of Arkansas (2), Arizona (3), California (1), Illinois (1), New Mexico (1), North Carolina (1), Tennessee (19), Texas (10) and Wyoming (14). Additionally, since 2012, at least 59 racing Quarter Horses have been confirmed positive for equine infectious anemia in states of California (39), Texas (5), Washington (10), Oregon (4), and Oklahoma (1). Epidemiologic investigations into these cases have indicated iatrogenic transmission of disease through high risk practices of trainers and owners. The failure to promptly identify positive animals poses a significant risk to the United States (US) equine population as the retired racing Quarter Horses travel across the US to be used as pleasure horses, roping or rodeo horses, barrel horses, show horses or ranch horses. Of concern regarding equine piroplasmosis, the US free status is at risk if identification and control measures are not implemented. Although it is acknowledged that imposing testing requirements on racing Quarter Horses prior to entry into a racing venue will impose an increased owner expense, the threat of the loss of US free status for EP, and the threat of allowing permanent establishment of a new disease into the US horse industry poses an even greater economic risk to the US equine industries.

RESOLUTION:
The United States Animal Health Association (USAHA) urges state animal health officials and Quarter Horse racing jurisdictions to impose equine infectious
anemia (EIA) and equine piroplasmosis (EP) testing requirements for Quarter Horses entering a racing venue. Additionally, USAHA urges the American Quarter Horse Association to encourage the EIA and EP testing of racing Quarter Horses and assist in the education of the racing Quarter Horse owners and trainers as to the risks of the diseases. Lastly, the USAHA urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to continue to compile national epidemiologic EIA and EP data for the high-risk group of horses and provide outreach information to states and industry regarding this issue.

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RESOLUTION NUMBER:  16, 23, and 40 Combined  APPROVED
SOURCE:  COMMITTEE ON SCRAPIE
COMMITTEE ON LIVESTOCK IDENTIFICATION
COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER:  Continued United States Department of Agriculture Provision of Plastic Scrapie Program Ear Tags for Sheep and Goats Producers

BACKGROUND INFORMATION:
While the National Scrapie Eradication Program (NSEP) has been successful in decreasing the prevalence of scrapie in the United States, eradication has not yet been achieved in sheep or goats. Continued improvement in traceability and surveillance is needed, not just to achieve the eradication of scrapie, but also to advance animal disease traceability (ADT) efforts.

Much of the success of the NSEP is attributable to the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service’s (APHIS) work with producers to find identification (ID) devices which have good retention and lend themselves to improving animal care and management. Currently, the USDA provides small metal tags or more visible plastic ear tags to producers, sales yards, fairs, veterinarians and veterinary clinics. The plastic tags have a larger profile and lend themselves to management systems where tag numbers are read and recorded. The metal tags are too small to be used as visible ID for management purposes, and they are more likely to lead to infections in goats than the plastic tags.

The publication of the NSEP final rule is expected in 2017 and will include new requirements for official identification and traceability for certain classes of goats and sheep previously excluded from mandatory official ID. In addition to the increasing numbers of new sheep and goat producers entering the program on a continuing basis, longtime producers of low risk goats and sheep, who were previously exempted, will have mandatory ID requirements for the first time. A change in tag-provision policy at this critical time jeopardizes the ability of veterinarians and scrapie program officials to facilitate compliance by these herd owners. Elimination of USDA-provided tags that provide best visible ID will compromise accurate recording of ID and compromise compliance with record keeping requirements for both traceability and the scrapie program.
Alternative sources of funds and cost saving options to support the USDA-provided plastic ear tags should be explored. Benefits of the USDA-provided plastic tags outweigh the savings that could be achieved by cutting the funding for this item. The success in ADT attributable to the NSEP and the wide adoption of sheep and goat plastic ear tags demonstrate the value of providing ID options that benefit both producers and traceability.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service to continue to provide plastic ear tags for the National Scrapie Eradication Program (NSEP) in the most economical and case appropriate manner. These USDA-provided tags are critical to successful identification and traceability of sheep and goats for NSEP and animal disease traceability.

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RESOLUTION NUMBER: 17 and 41 Combined  APPROVED  
SOURCE: COMMITTEE ON SCRAPIE  
COMMITTEE ON SHEEP AND GOATS  
SUBJECT MATTER:  Goat Scrapie Genetic Resistance  
BACKGROUND INFORMATION:  
Genotype selection for scrapie resistance in sheep has proven to be a great asset in efforts to eradicate scrapie in sheep. The availability of genetic tools for goats should have similar benefits. Based on information presented by the United States Department of Agriculture, Agricultural Research Service researchers, sufficient data exists to support further efforts toward testing for goat scrapie genotype resistance and development of field applications in the National Scrapie Eradication Program.  
RESOLUTION:  
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service to pursue efforts to develop pilot projects to explore the use of goat scrapie genotype testing in the National Scrapie Eradication Program. USAHA also requests that USDA-Agricultural Research Service conduct surveys to assess the frequency of resistant genotypes in United States (US) goats and identify methods to expand the availability of resistant genotypes to US goat producers.  
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RESOLUTION NUMBER: 18  APPROVED  
SOURCE: COMMITTEE ON scrapie  
SUBJECT MATTER: Identifying Non-Traditional Sheep and Goat Marketing and Slaughter Channels  
BACKGROUND INFORMATION:  
While the National Scrapie Eradication Program (NSEP) has been successful in decreasing the prevalence of scrapie in the United States, eradication has not yet been achieved. With all disease eradication programs, as prevalence of the disease declines the ability to identify the remaining cases becomes an even greater challenge.  
There is evidence that increasing numbers of sheep and goats are marketed and slaughtered outside of the traditional marketing system and may not be available for scrapie surveillance, the impact of which may prolong the time until eradication is achieved. It is also likely that the demand for nontraditionally marketed animals will continue to rise resulting in negative ramifications for the program.  
RESOLUTION:  
The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to actively pursue identifying nontraditional sheep and goat marketing and slaughter channels and to create a program to obtain samples from these channels.  
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RESOLUTION NUMBER: 19  APPROVED  
SOURCE: COMMITTEE ON BRUCELLOSIS  
SUBJECT MATTER: Review of State Brucellosis Management Plans  
BACKGROUND INFORMATION:  
All states are essentially free of bovine brucellosis, and the disease has largely been eliminated from the United States (US) cattle population, despite occasional ‘spillover’ infection from infected wildlife reservoirs. The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) published an Interim Rule in 2010, which effectively removed state status for bovine brucellosis. Eleven infected cattle or domestic bison herds have been detected within the Designated Surveillance Area (DSA) as a result of the testing required within the DSA since 2010, effectively identifying and mitigating disease risk to the US cattle population.  
Under the 2010 Interim Rule, the Greater Yellowstone area (GYA) states are responsible for defining the boundaries of the DSA, conducting surveillance “sufficient to prevent the spread of brucellosis…”, and implementing a Brucellosis Management Plan (BMP), approved by USDA-APHIS, Veterinary Services (VS) in a Memorandum of Understanding (MOU). USDA-APHIS-VS last reviewed GYA state BMPs in 2012.
State required testing of DSA cattle and domestic bison herds appears to be effective in identifying infected herds at low prevalence. Affected herds are being identified prior to leaving the DSA, no herds have been found infected outside of the DSA, and no cases of herd-to-herd transmission have been documented since the 2010 rule and implementation of DSA required testing.

However, surveillance in wildlife outside of the Wyoming DSA has identified seropositive elk annually for the last four years, and the boundaries of the DSA have not been expanded accordingly. The finding of seropositive elk in areas outside of a DSA may indicate current or past infection, the implication of which is that cattle and domestic bison herds in the area may also be at risk of infection.

Lack of timely action in expanding DSA boundaries in response to finding exposed wildlife may result in exposed or infected cattle or bison leaving the area undetected.

**RESOLUTION:**

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to conduct reviews of Greater Yellowstone Area (GYA) state Brucellosis Management Plans and their implementation, at least once every three years. In addition, USAHA also encourages GYA states and USDA-APHIS to continue to conduct wildlife surveillance outside of Designated Surveillance Areas (DSA), and for the states to adjust DSA boundaries accordingly to include geographic areas where there is a potential risk of transmission of brucellosis from wildlife to cattle or domestic bison.

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**RESOLUTION NUMBER: 20 APPROVED**

**SOURCE: COMMITTEE ON BRUCELLOSIS**

**SUBJECT MATTER: Brucellosis Milk Enzyme Linked Immunosorbent Assay Validation as an Additional Test for Brucellosis in Bulk Milk**

**BACKGROUND INFORMATION:**

At present, the Brucellosis Ring Test (BRT) is the only approved test for detection of antibodies to Brucella spp. in bulk milk tank samples, but this test consistently demonstrates false positives. If the brucellosis milk enzyme linked immunosorbent assay (ELISA) is demonstrated to have improved sensitivity and specificity, the United States Animal Health Association supports work by the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to validate the ELISA, in addition to the BRT, as an approved brucellosis bulk milk surveillance test.

The IDEXX milk ELISA test was available for bulk milk tank sampling from the early 2000s until 2006 or 2007. During that time, the milk ELISA was utilized for bulk milk tank samples due to the superior sensitivity when compared to the BRT. When IDEXX discontinued the production of the milk ELISA test, the BRT was the only approved test for bulk milk tank sampling in the United States.
NOMINATIONS AND RESOLUTIONS

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service to direct the National Veterinary Services Laboratory to pursue validation of the brucellosis milk enzyme linked immunosorbent assay.

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RESOLUTION NUMBER: 22 and 37 Combined APPROVED
SOURCE: COMMITTEE ON IMPORT, EXPORT AND INTERNATIONAL STANDARDS
COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: Cervid Import from Manitoba
BACKGROUND INFORMATION:
On January 1, 2003, the Canadian Food Inspection Agency (CFIA) and the Manitoba Department of Agriculture adopted the creation of a zone around Riding Mountain National Park (RMNP) with a different tuberculosis (TB) status than the rest of Manitoba and Canada. Manitoba was split into two areas and re-classified their TB status according to the new criteria as follows:
• Riding Mountain TB Eradication Area (RMEA) game hunting areas and will be upgraded from their current TB-accredited status to the new TB-accredited-advanced status; and
• Manitoba TB Eradication Area which will consist of the remainder of the province (approximately 90% of Manitoba cattle herds) and will be upgraded from its current TB-accredited status to TB-free status.

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service’s (APHIS) live import protocol for cervids from Canada to the United States has a specific TB requirement for Manitoba animals that adds additional isolation time.

Section 2.4 (h) of the protocol states, “For farmed cervids originating from Manitoba (or Manitoba farmed cervids which are added to a herd in another province): prior to the individual cervid TB test required under in Section 3, the animals must be isolated as a group for at least 60 days without addition.”

USDA-APHIS’ live animal import protocol for other species, such as camelids, has no special condition for Manitoba animals. USDA-APHIS’ import protocol for cattle mentions Manitoba has special TB status but does not require any extra testing or isolation for TB certified herds.

All farmed cervid herds in Manitoba are enrolled in a mandatory TB surveillance program administered by CFIA.

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to amend the live cervid import protocol upon request from the Canadian Food Inspection Agency to exclude Manitoba cervids that originate outside the Riding Mountain National Park Tuberculosis Eradication Area from the isolation requirements prior to testing.

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REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 25  APPROVED
SOURCE: COMMITTEE ON BIOLOGICS & BIOTECHNOLOGY

SUBJECT MATTER: International Promotion of the United States Regulatory System for the Regulation of Veterinary Biological Products

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA) has regulated the veterinary biologics industry for over 100 years, and under the Virus-Serum-Toxin Act of 1913 (amended in 1985), has developed regulatory methods to ensure that the veterinary biologics manufactured in the United States (US) are pure, safe, potent, and effective. This regulatory system is described in the Code of Federal Regulations (CFR) beginning at 9 CFR part 101 (Subchapter E). In 2015, the US domestic veterinary biologics industry manufactured over 100 billion doses of high quality products for both domestic and global markets. More recently, certain countries (often with local industry support interests) have intimated in the international arena that the US regulatory system is not equivalent, and by implication inferior, to their regulatory systems. Consequently, some countries are no longer accepting inspection certification from the USDA. Some insist on conducting their own inspections, while others will accept certificates of inspection from a regulatory body that is a member of the Pharmaceutical Inspection Cooperation Scheme (PIC/S). PIC/S is a non-binding cooperative arrangement between regulatory authorities to promote quality inspections and to facilitate cooperation and networking among these authorities to promote mutual confidence. Approximately fifty regulatory authorities are currently members of the PIC/S.

The USDA, Animal and Plant Health Inspection Service (APHIS), Center for Veterinary Biologics has worked to promote an understanding of their regulatory system through participation in the Veterinary International Conference on Harmonization (VICH), outreach to Latin America through a World Organization of Animal Health (OIE) program called CAMEVET, and participation in the Institute of International Cooperation in Animal Biologics, which is an OIE collaborating center located at Iowa State University that conducts programs that are often attended by foreign governments. These outreach efforts are appreciated, however more is needed to help promote and protect export markets for US veterinary biologics. Countries with recent specific issues include Russia, Thailand, and Turkey. The USDA-APHIS-CVB should evaluate leveraging other ongoing USDA-APHIS trade outreach programs to further promote their regulatory system and evaluate joining the PIC/S.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service programs, including International Services, Veterinary Services’ National Import Export Services, and Center for Veterinary Biologics to develop a plan to increase USDA efforts to promote the United States regulatory system for veterinary biologics as a high quality regulatory system designed to ensure the production of pure, safe, potent, and efficacious veterinary biological products. The plan should
specifically evaluate outreach to problematic areas and joining the Pharmaceutical Inspection Cooperation Scheme.

RESOLUTION NUMBER: 27  APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: Increased Fiscal Year 2018 Funding for the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services Oral Rabies Vaccination Program

BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), National Rabies Management Program (NRMP) has demonstrated though the strategic implementation of cooperative oral rabies vaccination (ORV) programs targeting wildlife to be cost-effective, while continuing to reduce rabies exposure and transmission among wildlife, livestock, pets and people. The United States Animal Health Association agrees with the World Organization for Animal Health (OIE); the most effective strategy to implement large scale rabies control efforts is at the source in animal (i.e., vector) populations. ORV programs are designed to immunize target wildlife species by increasing the percentage of rabies-immune animals within vaccination zones. Creating a population of immune animals results in the reduction of rabies cases, prevention of viral spread, and eventual rabies elimination.

In early 2016, WS with federal, state, academic, and international experts developed a comprehensive strategy to implement Phase 2, elimination of raccoon rabies variant in the Eastern United States. WS also developed and initiated an Enhanced Rabies Surveillance Program with state cooperation throughout the Northeast, Atlantic, and adjacent Mid-West and Southern States to enhance early detection of rabies cases or translocation of animals with rabies. This will allow for rapid contingency plans to eliminate rabies from re-infected areas and minimize the threat of rabies spread to newly infected areas.

Successful programs in Texas continue towards rabies elimination in gray foxes, as well as ongoing studies on rabies control methodology in skunks and maintaining a protective immune barrier along the Mexican border to keep the United States free of coyote (canine) rabies and prevent having gray fox rabies elimination efforts undermined by entry of rabid foxes into Texas from Mexico. The requested funding will allow USDA to:

- Fully implement the enhanced rabies surveillance program.
- Implement contingency action in response to rabid animals in sensitive areas.
- Continue Phase 1 as outlined in the US National Plan for Wildlife Rabies Management that maintains existing operational programs (immune zones) to control rabies in wildlife populations.
- Continue the investigation of novel and US-licensed vaccines and baits.
- Continue studies related to rabies control in skunks.
- Initiate Phase 2 of the national plan to eliminate raccoon rabies variant in the U.S.
RESOLUTION:
The United States Animal Health Association requests the 115th Congress to appropriate a minimum of $30 million for program management and contingency actions at the state level in the Fiscal Year 2018 budget line item for the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services National Rabies Management Program.

RESOLUTION NUMBER: 28  APPROVED
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: Wildlife Translocation: A Threat to Rabies Management and Elimination Programs

BACKGROUND INFORMATION:
Intentional and accidental translocation of meso-carnivores can result in significant management challenges and seriously threatens wildlife rabies management initiatives being implemented by the Wildlife Services (WS) National Rabies Management Program (NRMP) and its international, national, and state partners. Translocation often occurs as a response to human-wildlife conflicts. The intentional relocation of raccoons, skunks, foxes, and coyotes is typically carried out by the public, nuisance wildlife control operators, wildlife rehabilitators, and others to move nuisance or rehabilitated animals away from the site of capture. Accidental translocation (hitch-hikers) by vehicle, boat, or airplane may result in local, interstate, or international movement that can facilitate the spread of rabies. Raccoon rabies was documented again in Ontario Canada last fall after more than 10 years of being raccoon rabies free. The Ontario Ministry of Natural Resources immediately implemented a contingency action plan to control, minimize, and work to eliminate the outbreak. The Canadian Food Inspection Agency in Ottawa, Canada determined by DNA sequence of the raccoon rabies isolate that the likely origin was from southeastern New York State or New York City and it probably reached Ontario by translocation. Recently, several confirmed raccoon translocation events occurred in states where oral rabies vaccination (ORV) programs were being conducted to stop the spread of raccoon rabies, underscoring potential impacts on broad scale rabies management programs in 15 states.

State fish and wildlife agencies have legal jurisdiction and management authority over the common rabies vector species (RVS) in the United States. The South-Eastern Association of Fish and Wildlife Agencies Fur Working Group (FWG) developed recommendations for their respective state agencies that are attempting to prevent the spread of rabies by RVS. The FWG developed Best Management Practices (BMP) for various user groups, wildlife damage control agencies, wildlife rehabilitators, trappers, and the general public that may encounter RVS. The BMPs are sound and work on the basis that no RVS should be relocated or translocated, but instead should be released at the capture site or humanely euthanized. Many states allow user groups to release RVS away from the original site of capture and state laws and regulations vary greatly on the legality of transporting across state lines.
Translocation of RVS can result in significant costs to cooperative ORV programs that have to implement contingency actions to reestablish raccoon rabies free areas once raccoon rabies outbreaks occur. The development and implementation of a comprehensive public education strategy in concert with aggressive enforcement of state and local regulations prohibiting translocation of meso-carnivores is essential to reduce the economic burden of translocation of RVS.

RESOLUTION:
The United States Animal Health Association requests that the United States Department of Agriculture, Wildlife Services collaborate with local, state, and international partners to promote and, where legal and practical, implement the Best Management Practices for common rabies vector species developed by the South-Eastern Association of Fish and Wildlife Agencies.

RESOLUTION NUMBER: 30 APPROVED
SOURCE: COMMITTEE ON Captive Wildlife and Alternative Livestock
SUBJECT MATTER: Live Animal Testing for Chronic Wasting Disease
BACKGROUND INFORMATION:
Detection of Chronic Wasting Disease (CWD) in live animals is an important component of CWD Prevention and Control Programs.

With the funding decrease for CWD indemnification, the need for a successful live animal test option, with a high rate of sensitivity and specificity, is critical in both a trace-forward / trace-back scenario, as well as in herd management plans.

There have been numerous studies evaluating the sensitivity and specificity of tonsillar biopsies in cervids. Similar to scrapie, PrP(CWD) in deer accumulates in the retropharyngeal lymph nodes and tonsillar follicles before central nervous system involvement or clinical symptoms (Sigurdson et al., 1999; Spraker et al., 2002b; O’Rourke et al., 2003). Antemortem testing of these tissues by immunohistochemistry provides a reliable preclinical diagnosis in deer (Wild et al., 2002; Wolfe et al., 2002).

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services to expedite evaluation and approval of tonsillar biopsies into the Chronic Wasting Disease (CWD) Program Standards, providing for rapid implementation and deployment as a viable, accurate, and reliable means of live animal testing for CWD in cervids.
Resolution number: 31 and 39 Combined  APPROVED
Source: COMMITTEE ON CAPTIVE WILDLIFE & ALTERNATIVE LIVESTOCK
COMMITTEE ON TUBERCULOSIS
Subject Matter: National Cervid Tuberculosis Herd Accreditation Program

BACKGROUND INFORMATION:

The primary objective of the cervid bovine tuberculosis (bTB) herd accreditation program is to eliminate *Mycobacterium bovis*, the causative agent of bTB, in farmed/captive cervids as part of a comprehensive approach to eradicate bTB in domestic cattle and bison in the United States. All farmed/captive cervids destined for interstate movement are required to be tested for bTB.

In 2005 Code of Federal Regulations (CFR) 9 Part 77 was updated to separate cervids from the cattle and bison program, and a new testing criteria for cervids was implemented. Herds that participate in the United States Department of Agriculture, Animal and Plant Health Inspection Service Cervid bTB Herd Accreditation Program must test their entire herd of cervids over 12 months of age, negative for bTB two times in 9 to 15 month intervals to establish an Accredited Free herd. The accreditation is valid for 33 to 39 months from the original anniversary date and a negative whole herd retest must be performed in that period of time to maintain the accredited status. Animals from the Accredited Free herds are allowed to be moved interstate at any time without further testing.

Details on the bTB testing requirements for interstate movements of cervids from monitored herds, qualified herds, and accredited herds from modified accredited States and zones are provided in the federal regulations (9 CFR Parts 77 and 86) and in the 1999 UM&R on Bovine Tuberculosis Eradication.

Language from USDA Website referencing 1999 UM&R -

Bovine Tuberculosis (bTB) Testing Requirements for Interstate or International Movement
Last Modified: Apr 7, 2015

According to the 1999 TB UM&R:

1. No captive cervid with a response to any tuberculosis test is eligible for international movement.
2. No captive cervid with a response to any tuberculosis test is eligible for interstate movement unless said animal is subsequently classified “negative for tuberculosis” based upon an official tuberculosis test or is consigned directly to slaughter.
3. Captive cervids that originate from accredited herds may be moved interstate without further tuberculosis testing, provided that they are accompanied by a certificate stating that such captive cervids originated from an accredited herd.
4. Captive cervids not known to be affected with or exposed to tuberculosis that originate from qualified herds may be moved interstate if the animals are accompanied by a certificate stating that they originate from a qualified herd and have been classified negative to an official tuberculosis test that was conducted within 90 days prior to the date of movement. If the
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qualifying test was administered within 90 days of movement, the animal(s) to be moved do not require an additional test.

5. Captive cervids not known to be affected with or exposed to tuberculosis that originate from monitored herds may be moved interstate if they are accompanied by a certificate stating that such captive cervids originate from a monitored herd and have been classified negative to an official tuberculosis test that was conducted within 90 days prior to the date of movement.

6. Captive cervids not known to be affected with or exposed to tuberculosis that originate from all other herds may be moved interstate, provided that (1) they are accompanied by a certificate stating that such captive cervids have been classified negative in response to two official tuberculosis tests conducted no less than 90 days apart, (2) the second test was conducted within 90 days prior to the date of movement, and (3) the animals were isolated from all other members of the herd during the testing period.

7. Captive cervids less than 12 months of age that originate from and were born in qualified or monitored herds may be moved without further tuberculosis testing, provided that they are accompanied by a certificate stating that such captive cervids originated from such herds and have not been exposed to captive cervids from a lower status herd.

8. Institutions that have been accredited by the American Zoo and Aquarium Association (AZA) are exempt from these requirements when movement is between accredited member facilities. Captive cervids in zoological parks that have been accredited by AZA are exempt from the regulations in this subpart when the captive cervids are moved directly interstate between AZA member facilities. Any captive cervids moved interstate that are not moved directly from an AZA member facility to another AZA member facility must be moved in accordance with the regulations in this subpart.

9. Except for captive cervids moving interstate under permit directly to slaughter or necropsy, each captive cervid or shipment of captive cervids to be moved interstate must be accompanied by a certificate issued within 30 days of the movement by a State or Federal animal health official or an accredited veterinarian. The certificate must state the number of the official eartag or other identification approved by the Administrator for each captive cervid to be moved, the number of captive cervids covered by the certificate, the purpose of the movement, the origin and destination of the captive cervids, the consignor, and the consignee.

Language from 1999 UM&R - Part VI—Herd Status Plans for Captive Cervids

A. Accredited herd plan for captive cervids

1. Animals to be tested—Testing of herds for accreditation or reaccreditation shall include all captive cervids and all other hoof stock over 12 months of age and animals under 12 months of age that are not natural additions, except that animals under 12 months of age that are not natural additions originating from an accredited herd need not be tested.
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2. Qualifying standards—To meet the requirements for accredited herd status, the herd must pass at least three consecutive official tests for tuberculosis conducted at 9- to 15-month intervals with no evidence of bovine tuberculosis.

In herds previously infected, the fourth, fifth, and sixth annual whole-herd negative test will requalify the herd for accreditation.

Herds meeting these standards may be issued a certificate by local State and Federal animal health officials.

3. Additions—Accredited herd additions must originate directly from one of the following and have no exposure to captive cervids from herds of lesser status than the additions’ herd of origin:
   a. An accredited herd.
   b. A qualified or monitored herd, provided that the individual animals for addition had negative results on an official tuberculosis test conducted within 90 days prior to entry and were isolated from members of the accredited herd until these animals had a negative result on an official tuberculosis test conducted at least 90 days following entry.
   c. A herd not meeting the requirements of (a) or (b) in this section. Individual animals for addition must be isolated from all other members of the herd of origin and must have negative results on two official tests for tuberculosis conducted at least 90 days apart. The second of these tests must be conducted within 90 days prior to movement to the premises of the accredited herd. The additions must be kept in isolation from members of the accredited herd until the additions have a negative result on an official tuberculosis test conducted at least 90 days following the date of entry.

Animals other than natural additions added to an accredited-free herd shall not receive the accredited herd status for sale or movement purposes until they have a negative result on a retest 90 days after entry and until they have been included in a recertification herd test.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (VS) to issue a VS Guidance Document stating that “Animals other than natural additions added to an accredited-free herd shall not receive the accredited herd status for sale or movement purposes until they have a negative result on a retest 90 days after entry and until they have been included in a recertification herd test” is no longer applicable in the National Cervid Tuberculosis (TB) Herd Accreditation Program and no additional TB test is required for the accredited individual animal addition(s).

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RESOLUTION NUMBER: 32  APPROVED
SOURCE: COMMITTEE ON CAPTIVE WILDLIFE & ALTERNATIVE LIVESTOCK
SUBJECT MATTER: Chronic Wasting Disease Testing Protocol for Wild Cervidae

BACKGROUND INFORMATION:
Over the last 15 years the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and state regulatory officials have worked to control and prevent the spread of Chronic Wasting Disease (CWD).

Producers raising CWD susceptible species can only move their animals interstate if they are in compliance with the CWD program set forth in Title 9 Code of Federal Regulations (CFR) Parts 55 & 81 that state animals must originate from herds with at least five years of CWD monitored status.

State wildlife agencies that plan and execute elk restoration projects from one state to another are moving CWD susceptible species interstate without following minimum interstate movement requirements for farmed cervidae. Instead, Title 9 CFR Part 81.3 states the source population be considered "low risk" by the receiving state and USDA APHIS.

To date, over two dozen herds of wild elk have been captured and transported to other states across the nation that follow no CWD protocol set forth in the CWD Program Standards.

The movement of CWD susceptible cervid species with unknown CWD status by state wildlife agencies can undermine the success of CWD control programs that have been in place in many states for more than 15 years. CWD has been found in 23 states. Eight of the 23 states have detected CWD in the free-ranging deer populations but not in the farmed cervid herds.

The USAHA Committee on Wildlife Diseases approved a resolution at the 2015 annual conference that requested USDA Veterinary Services to develop a guidance document for captive deer, elk, or moose captured from a wild population for interstate movement and release.

APHIS has finalized and released VS Guidance Document 8000.1 “Surveillance and Testing Requirements for Interstate Transport of Wild Caught Cervids” in October 2016 but the requirement of an ante-mortem test, such as the rectal biopsy, is only optional.

Exact language is as follows:
“Optionally, a whole-herd rectal biopsy or other mutually agreed-on method of antemortem CWD test with concurrent genotyping may be performed on the assembled herd. Laboratory results must be “not detected” on all animals. Animals with untestable or incorrect location samples (i.e., samples that are autolyzed or of the wrong tissue type) may be retested.”

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services (VS) to amend the language in VS Guidance Document 8000.1 “Surveillance and Testing Requirements for Interstate Transport of Wild Caught
Cervids”, the Chronic Wasting Disease Program Standards, and Title 9 Code of Federal Regulations (CFR) Part 81.3, (b) Animals captured for interstate movement and release, to indicate that any wild cervid of a Chronic Wasting Disease (CWD) susceptible species captured and transported interstate for release shall require:

1) A rectal biopsy or other mutually agreed-on method of ante-mortem CWD test with concurrent genotyping performed on the assembled herd; and

2) Documentation of a sampling scheme sufficient to detect CWD at 1 percent prevalence with 95 percent confidence in wild cervids within the defined source population from which the animals are being moved and conducted within the most recent three-year period. Such sampling scheme shall include both passive (hunter harvest and found dead) and targeted surveillance for CWD.

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RESOLUTION NUMBER: 33  APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: Approval of Real Time Reverse Transcriptase Polymerase Chain Reaction Matrix Assay for Avian Influenza Surveillance in National Poultry Improvement Plan Authorized Laboratories

BACKGROUND INFORMATION:
National Poultry Improvement Plan (NPIP) authorized labs have successfully conducted avian influenza (AI) screening of flocks using agar gel immunodiffusion (AGID) and enzyme linked immunosorbent assay (ELISA) tests with approval of their Official State Agency (OSA), and state animal health officials for 18 years. The real time reverse transcriptase polymerase chain reaction (RRT-PCR) matrix assay for influenza A provides highly sensitive detection that is critical to ensure that birds are negative prior to translocation to other facilities. Authorized laboratories have successfully utilized molecular diagnostics for Salmonella and Mycoplasma and these assays have proven invaluable in NPIP program testing and compliance. An NPIP authorized primary breeder company laboratory not affiliated with the National Animal Health Laboratory Network (NAHLN) that uses a United States Department of Agriculture approved influenza A matrix assay RRT-PCR, achieves ISO 17025 quality certification, satisfactorily passes a National Veterinary Services Laboratory (NVSL) avian influenza matrix RRT-PCR proficiency test, and has an agreed memorandum of understanding (MOU) with their state animal health officials and official state agency (OSA) should be allowed to use the assay as a screening test within the NPIP’s US Avian Influenza Clean program. Any non-negative detection at NPIP authorized laboratory would immediately be forwarded to the NVSL for confirmation and notification of state animal health officials and the OSA will occur as outlined in NPIP provisions and State animal health emergency protocols.

The following proposal was approved at the 2016 NPIP Biennial Conference: § 145.14 Testing (d) For avian influenza.
Agent detection tests. Agent detection tests may be used to detect influenza A matrix gene or protein but not to determine hemagglutinin or neuraminidase subtypes. Samples for agent detection testing should be collected from naturally occurring flock mortality or clinically ill birds.

(i) The real time reverse transcriptase/polymerase chain reaction (RRT-PCR) assay.

(A) The RRT-PCR tests must be conducted using reagents approved by the Department and the Official State Agency. The RRT-PCR must be conducted using the National Veterinary Services Laboratories (NVSL) official protocol for RRT-PCR or a test kit licensed by the Department and approved by the OSA and the State Animal Health Official, and must be conducted by personnel who have passed an NVSL proficiency test.

(a) For non-National Animal Health Laboratory Network (NAHLN) Authorized Laboratories:

(i) RRT-PCR testing can only be used by primary breeder company Authorized Laboratories,

(ii) RRT-PCR testing can only be performed on their own breeding flocks and only used for routine surveillance,

(iii) the Authorized Laboratory has a quality system that is accredited as ISO/IEC 17025 or equivalent to perform the avian influenza RRT-PCR assay,

(iv) the Authorized Laboratory Memorandum of Understanding (MOU) included approval of use between the Authorized Laboratory, the Official State Agency (OSA), and the State Animal Health Official(s) of both the location of the Authorized Laboratory and the location where the breeder flocks reside,

(v) split samples for testing must occur between the Authorized Laboratory and a NAHLN laboratory at a frequency designated in the MOU.

(B) Positive results from the RRT-PCR must be further tested by Federal Reference Laboratories using appropriate tests for confirmation. Final judgment may be based upon further sampling and appropriate tests for confirmation.

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(b) Avian influenza.

(2) Agent detection tests. Agent detection tests may be used to detect influenza A matrix gene or protein but not to determine hemagglutinin or neuraminidase subtypes. Samples for this testing should be collected from naturally occurring flock mortality or clinically ill birds.

(i) The real time reverse transcriptase/polymerase chain reaction (RRT-PCR) assay.

(A) The RRT-PCR tests must be conducted using reagents approved by the Department and the Official State Agency. The RRT-PCR must be conducted using the National Veterinary Services Laboratories (NVSL) official protocol for RRT-PCR or a test kit licensed by the Department and approved by the OSA and the State Animal Health Official, and must be conducted by personnel who have passed an NVSL proficiency test.

(a) For non-National Animal Health Laboratory Network (NAHLN) Authorized Laboratories:
(i) RRT-PCR testing can only be used by primary breeder company Authorized Laboratories,
(ii) RRT-PCR testing can only be performed on their own breeding flocks and only used for routine surveillance,
(iii) the Authorized Laboratory has a quality system that is accredited as ISO/IEC 17025 or equivalent to perform the avian influenza RRT-PCR assay,
(iv) the Authorized Laboratory Memorandum of Understanding (MOU) included approval of use between the Authorized Laboratory, the Official State Agency (OSA), and the State Animal Health Official(s) of both the location of the Authorized Laboratory and the location where the breeder flocks reside,
(v) split samples for testing must occur between the Authorized Laboratory and a NAHLN laboratory at a frequency designated in the MOU.
(B) Positive results from the RRT-PCR must be further tested by Federal Reference Laboratories using appropriate tests for confirmation. Final judgment may be based upon further sampling and appropriate tests for confirmation.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services to approve the use of a USDA approved real time reverse transcriptase polymerase chain reaction matrix assay for influenza A in National Poultry Improvement Plan (NPIP) authorized primary breeder company laboratories as outlined in the NPIP proposed and passed change to the 9 Code of Federal Regulations 145.14 and 146.13 (Testing).

RESOLUTION NUMBER: 35    APPROVED
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES
SUBJECT MATTER: Upland Gamebird Secure Poultry Supply Plan
BACKGROUND INFORMATION:
The upland gamebird industry is a $1.9 billion industry that produces pheasants, bobwhite quail, chukar and Hungarian partridges for the United States gamebird hunting industry.
To minimize business interruption during a highly pathogenic avian influenza (HPAI) event, Secure Poultry Supply (SPS) plans for the table-egg layer, broiler and turkey industries are continuing to be developed using new risk assessments and past experience to act as tools to help emergency decision makers to provide rapid science-and risk-based decisions on the issuance or denial of movement permits within a Control Area.
The North American Gamebird Association, through its gamebird secure poultry supply plan working group, is attempting to develop a SPS plan for upland gamebirds that will be based upon a specific science- and risk-based plan that will include completed risk assessments.
RESOLUTION:
The United States Animal Health Association supports the current funding from United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services for the Upland Gamebird Secure Poultry Supply Plan risk assessments and encourages continued funding for these risk assessments beyond the current cooperative agreement.

RESOLUTION NUMBER: 36  APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
SUBJECT MATTER: Veterinary Public Practice Awareness and Promotion
BACKGROUND INFORMATION:
There have been several workforce studies over the last few years addressing the future of veterinary medicine and the critical role the profession plays in meeting societal needs, and the additional challenges the profession faces such as increased student debt. Most citizens of the nation are not aware of all the significant contributions veterinarians make to public health. To meet the increasing costs of veterinary education and the decreasing federal and state funding to support that education, veterinary colleges are increasing tuition and increasing class sizes in an attempt to meet those financial challenges.

A National Academy of Sciences (NAS) report from 2013 entitled “Workforce Needs in Veterinary Medicine” states that most of those students will likely practice companion animal medicine, and that “these actions will increase the supply of companion animal practitioners, the largest group of veterinary practitioners, at a time of uncertain demand for companion animal services”. The report further states that “the veterinary profession should expand its capacity to address complex global problems, such as those associated with food security, by encouraging interactions between US veterinary graduates and other disciplines and cultures, particularly in the developing world, where the profession has the opportunity to leverage its expertise in One Health and lead advances in food animal husbandry welfare, water safety and security, and the health of wildlife and ecosystems”. However, society must be convinced that investment in veterinary medicine is imperative. The study states that “the public, policymakers, and even medical professionals are frequently unaware of how veterinary medicine fundamentally supports both animal and human health and well-being” and that “broadening the public’s understanding will require commitment by veterinary leadership, the academe, and practitioners to develop and promote the profession as one that offers diverse career paths with many different niches for veterinarians, ranging from traditional companion animal practice to public and private sector positions in biomedicine, animal research, wildlife, the environment, global food production, food safety and security, and public health”.

An American Academy of Veterinary Medical Colleges (AAVMC) report of 2008 stated, “To safeguard the US economy, public health, and food supply, there must be recruitment and preparation of additional veterinarians into careers in public health, food systems, biomedical research, diagnostic laboratory investigation, pathology,
epidemiology, ecosystem health, and food animal practice”. Conclusion 1 of the NAS report states in part “societal needs for veterinary expertise are substantial and growing, but the potential contributions of veterinary medicine are not realized because appropriate positions in relevant sectors are lacking.” Although there are many reasons why there has not been adequate public sector financial support of veterinary education and opportunities, one clear reason is the lack of awareness of the public and decision-makers, and indeed many early career veterinary students, as to the value, skills, and broad interdisciplinary capabilities of veterinarians. To enhance the ability of the veterinary profession to better meet societal needs and to provide more opportunities for employment for veterinarians, it is critically important to increase public awareness of the skills, abilities, and broad-based training of veterinarians.

RESOLUTION:

The United States Animal Health Association urges the American Veterinary Medical Association to lead a public relations campaign similar to the “Partners for Healthy Pets” campaign, with a goal to raise public awareness of the breadth of skills of veterinarians in diagnostic and regulatory medicine and the contribution of veterinary medicine to public, animal and environmental health. Such a campaign could be called “Partners for a Healthy Planet”, “Partners for a Healthy Society,” or some such similar title.

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RESOLUTION NUMBER: 38 APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: Optimization and Standardization of Purified Protein Derivative Tuberculin Application for Interferon-gamma Release Assays

BACKGROUND INFORMATION:

Infection with Mycobacterium bovis (M. bovis) continues to impact the United States cattle industry with a significant number of tuberculosis (TB) infected herds detected in different states in 2016. The caudal fold tuberculin (CFT) test is the primary screening test used in the bovine TB program. A major disadvantage of this test is that it requires cattle to be handled twice, once for the injection and a second time to interpret the test. Further, the person performing the test must also be adequately trained and sufficiently experienced to interpret the test results accurately. Experience is critical; determining a “response” may be subjective, especially if the response to the injection is weak. Test result accuracy may also depend on the purified protein derivative (PPD) tuberculin which is applied. Current regulation allows a range of potency as prescribed in the respective regulation of Title 9 Code of Federal Regulations (CFR) 113.409(c).

Currently used antibody tests demonstrate poor specificity resulting in too many false negative test results leading to undetected reactors remaining in the herd. In addition, antibody test can interfere with the caudal fold test.

BOVIGAM™ is one official auxiliary test used in cattle herds with the approval of the State Animal Health Official and United States Department of Agriculture,
Animal and Plant Health Inspection Service, Veterinary Services, National Import Export Services Service Centers. This test may be used under direction of the Designated TB Epidemiologist and with concurrence of the Regional TB Epidemiologist. BOVIGAM™ is an IFN-y release assay which is widely used in different national tuberculosis eradication programs world-wide. In 2015 OIE approved BOVIGAM™ for use as a primary test. Resolution 29/2014 recommends the use of BOVIGAM™ utilizing Lelystad PPD due to the improved sensitivity whereby specificity remains equivalent in comparison to PPD from CSL origin. However, test accuracy is dependent upon standardized and harmonized batch production of the applied PPD tuberculin for the stimulation of the whole blood samples.

An optimized and more standardized PPD tuberculin for IFN-y release assay applications should be developed to improve the national tuberculosis program which is urgently needed by the cattle industry.

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Center for Veterinary Biologics (CVB) to work with USDA-APHIS Veterinary Services (VS) Cattle Health staff to optimize purified protein derivative tuberculin for interferon-gamma release assays and that the resulting product(s) be submitted to APHIS-VS-CVB for licensing purposes.

RESOLUTION NUMBER: 43  APPROVED
SOURCE: COMMITTEE ON SHEEP AND GOATS
SUBJECT MATTER: Ensuring Sound Science-Based Animal Health Policies
BACKGROUND INFORMATION:
Science-based animal health policies are fundamental to the United States Department of Agriculture in their efforts to issue decisions, develop regulations, and identify diagnostic test needs.

In some cases, policies and decisions are justified by in-house studies that are not subject to a rigorous outside and independent scientific review. In other cases, potential conflicts of interest develop when a study that serves as the foundation for a regulatory decision has been published in a scientific journal with an editorial board that includes individuals from government agencies through which the decision will be issued.

Clear and sound evaluation criteria for scientific studies used to support federal animal health policies are key to retaining public trust and confidence in agency actions.

RESOLUTION:
To ensure the development of science-based animal health policy, the United States Animal Health Association urges the United States Department of Agriculture (USDA), the United States (US) Department of Homeland Security and
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the US Department of Interior to establish Department-wide criteria for evaluating research that is used to support animal health policy decisions. The following actions would help establish sound evaluation criteria and help increase trust and confidence in the policy making process:

- Initiate an independent and unbiased review of the science and/or methodologies used to support broad policy decisions.
- Establish a validation process for prediction models, risk assessments, spread models, or other diagnostic or analytical methods that are to be used.
- Require any studies proposed to be undertaken by an agency or department, intended to be used to justify or direct animal health policy or decision making, be subject to an independent scientific review which would be consistent with a previously established rigorous outside, independent review processes in place for evaluation of competitive grant proposals at USDA.

RESOLUTION NUMBER: 44  APPROVED
SOURCE: COMMITTEE ON PARASITIC AND VECTOR BORNE DISEASES
SUBJECT MATTER: Development of Cattle Fever Tick Prevention and Treatment Methods for Both Livestock and Wildlife

BACKGROUND INFORMATION:

The Texas Cattle Fever Tick Eradication Program (CFTEP), established in 1906, is the oldest livestock pest eradication program in the nation. CFTEP’s mission is to eradicate fever ticks through the management of a permanent quarantine zone, as well as through temporary quarantine areas created to address the presence of fever ticks outside the permanent quarantine zone. Since the onset of the Program, the required 100% treatment of cattle has been the most effective method of eradicating ticks from infested premises. The 100% treatment requirement, while primarily responsible for the successful eradication of fever ticks from the U.S. in 1946, creates a burden for producers by increasing gathering frequency and handling of cattle.

Treatment for cattle fever ticks has historically been accomplished by the application of acaricides through the use of swim vats. Multiple acaricides have been used over the years. Due to environmental concerns and tick resistance issues, coumaphos is the only remaining, licensed topical acaricide for use in eradication efforts and has a required treatment interval of 7-14 days. Doramectin is the only approved systemic acaricide and has a required treatment interval of 25-28 days. Systematic treatment of infested cattle must occur at the frequency prescribed by one of the two treatments for the duration of the quarantine period. Quarantine periods for infested cattle can last nine months or longer.

Moving forward, the key to mitigating the risk of fever tick incursions from Mexico and reducing the size of cattle fever tick outbreaks will be development and implementation of preventive therapies such as vaccines. A recently developed fever tick vaccine is now in use in beef cattle in the permanent quarantine zone and
temporary preventive quarantine areas. The vaccine will be a valuable tool in eradication efforts. While it is highly efficacious against the *Rhipicephalus annulatus* tick, it has only moderate efficacy against the *R. microplus* tick, the species of fever tick involved in the current large outbreaks.

Wildlife, such as white-tailed deer, and exotic wildlife, such as red deer, elk, and nilgai antelope, are also very competent fever tick hosts. Expanding populations of these wild and exotic hosts have led to, and are continuing to be major contributors to, fever tick outbreaks outside of the permanent quarantine zone. The most recent of these includes the current outbreak in Cameron and Willacy counties in Texas. An approximately 223,000 acre temporary preventive quarantine area was established in October 2014 in Cameron County after the discovery of infested cattle on three premises outside of the permanent quarantine zone. Since October 2014, the number of infested premises in Cameron and Willacy Counties has risen to nearly 40 and the number of quarantined acres has risen to nearly 360,000. Approximately two-thirds of the currently infested premises are attributed to infested nilgai antelope, demonstrating that the species is an important contributor to the northern movement of the cattle fever tick. Similarly, wildlife hosts are contributing to an increase in fever tick infestations in the permanent quarantine zone as land use transitions away from cattle ranching and into wildlife only operations. There is no current treatment method for nilgai antelope or other exotic wildlife hosts, and only one approved treatment for white-tailed deer.

The diminishing number and short treatment interval of approved treatments, the limited number of new treatment and prevention mechanisms for cattle, and the limited to non-existent treatment and prevention methods for wild and exotic hosts are putting fever tick eradication efforts at risk. Additionally, as the current fever tick outbreaks spread, cattle producers are being forced to assume the additional costs of increased gathering and treatment of cattle when there is no available effective mechanism to treat infested wild and exotic hosts. The only current mechanism for control of infested exotic wildlife hosts is lethal removal.

**RESOLUTION:**

The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS) to collaborate with the USDA-Agricultural Research Service to prioritize research projects to:

1) develop, and gain approval for use of new, systemic cattle fever tick treatment products with longer treatment intervals for cattle;

2) develop, and gain approval for use of new cattle fever tick treatment products for wildlife, especially nilgai antelope; and,

3) develop, and gain approval for use of improved cattle fever tick preventive therapies, such as vaccines, for both cattle and wildlife hosts.

Further, the United States Animal Health Association urges the USDA-APHIS to prioritize resources for cattle fever tick eradication efforts through increased support of the USDA-APHIS-Veterinary Services-Cattle Fever Tick Eradication Program.
REPORT OF THE USAHA COMMITTEE ON PARASITIC AND VECTOR BORNE DISEASES
Chair: Dee Ellis, TX
Vice Chair: Diane Kitchen, FL

Gary Anderson, KS; Celia Maria Antognoli, CO; James Averill, MI; Bob Bokma, MD; Bethany Bradford, VI; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; Charles Brown II, WI; Stan Bruntz, CO; Alfonso Clavijo, KS; Matt Cochran, TX; Karen Conyngham, TX; Joseph Corn, GA; Lynn Creekmore, CO; Susan Culp, TX; Mark Davidson, MD; Glenda Davis, AZ; Ignacio dela Cruz, MP; Barbara Determan, IA; Edward Dubovi, NY; William Edminton, TX; Anita Edmondson, CA; Dee Ellis, TX; James Evermann, WA; Katherine Flynn, CA; Robert Fulton, OK; Donna Gatewood, IA; Robert Gerlach, AK; Paul Gibbs, FL; Tony Good, OH; Nita Grause, IA; Thomas Hairgrove, TX; Hallie Hasel, TX; Percy Hawkes, UT; Greg Hawkins, TX; Carl Heckendorf, CO; Linda Hickam, MO; Bob Hillman, ID; Thomas Holt, FL; Dennis Hughes, NE; Russell Iselt, TX; Bruce King, UT; Diane Kitchen, FL; Charlotte Krugler, SC; Todd Landt, IA; T.R. Lansford, TX; Delorias Lenard, SC; Randall Levings, IA; Chuck Lewis, IA; Coleman Locke, TX; Linda Logan, TX; Travis Lowe, MN; N James Maclachlan, CA; David Marshall, NC; Chuck Massengill, MO; Terry McElwain, WA; Scott McVey, KS; Shelley Mehlenbacher, VT; Brodie Miller, TX; Myrna Miller, WY; Eric Mohlman, NE; Igor Morozov, KS; Peter Mundschenk, AZ; Cheryl Nelson, KY; Sandra Norman, IN; Dustin Oedekoven, SD; Eileen Ostlund, IA; Elizabeth Parker, TX; Steve Parker, GA; Boyd Parr, SC; Angela Pelzel-McCluskey, CO; Alejandro Perera, MEX; William Pittenger, MO; David Pyburn, IA; Justin Roach, OK; Jonathan Roberts, LA; Keith Roehr, CO; Larry Samples, PA; Shawn Schafer, OH; Jack Schlater, IA; David Schmitt, IA; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Michael Short, FL; David Smith, NY; Robert Stout, KY; Manoel Tamassia, NJ; Patrick Tarlton, TX; Susan Tellez, TX; Brad Thurston, IN; Tracy Tomascik, TX; Alex Turner, CO; Paul Ugstad, NC; Douglas Wagner, PA; Curt Waldvogel, OH; Mark Walter, PA; James Watson, MS; Skip West, OK; William Wilson, KS; David Winters, TX.

The Committee met on October 19, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 8:00 a.m. to 12:00 p.m. There were 36 members and 40 guests present.

Presentations

SCWDS Exotic Arthropod Surveys
Joseph Corn and Stacey Vigil, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia
James Mertins, USDA-APHIS-National Veterinary Services Laboratories

The Southeastern Cooperative Wildlife Disease Study (SCWDS), in collaboration with the USDA-APHIS-VS, conducts surveys for exotic arthropods in the Southeastern United States and Caribbean region. Current programs include surveys for the tropical bont tick on wildlife in Vieques, Puerto Rico; surveys for cattle fever ticks on wildlife in the Cattle Fever Tick Quarantine Area in Texas; and surveys for Culicoides vectors of bluetongue virus and epizootic hemorrhagic
disease virus in the Southeast United States. Surveys for the tropical bont tick on mongooses, cattle egrets and feral horses in Vieques began in late 2014 and are ongoing. SCWDS is collaborating with Vieques NWR on surveys in previously restricted areas in Vieques. A survey for cattle fever ticks on deer and other ungulates in South Texas is being conducted during 2016-2017 in collaboration with USDA-APHIS-Veterinary Services and the Texas Animal Health Commission. Surveys for Culicoides have detected new state records for 11 Culicoides species in 15 states as some Culicoides species appear to be expending their range northwards. Surveys this year were conducted in Alabama, Georgia, Mississippi, North Carolina, South Carolina and Tennessee.

SCWDS Hemorrhagic Disease Surveillance in Wild Ruminants
Mark Ruder, Clara Kienzle, Rebecca Poulson, and David Stallknecht, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia

Annually, SCWDS receives tissue samples from throughout the United States from wild ruminants suspected to have orbiviral hemorrhagic disease. Virus isolation and identification is performed and findings from the 2015 and 2016 transmission seasons are reported here. During 2015, 56 viruses were isolated from 172 tissue samples, representing six species of wild ruminant (159 white-tailed deer, 6 mule deer, 3 elk, 2 key deer, 1 moose, and 1 bison) from 19 states. Isolations of EHDV-1 (3), EHDV-2 (42), EHDV-6 (3), and BTV-17 (8) were made from white-tailed deer (see Table). As of October 1, 2016, there have been 36 viruses isolated from 99 tissue samples, representing 21 states and six species (84 white-tailed deer, 6 mule deer, 4 pronghorn, 3 bighorn sheep, 1 elk, and 1 nilgai). Isolations of EHDV-1 (1), EHDV-2 (21), EHDV-6 (3), BTV-2 (1), BTV-3 (9), untyped pending (1) were made from white-tailed deer or mule deer (see Table).

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<thead>
<tr>
<th>STATE</th>
<th>SPECIES</th>
<th>VIRUS</th>
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<tr>
<td>Alabama</td>
<td>white-tailed deer</td>
<td>EHDV-1</td>
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<td>EHDV-2</td>
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<td>Florida</td>
<td>white-tailed deer</td>
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<td>EHDV-6</td>
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<td>white-tailed deer</td>
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<td>Indiana</td>
<td>white-tailed deer</td>
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<td>Montana</td>
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<td>North Carolina</td>
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The 2016 BTV-3 outbreak in West Virginia and Virginia is noteworthy because this serotype of BTV is not historically endemic to the U.S. Furthermore, this outbreak represents the northeastern most detection of BTV-3 in the U.S. and there is concern over the northern expansion of bluetongue and EHD viruses into northern states. During early- to mid-August 2016, the Virginia Department of Game and Inland Fisheries (VDGIF) and the West Virginia Division of Natural Resources (WVDNR) received numerous reports of sick and dead white-tailed deer in bordering counties of the northern part of each state. Prompt field investigation and diagnostic sample submission by agency personnel lead to the isolation of BTV at SCWDS, which was confirmed as BTV-3 by NVSL. Reporting of sick and dead deer by the public continued through mid- to late-September. Based on these reports and field investigation by WVDNR and VDGIF, the outbreak was intense in the deer population but appears to have been fairly localized to a mountainous region in extreme eastern Hardy County, West Virginia, western Shenandoah County, Virginia, and northern Rockingham County, Virginia. However, follow-up investigation will aim to better evaluate the geographic extent of the outbreak. In total, BTV-3 was detected in tissues sampled from 9 of 14 deer from the region. BTV-3 was first confirmed in Florida in 1999 by the National Veterinary Services Laboratory (NVSL). However, since that time, BTV-3 has been detected in domestic and wild ruminants over a broad geographic region, including Florida (1999-2003, 2013), Mississippi (2006, 2009), Arkansas (2008), Oklahoma (2008), South Dakota (2012), and Texas (2015). A large portion of these BTV-3 detections have been made from white-tailed deer, highlighting the importance of monitoring
PARASITIC AND VECTOR BORNE DISEASES

wild ruminants for orbivirus activity. In many regions of the U.S., this species can serve as an important sentinel for EHDV and BTV activity.

An additional noteworthy observation from 2016 is the isolation of EHDV-6 from a mule deer in New Mexico. This represents the western most detection of EHDV-6 by SCWDS and indicates that this virus continues to circulate over a very broad geographic region in the United States.

Updates for the Committee on Parasitic and Vector Borne Diseases

Equine Piroplasmosis
Angela M. Pelzel-McCluskey, USDA-APHIS-Veterinary Services (VS)

Since November 2009, more than 314,000 domestic U.S. horses have been tested for equine piroplasmosis (EP) through active surveillance and movement testing. To date, 331 EP-positive horses (321 *Theileria equi*-positive, 10 *Babesia caballi*-positive) have been identified through this surveillance. These positive horses are unrelated to the 2009-2010 *T.equi* outbreak on a Texas ranch where 413 positive horses were identified in connection with the outbreak and natural tick-borne transmission on the ranch was documented to have occurred over at least 20 years and has since been eradicated. Of the 331 positive horses identified through active surveillance, 280 were Quarter Horse racehorses, 13 were Thoroughbred racehorses, and 32 were horses previously imported to the United States before August 2005 under the complement fixation test. The epidemiology investigations conducted in all of these cases have indicated no evidence of tick-borne transmission and the cases in racehorses specifically have involved iatrogenic transmission as the method of spread.

So far in 2016, 17,507 domestic U.S. horses were tested for EP with the identification of 68 horses positive for *T. equi*. Sixty-seven (67) were Quarter Horse racehorses and one horse was an Azteca mare suspected to have been illegally moved from Mexico. The Quarter Horse racehorses were participating in sanctioned racing, unsanctioned racing, or both and one of these horses was found to be dually infected with both *T. equi* and equine infectious anemia (EIA). The majority of these horses were found as clusters of positives associated with the same trainer and/or owner and epidemiology investigations conducted have implicated iatrogenic transmission (needle/syringe/IV equipment reuse, blood transfusions, contamination of multi-use drug vials, etc.) as the primary method of transmission in all Quarter Horse racehorse cases identified in 2016.

All EP-positive horses are placed under State quarantine and the horse owners are offered four options for long-term management under state/federal regulatory oversight: 1) life-time quarantine, 2) euthanasia, 3) export from the country, or 4) long-term quarantine with enrollment in the APHIS-VS and ARS treatment research program. In February 2013, APHIS-VS established a policy to release horses previously infected with *T. equi* which had completed the official treatment program, been proven cleared of the organism by a series of methods over time, and were test negative on all available diagnostics. Of the 331 positive horses identified, 172 have either died or been euthanized, 19 have been exported, and 103 have been enrolled in the treatment program. Thirty-one (31) of the horses
enrolled in the treatment program have met all of the test-negative requirements and have been released from quarantine. From the 2009-2010 Texas ranch outbreak, 163 horses were enrolled in the treatment research program and have completed treatment with more than 140 horses having met all test-negative requirements and are eligible for release. Successful results from the treatment research program were previously reported by Ueti et al. in Re-emergence of the Apicomplexan Theileria equi in the U.S.: Elimination of Persistent Infection and Transmission Risk published in PLoS One, September 2012.

Given that the primary high-risk population for EP over the past several years has been determined to be limited to Quarter Horse racehorses, targeted surveillance in this population is critical to identifying positive cases quickly and mitigating further iatrogenic spread of the disease. While annual surveillance for EP was previously conducted at levels of approximately 75,000 horses per year in 2010 and 2011, surveillance numbers since that time have been dropping annually and now hover around 20,000 horses tested per year. Additionally, while there were once 11 states with EP test requirements to enter sanctioned racetracks in 2010, there are now only four states with an EP test requirement to enter tracks. This decline in surveillance testing in the high-risk population hinders the goal of early detection and is likely to lead to further disease spread over time. Additional industry support and involvement is needed at this juncture to: 1) increase EP surveillance in Quarter Horse racehorses and, 2) assist in educational outreach to prevent the poor biosecurity practices which have led to continued spread by iatrogenic means in this population.

Vesicular Stomatitis

The 2015 vesicular stomatitis virus (VSV) outbreak in the United States occurred from April 29, 2015 to March 4, 2016. A total of 823 VSV-affected premises (New Jersey serotype) were confirmed or suspected in eight (8) U.S. states; Arizona (36 premises in 3 counties), Colorado (441 premises in 36 counties), Nebraska (38 premises in 10 counties), New Mexico (52 premises in 13 counties), South Dakota (50 premises in 7 counties), Texas (4 premises in 4 counties), Utah (56 premises in 8 counties), and Wyoming (146 premises in 10 counties).

The World Organization for Animal Health (OIE) removed vesicular stomatitis from the international list of reportable diseases as of January 1, 2015. APHIS, Veterinary Services (VS) held a national-level VSV after-action review in January 2015 to review the response to the 2014 outbreak and to examine future VSV response actions in light of OIE’s delisting of the disease. Overall conclusions from the meeting included: 1) a VSV control strategy is still needed to prevent movement of infectious animals and to secure both interstate and international trade during an outbreak; 2) VSV must remain reportable to State and Federal officials to implement this control strategy; and 3) while existing regulatory response protocols in cloven-hooved species must be maintained to rule out other diseases such as foot-and-mouth disease, response to equine cases can be appropriately modified to reduce the impact on State and Federal resources.

Based on these conclusions and other recommendations, USDA-APHIS-VS, and State Animal Health Officials (SAHOs) employed a modified response in the
2015 outbreak. New measures included a reduction in the quarantine period based on viral shed from affected animals, activation of VSV-approved NAHLN laboratories to assist in testing of affected equine species, and flexibility to use accredited veterinarians for sample collection in equine species and management of affected premises. Feedback from affected States on the modified approach was positive, especially with regard to the reduced quarantine period and the use of accredited veterinarians, both of which significantly reduced the impact on State and Federal resources while maintaining the necessary infection control strategy.

Although state and federal animal health officials were prepared to implement the successful response strategies employed in 2015 for a 2016 outbreak season, to date there have been no cases of VSV confirmed in the U.S. during the expected 2016 season.

**Equine Arboviruses (WNV, EEE)**

An update on the 2015 and 2016 case counts for equine cases of West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE) Virus in the United States was presented. In 2015, a total of 225 equine cases of WNV were reported from 31 states and 70 equine cases of EEE were reported from 11 states. Complete annual reports for WNV and EEE equine cases are available on the USDA-APHIS website.

Data on equine WNV and EEE cases are provided to APHIS-VS via bi-weekly reporting from the Centers for Disease Control’s ArboNET database. VS’s Center for Epidemiology and Animal Health validates the report through communication with state animal health officials and posts the most recent validated case report to the USDA-APHIS website in an attempt to provide the public with more timely current case information during the year. As of the October 4, 2016 report, 183 equine WNV cases have been reported in 26 states and 81 equine EEE cases have been reported in 12 states.

Although epidemiological details associated with each reported case are not available through ArboNET, communication with state animal health officials on a subset of reported WNV and EEE cases has indicated the majority of these cases to have been confirmed either unvaccinated or under-vaccinated equids. Often it has been identified that economic hardship plays a role in a horse owner’s decision not to booster vaccinate horses for EEE or WNV thereby leaving them inadequately protected from these viruses. Given the costs associated with laboratory confirmation of a positive case, it is widely understood that the equine cases confirmed and reported through the ArboNET system are likely to reflect significant underreporting of the actual cases counts of EEE and WNV in U.S. equids.

**Wyoming Equine Piroplasmosis Summary**

Thach Winslow, Wyoming Livestock Board Animal Health

On August 24, 2016, the Wyoming Livestock Board was notified by the California Department of Agriculture of a Wyoming origin Equine Piroplasmosis positive horse in Los Alamitos, California.

This horse is a two-year-old Filly originally purchased as a yearling from the fall sale in Los Alamitos and since trained and raced in Wyoming.
REPORT OF THE COMMITTEE

She was legally moved from Wyoming to California without a negative Piroplasmosis test and was only tested because the owners were misinformed that a test was required to race at the track. Wyoming immediately placed quarantine on all horses of common ownership and/or common trainer. This included four yearlings, a mare and a stallion at the Uinta County stable and 14 race horses at Sweetwater Downs in Rock Springs, Wyoming. Only one of these fourteen was of different ownership. As potentially exposed animals, the horses at the track were allowed to race and were permitted movement to the Central Wyoming Fairgrounds for the next scheduled race pending test results. The trainers were educated about iatrogenic transmission with specific restrictions for administration of any injectable products by veterinarian only.

The horses at the home stable were restricted from movement and commingling.

All 20 horses were bled and checked for ticks. Blood samples were sent to National Veterinary Services Laboratory (NVSL) for testing, and no ticks were found.

Results were positive on all fourteen horses at the track. All of the horses at the home stable except the one stallion (who had raced previously) were negative. This was a strong indication that spread was iatrogenic which was confirmed on interview with the trainer who was in the practice of changing needles, but using a shared syringe and phenylbutazone bottle when giving IV treatments. No blood products were used in these horses.

The fourteen horses as well as the filly in Los Alamitos were returned to Uinta County on 1-27’s and sealed vehicles where all positive horses are being held separately from the negative ones.

The owner(s) anticipate that they will treat all, if not the majority, of the horses.

There has been a total of 50 horses thus far involved in this investigation. Of these proven links, have produced 12 trace outs (1 low risk horse whose presence is unknown, 7 horses now in Mexico, 1 horse that has died, and three horses in Utah - two of which have been tested positive and euthanized. One of these horses, prior to being confirmed positive and euthanized, was brought to the Casper track with nine other horses under common trainer. These nine tested negative once and were under quarantine awaiting a second negative 30 day test during which time Wyoming permitted them to move to Energy Downs in Gillette, Wyoming to race with restrictions. From there, five were sent on 1-27’s to the trainer’s residence in Utah and the remaining four were sent on 1-27’s to three Wyoming home premises where all tested negative on the 30-day post exposure test and released from quarantine.

The basic business plan for this owner is to purchase yearlings, break, train, and race them as 2 and 3 year olds in the U.S. and then race and or sell them in Mexico.

Some of the purchased horses in the investigation however had previous race histories. We looked at these first to determine the source of the disease introduction with little success. Testing has established that this cluster of horses has been infected since at least 2014.
It appears that the source of infection was a horse purchased out of Mexico that match raced in Texas prior to coming to Utah in 2013 where it presumable infected the positive horse that turned up in Nevada and then was to sell to Wyoming where it infected this cluster. It was sold and sent to Guatemala in the fall of 2014 with no test history. Currently Wyoming has 16 EP positive horses under quarantine and to be treated.

**Tennessee EP Presentation Summary**

Charles Hatcher, Tennessee Department of Agriculture

The Tennessee update on the recent Equine Piroplasmosis outbreak in 2016 involving racing quarter horses was provided as follows. The outbreak occurred on two main training locations with 24 positive horses. Initial positive horses were first detected through the efforts of attending veterinarians. Two horses have been euthanized and the remaining 22 are undergoing treatment. Training cohorts are in the process of ongoing testing.

**USDA-ARS Knipling-Bushland U.S. Livestock Insects Research Laboratory: Research Update**

Robert Miller, USDA-ARS, Cattle Fever Tick Research Laboratory

Dr. Miller spoke about current research into the control of cattle fever ticks to include new product development and anti-tick vaccine testing. He also spoke about the 3-year project to develop a sustainable Integrated Pest Management (IPM) program for tick control in Puerto Rico. He discussed the research on Nilgai and biocontrol of Arundo and cattle fever ticks. Lastly, he discussed the development of a male-only strain of screwworms.

**New World Screwworm in the Florida Keys**

Diane Kitchen, Florida Department of Agriculture and Consumer Services

On September 29, 2016, Florida Department of Agriculture and Consumer Services, Division of Animal Industry (FDACS-DAI) was contacted by a biologist at the National Key Deer Refuge regarding an increased incidence of myiasis in Key Deer on the Big Pine Key (BPK). Key Deer are a subspecies of Whitetail deer, and are federally listed as endangered. FDACS-DAI initiated a Foreign Animal Disease Investigation (16FL0012) immediately. Larvae collected from deer euthanized due to severe infestation, were submitted to the National Veterinary Services Laboratory (NVSL) in Ames, Iowa for identification. NVSL confirmed that the larvae were New World screwworm (*Cochliomyia hominivorax*) on September 30, 2016.

History from the reporting source indicated that severe myiasis was first observed on July 4, 2016 in a Key Deer injured in a motor vehicle accident. Subsequently, additional Key Deer have been and continue to be euthanized due to the severe infestation. Additional information suggested that domestic animals in the area had also been observed with severe myiasis.

Contact with a veterinarian located in Marathon, Florida (approximately 25 miles east of BPK) confirmed reports that at least three domestic animals with severe myiasis had been examined since July 22, 2016. These included two dogs
and a pet pig. One of the dogs survived the infestation. A dog on No Name Key has also tested positive for NWS.

National Key Deer Refuge - Big Pine Key, FL

The National Key Deer Refuge is administered by the U.S. Fish and Wildlife Service and includes land on multiple keys in the chain of keys (islands) in South Florida. The government owned lands are intermixed with private lands and urban development. The refuge is home to 800-1,000 Key Deer (a subspecies of White Tail Deer) and numerous other endangered species including many insects. The urban-wildlife interface is significant and the key deer regularly wander into urban areas and are favorites of the residents.

Between July 3, 2016 and September 29, 2016, 31 Key Deer were euthanized due to severe myiasis. The majority of the mortality has been male deer (25) and appears to be associated with antler base or antler injury related wounds which become infested. Mortality was becoming increasingly frequent and most deer were demonstrating extreme tissue damage.

![Chart 1 - Key Deer Mortality by date and sex](chart1.png)

Chart 1 - Key Deer Mortality by date and sex

Response - Incident Management Team

Based on the history of significant loss and the potential risk to the animal agriculture of Florida and the U.S., a Unified Command IMT was immediately established following confirmation of the finding of New World Screwworm. USDA and Florida Department of Agriculture and Consumer Services coordinated with multiple agencies and deployed to the Florida Keys. Florida's Commissioner of
Agriculture declared an Agricultural Emergency and issued a Movement Control Area for Monroe County Florida.

A mandatory animal inspection station was established on Highway 1 near Key Largo with signage to direct traffic for animal inspection prior to leaving the keys. Agricultural Law Enforcement and veterinary support team operate the station 24 hours per day, seven days a week.

Extensive outreach and education was prepared and many resources for public awareness were developed quickly. Outreach has focused on veterinarians, pet owners, groomers, marinas, community meetings and industry stakeholders. A website was opened with information and resource material.

A Sterile Fly Release Taskforce was developed and subject matter experts from USDA-ARS and USDA-International Services (IS) working with Cooperative for the Eradication and Prevention in Panama implemented extensive surveillance and determined sites for Sterile Fly Release on the infested keys. At this time, 13 release sites on five keys have begun release activities. It is expected that the releases will continue for at least 25 weeks.

At this time, there are three confirmed cases on two keys. These include a key deer, dog and domestic pig. Over 90 key deer and two dogs and a pig are defined as Presumptive positive cases. Surveillance on the mainland peninsula of Florida has been negative for NWS.

Research Update - The Arthropod-Borne Animal Diseases Research Unit (October 2016)

USAHA

D. Scott McVey, Research Leader and Veterinary Medical Officer, Arthropod-Borne Animal Diseases Research Unit, USDA-ARS-PA-CGAHR

The Arthropod Borne Animal Diseases Research Unit’s (ABADRU) research mission is to solve major endemic, emerging, and exotic arthropod-borne disease problems in livestock. The Unit completed the move to Manhattan, Kansas in 2010 and now the ABADRU is well established at the Center for Grain and Animal Health Research (CGAHR). All ABADRU research falls under the ARS National Research Programs: NP103 and Animal Health and NP104 Veterinary, Medical, and Urban Entomology. The areas of research range from vector biology to virus-vector-host interactions.

The viruses that cause bluetongue (BT) and epizootic hemorrhagic disease (EHD) are of concern to livestock producers in North America because of 1) the emergence of new serotypes, 2) increased reports of spillover and clinical disease in cattle, and 3) increased spread and adaptation to new geographical areas. Current projects in ABADRU include virus genotyping of more recent isolates, virus transmission and related pathogenesis, development of fluorescent microsphere assays for detection of antibody, EHDV infection of and transmission to white-tailed deer, vector genetics, vector proteomics, vector transcriptomics, vector ecology/biology and vector control. The Unit is focused on the Culicoides vector transmission mechanisms, maintenance of infection in the vector and the characterization of host immune responses to inform improvement of animal models, diagnostics and vaccines.
The potential introduction of Rift Valley fever (RVF) virus (RVFV) is the most significant arthropod-borne animal disease threat to U.S. livestock. A number of challenges exist for the control and prevention of RVF in the areas of disease surveillance, diagnostics, vaccines and vector control. Understanding the epidemiological factors affecting disease outbreak and the inter-epizootic maintenance of RVFV is necessary for the development of appropriate countermeasure strategies. This includes the ability to detect and characterize emergent viruses. Outcomes of current research will potentially identify determinants of RVFV infection, pathogenesis and maintenance in mammalian and insect vector hosts. Information derived from these studies will also support continued vaccine development. Experimental vaccine formulations have been developed to improve immunogenicity, onset of immunity and stability to provide better response to outbreaks and prevent RVFV epizootics. Improved diagnostic assays have been developed in collaboration with research scientists at Kansas State University (ELISA technology, immunohistochemistry methods and reagents, multiplex assays (Luminex™) and lateral flow assays).

Research has continued in the emerging field of predictive biology. The goals of this molecular epidemiology research program are to understand how viruses differentially adapt to insect and animal hosts and how these viruses are maintained and transmitted. Improved RVF risk models were developed and evaluated for the United States that account for two species of mosquitoes (*Aedes vexans* and *Culex tarsalis*), cattle, humans, and pathogen transmission along a contact network continue to provide insight into the potential epidemiology should the virus be introduced. Mitigation strategies were tested in the model to determine optimal timing and application. Mosquito population reduction is the most effective arthropod control method, whereas vaccination and quarantine were the best animal methods. This work has been extended to 1) Flaviviridae, genus Flavivirus (West Nile virus and Japanese Encephalitis virus) and 2) Rhabdoviridae, genus Vesiculovirus (Vesicular Stomatitis virus).

The ABADRU also has a very important program in arthropod vector pathology. An extremely small percentage of insect species transmit disease-causing pathogens to animals and humans. Specific biological and behavioral characteristics allow these vector insect species to be efficient means of pathogen propagation and transmission; however, these same characteristics may be targeted by control measures to limit pathogen spread or disease vector abundance. The common purpose of these projects is to understand key components of the host-pathogen-vector cycle to reduce or prevent pathogen transmission by the most common disease vectors: house flies, mosquitoes, and biting midges. House flies associate with bacteria-rich environments due to the nutritional requirements of their larvae. This research defines the role of bacteria in fly development, bacterial persistence during microbe and insect interactions, and pathogen dissemination. Natural selection for increased *Culex tarsalis* mosquito fitness for various habitats and animal hosts has left genetic markers (single nucleotide polymorphisms) throughout the genome. These markers can be associated with traits and used to predict regional entomological risk in a changing climate throughout the mosquito’s large geographic range. The identification of
BITING MIDGE saliva components that facilitate pathogen transmission will lead to improved transmission and pathogenesis models. This information will enhance development of vaccines and other countermeasures to reduce disease transmission. Lastly, not all Culicoides are competent vectors and this study will determine vector species and their habitats to help estimate risk in specific geographic regions. This plan aims to limit pathogen transmission by targeting the connections between hosts, vectors, and their environments via the insects’ unique characteristics using novel disease control methods.

**Bluetongue Virus Surveillance Pilot Study Presentation**
David Hsi, USDA-APHIS-VS-STAS-CEAH-SDA

Responding to resolutions from the United States Animal Health Association and trading partner concerns reported by our National Import-Export Services staff, USDA-APHIS-VS has developed a proposal for a multi-faceted bluetongue virus (BTV) pilot surveillance study. This study combines:

- Serologic surveillance using samples collected from cattle at slaughter for brucellosis surveillance with limited epidemiologic trace-backs for positive results;
- Surveillance using sentinel animals possibly in combination with vector surveillance; and
- Aggregation of BTV testing data from bulls associated with semen collection centers.

In each case, the focus will be limited to free/low-incidence states. Through this study, we expect to gain a broad geographic view of the current U.S. BTV situation. A staged approach is proposed, with initiation of the serologic surveillance and data aggregation portions coming online relatively quickly while we further develop the surveillance portion using sentinel animals on farms. This project has four main objectives:

1. Support trade by defining areas with free or low prevalence of BTV per OIE guidelines;
2. Explore the prevalence and distribution of BTV and assess current ecology given concerns about potential impact of climate change;
3. Begin to establish a BTV serotype distribution map to monitor future changes in endemic serotypes and detect incursions of new serotypes; and
4. Develop a national BTV surveillance and export strategy.

We expect this study to provide multiple informational products. The serologic surveillance is underway and the data aggregation portion is in development. VS is actively exploring resource options and timelines for the potential implementation of the sentinel surveillance and vector distribution portions and is performing stakeholder outreach to assess strategies for further implementation.
REPORT OF THE COMMITTEE

Zika Virus in the Americas
Stephen Higgs, Biosecurity Research Institute, Kansas State University

Dr. Higgs’ presentation covered the history of Zika virus from its discovery in 1947, though its introduction into the Americas and its emergence as a major human pathogen. Maps were presented to show the increasing number of travel-related cases in the United States from the first reported case in January 2016 to the situation in October with 3,808 cases and 128 locally transmitted cases in Florida. Important species of mosquito vectors were discussed, including a review of the potential role of Culex species. Unpublished data from infection experiments in a wide range of vertebrates, which were conducted at Colorado State University by Dr. Richard Bowen, Izabela Ragan (Kansas State University) and Emily Blizzard, were discussed.

USAHA 2016 CFTEP Update Summary
Hallie Hasel, USDA-VS
TR Lansford, Texas Animal Health Commission

The Cattle Fever Tick Eradication Program (CFTEP) encompasses an area of land along the Texas/Mexico border from Del Rio to Brownsville, approximately 500 miles. This strip of land was established in 1938 as the Permanent Quarantine Zone (PQZ), a border to keep the cattle fever tick from moving north following its eradication from most of the southeast U.S.

In FY16, we have experienced a significant increase in infested premises over FY15. The CFTEP now has 1,861 quarantines spread throughout the PQZ and in the free area (outside of the PQZ). The quarantines encompass 138,439 acres, including three United States Fish and Wildlife Refuge properties in Cameron County. The fever tick continues to progress north along the coastal border of southeast Texas, spread primarily by Nilgai antelope.

The BM86 Fever Tick Vaccine was introduced in late summer of FY16. The vaccine was made possible through ARS research and manufactured by Zoetis. The BM86 vaccine is licensed for use only by USDA-APHIS-VS or TAHC personnel, for use in the Cattle Fever Tick Eradication Program. TAHC passed the fever tick vaccine rule requiring a minimum of one dose annually for all cattle within the PQZ. Label dosage includes an initial 2ml IM dose, a second dose (booster) four weeks later, and a single dose booster every six months. The vaccine is licensed for use in beef cattle two months of age and older, and has a 60-day slaughter withdrawal.

Continued challenges for the elimination of cattle fever ticks include the increasing spread of Nilgai antelope and other exotic species throughout south Texas, especially along the coastal region. Other challenges include identifying new and improved treatment methods for both wildlife and cattle. Currently, treatment is limited to injectable Doramectin, coumaphos spray or dipping vat solution, ivermectin treated corn for white–tailed deer (WTD), ivermectin molasses tubs, and fever tick vaccine. Approximately 1,500 head have been vaccinated thus far within the CFTEP.

We encourage Agricultural Research Service (ARS) to continue research focused on identifying treatment methods for WTD and cattle, focusing on the
length of time each item maintain therapeutic levels in the affected species. We also encourage further discussion with Mexico to develop a vaccination and/or treatment protocol for cattle fever ticks.

**Texas Cattle Fever Tick Update– TAHC Perspective**  
T.R. Lansford, Texas Animal Health Commission

This presentation will provide an update on the cattle fever tick eradication efforts in the quarantined areas outside of the Permanent Quarantine Zone and some of the unique challenges that are being faced in those areas.

Competent wildlife vectors and treatment challenges associate with those species, combined with favorable climatic conditions, are resulting in continued fever tick outbreaks. The number of newly discovered infested premises in south Texas (in all quarantine areas) has increased 75% since 2015 and 395% since 2014. There are currently nearly 453,000 acres under some kind of fever tick quarantine outside of the permanent quarantine zone. Approximately 123,000 of those acres are under an infested quarantine. The temporary preventive quarantine area (TPQA) and associated control purpose area quarantines continue from Cameron County up the coast into Willacy and Kenedy counties. Additionally, the control purpose quarantine areas in Jim Wells and Kleberg counties are still in effect. Lastly, an outbreak associated with white-tail deer continues to expand in the Webb/Zapata county area.

In October 2014, the Texas Animal Health Commission established a TPQA in eastern Cameron County, Texas. The TPQA, consisting of approximately 223,000 acres, was put in place after the discovery of four fever tick infested premises outside of the permanent quarantine zone. Since October 2014, additional fever tick infestations have been found in Willacy, Kleberg, and Jim Wells counties. The number of infested premises in Cameron and Willacy Counties has risen to forty (40) and the number of quarantined acres has grown to nearly 360,000.

Expanding populations of wildlife, such as white-tailed deer, and exotic wildlife, such as red deer, elk, and nilgai antelope, all of which are very competent fever tick hosts, continue to be major contributors to the fever tick outbreaks. For instance, approximately two-thirds of the currently infested premises in Cameron and Willacy counties are attributed to infested nilgai antelope, demonstrating that the species is an important contributor to the northern movement of the cattle fever tick.

**Bluetongue Virus (BTV) and Epizootic Hemorrhagic Disease Virus (EHDV) Isolations/PCR Positives - Calendar Year 2015**

Tracy Sturgill Samayoa, USDA-APHIS-VS-STAS, National Veterinary Services Laboratories

Bluetongue virus or ribonucleic acid (RNA) was detected in 46 samples submitted or collected during calendar year 2015. The positive bluetongue virus isolation (VI) and polymerase chain reaction (PCR) test results from submissions to the National Veterinary Services Laboratories (NVSL) in 2015 are listed in Table 1.
### Table 1. BT virus isolation (VI) / PCR positives, calendar year 2015

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ</td>
<td>1</td>
<td>Bighorn sheep</td>
<td>BTV-10</td>
<td>Neg</td>
</tr>
<tr>
<td>CA</td>
<td>6</td>
<td>Sheep</td>
<td>BTV-10</td>
<td>BTV-10</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Deer</td>
<td>BTV-10</td>
<td>Neg</td>
</tr>
<tr>
<td>CA</td>
<td>2</td>
<td>Sheep</td>
<td>BTV-11</td>
<td>Neg</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Mule deer</td>
<td>BTV-17</td>
<td>BTV-17</td>
</tr>
<tr>
<td>CA</td>
<td>2</td>
<td>Sheep</td>
<td>BTV-17</td>
<td>Not done</td>
</tr>
<tr>
<td>CA</td>
<td>4</td>
<td>Antelope</td>
<td>BTV-17</td>
<td>BTV-17</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>White-tailed deer</td>
<td>BTV-6</td>
<td>Neg</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>White-tailed deer</td>
<td>BTV-10</td>
<td>BTV-10</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>White-tailed deer</td>
<td>BTV-19</td>
<td>Neg</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>White-tailed deer</td>
<td>BTV-22</td>
<td>Neg</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>White-tailed deer</td>
<td>BTV-24</td>
<td>Neg</td>
</tr>
<tr>
<td>ID</td>
<td>1</td>
<td>Cattle</td>
<td>BTV-17</td>
<td>BTV-17</td>
</tr>
<tr>
<td>ID</td>
<td>4</td>
<td>Sheep</td>
<td>BTV-17</td>
<td>BTV-17</td>
</tr>
<tr>
<td>ID</td>
<td>2</td>
<td>White-tailed deer</td>
<td>BTV-17</td>
<td>BTV-17</td>
</tr>
<tr>
<td>ID</td>
<td>1</td>
<td>Yak</td>
<td>BTV-17</td>
<td>BTV-17</td>
</tr>
<tr>
<td>NV</td>
<td>1</td>
<td>Cattle</td>
<td>BTV-13</td>
<td>Neg</td>
</tr>
<tr>
<td>NV</td>
<td>3</td>
<td>Bighorn sheep</td>
<td>BTV-17</td>
<td>BTV-17</td>
</tr>
</tbody>
</table>

- **CAHFS-UC Davis BTV-pos PCR submission for typing**
- **WADDL BTV-pos PCR submission for typing**
- **CAHFS-UC Davis BTV-pos PCR submission for typing; insuff for VI**
- **CAHFS-UC Davis BTV-pos PCR submission for typing; insuff for VI**
- **CAHFS-UC Davis & WADDL BTV-pos PCR submission for typing**
- **Also positive EHDV-6**
- **Bacterial contamination in cell culture**
- **TVMDL BTV-pos PCR submission for typing**
- **WADDL BTV-pos PCR submission for typing**
During calendar year 2015, 15 samples tested positive for Epizootic Hemorrhagic Disease Virus (EHDV) by virus isolation and/or PCR. The positive EHDV isolation and PCR test results from submissions to NVSL in 2015 are listed in Table 2.

**Table 2.** EHDV isolation (VI)/ PCR positives, calendar year 2015

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>1</td>
<td>White-tailed deer</td>
<td>EHDV-6</td>
<td>Neg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Also positive BTV-6</td>
</tr>
<tr>
<td>IL</td>
<td>1</td>
<td>White-tailed deer</td>
<td>EHDV-2</td>
<td>Neg</td>
</tr>
<tr>
<td>IA</td>
<td>2</td>
<td>Cattle</td>
<td>EHDV-2</td>
<td>Neg</td>
</tr>
<tr>
<td>IA</td>
<td>5</td>
<td>White-tailed deer</td>
<td>EHDV-2</td>
<td>EHDV-2 (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bacterial contamination in cell culture, no VI</td>
</tr>
<tr>
<td>KS</td>
<td>1</td>
<td>White-tailed deer</td>
<td>EHDV-2</td>
<td>Neg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tissue autolyzed, no VI</td>
</tr>
<tr>
<td>OK</td>
<td>1</td>
<td>Elk</td>
<td>EHDV-2</td>
<td>Not done</td>
</tr>
<tr>
<td>OK</td>
<td>2</td>
<td>White-tailed deer</td>
<td>EHDV-2</td>
<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Isolate from 1 case; 1 case VI not done</td>
</tr>
<tr>
<td>SD</td>
<td>2</td>
<td>Deer</td>
<td>EHDV-2</td>
<td>EHDV-1 (1)</td>
</tr>
</tbody>
</table>
Part-year 2016 data for NVSL orbivirus identifications is shown in Tables 3 and 4. As of October 11, 2016, BTV has been identified in 10 samples from 4 states and EHDV has been identified in 13 samples from 4 states.

**Table 3.** Bluetongue virus (BTV) isolations/PCR positives during Calendar year 2016 (January 1 through October 11)

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>3</td>
<td>Sheep</td>
<td>BTV-1</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Ct, no VI; 1 also pos BTV-3</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Sheep</td>
<td>BTV-3</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Also pos BTV-1</td>
</tr>
<tr>
<td>FL</td>
<td>1</td>
<td>Sheep</td>
<td>BTV-22</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Ct, no VI</td>
</tr>
<tr>
<td>OK</td>
<td>1</td>
<td>Cattle</td>
<td>BTV-17</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High Ct, no VI</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Sheep</td>
<td>BTV-1</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CAHFS-UC Davis BTV-pos PCR submission for typing; High CT</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Sheep</td>
<td>BTV-17</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CAHFS-UC Davis BTV-pos PCR submission for typing; High CT</td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Alpaca</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CAHFS-UC Davis BTV-pos PCR submission for typing; High CT</td>
</tr>
<tr>
<td>VA</td>
<td>1</td>
<td>White tailed deer</td>
<td>BTV-3</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SCWDS isolate for typing; Low Ct, no VI</td>
</tr>
</tbody>
</table>

**Table 4.** Epizootic hemorrhagic disease virus (EHDV) isolations/PCR positives during calendar year 2016 (January 1 through October 11)

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>PCR</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>1</td>
<td>White tailed deer</td>
<td>EHDV-1</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low Ct, no VI</td>
</tr>
<tr>
<td>IA</td>
<td>2</td>
<td>White tailed deer</td>
<td>EHDV-6</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low Ct, no VI</td>
</tr>
<tr>
<td>NC</td>
<td>2</td>
<td>White tailed deer</td>
<td>Pos</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low Ct, no VI</td>
</tr>
<tr>
<td>VA</td>
<td>1</td>
<td>Yak</td>
<td>EHDV-2</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low Ct, no VI</td>
</tr>
<tr>
<td>SD</td>
<td>7</td>
<td>White tailed deer</td>
<td>EHDV-2</td>
<td>Not done</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low Ct, no VI</td>
</tr>
</tbody>
</table>

Note: Only submissions with positive results are reported for 2016. Cases with negative results were not included as with previous year's data.
PARASITIC AND VECTOR BORNE DISEASES

EHD and BTV Transmission Ecology in Florida Deer Farms: Overview and Update from University of Florida
Samantha Wisely, University of Florida

The Cervidae Health Research Initiative (CHeRI) is a research program funded by the Florida State Legislature to assist Florida deer producers in animal health and sustainable agriculture. The current foci of this initiative is 1) development of an effective vaccine for epizootic hemorrhagic disease virus (EHDV), and 2) integrated pest management strategies of Culicoides vectors of EHD. Current projects focus on molecular characterization of epitope variation in endemic serotypes of EHDV, and basic ecology of Culicoides of Florida.

Committee Business:

Two resolutions were presented at the meeting and both were passed as below:

SUBJECT MATTER: EQUINE INFECTIOUS ANEMIA AND EQUINE PIROPLASMOSIS TESTING OF RACING QUARTER HORSES
Motion by: Dr. Flynn Second by: Dr. Hillman Resolution Passed. Amended to match the Committee on Infectious Diseases of Horses (IDOHC) resolution, motion by Dr. Hillman, seconded by Dr. Lansford, Amendment Passed.

SUBJECT MATTER: DEVELOPMENT OF CATTLE FEVER TICK PREVENTION AND TREATMENT METHODS FOR BOTH LIVESTOCK AND WILDLIFE
Motion by: Dr. Hillman, Second by Dr. Watson. Resolution Passed.

Recommendations:

The Committee recommends that Dr. Diane Kitchen be appointed as New Chair and Dr. TR Lansford as Vice-Chair.
James Averill, MI; Tom Burkgren, IA; Stephen Crawford, NH; Barbara Determan, IA; Leah Dorma, OH; William Fales, MO; Timothy Goldsmith, MN; Kristi Henderson, IL; Rick Hill, IA; Christine Hoang, IL; Donald Hoenig, ME; David Marshall, NC; Shelley Mehlenbacher, VT; Cheryl Nelson, KY; M. Gatz Riddell, Jr., AL; Roxana Sanchez-Ingunza, KS; Joni Scheftel, MN; Craig Shultz, ID; Richard Sibbel, IA; Kathryn Simmons, DC; John Thomson, IA; Liz Wagstrom, DC; Brad Williams, TX; Dennis Wilson, CA; Jennifer Wishnie, IA.

The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 8:00 a.m. – 12:00 p.m. There were eight members and 18 guests present. General introductions of people in attendance were given at the beginning, with additional people joining as the meeting progressed.

Presentations and Reports

FSIS Update on Residue Testing
Louis Bluhm, FSIS
A summary of the testing procedures and results for Food Safety and Inspection Service (FSIS) sampling for meat, poultry, and catfish that are under their purview.

The complete PPT presentation can be found on the Committee page at usaha.org.

Complying with California’s SB-27 Law on Antibiotic Use in Food Animals
Annette Jones, California Department of Food and Agriculture
A summary of actions by the state of California in relation to the SB-27 law and associated challenges was presented.

The complete PPT presentation can be found on the Committee page at usaha.org.

Antimicrobial Use and Resistance Initiatives of the National Animal Health Monitoring System, USDA
Kathe Bjork, USDA-CEAH
An overview of USDA, Center for Epidemiology and Animal Health (CEAH) activities related to; USDA, Antimicrobial Resistance (AMR) Action Plan Center for Advanced Research in Biotechnology (CARB), traditional data collection, proposed data initiatives and relationship with FDA guidance and VFD was given.

Discussion on limitations of funding and ability to collect the proposed surveys was also included.

The complete PPT presentation can be found on the Committee page at usaha.org.
Update from FDA on VFD Implementation and Pilot
Mike Murphy, FDA
A presentation on activities related to the “Field Project” or the 2016 VFD field inspection activities was given. Discussion on the educational inspection activities and common questions/challenges was included. The complete PPT presentation can be found on the Committee page at usaha.org.

U.N. Resolution and Codex AMR Update
Liz Wagstrom, NPPC
An update on international discussion that occurred on September 21, 2016 at the United Nations was provided. A summary of the resulting resolution, how it was developed, and how it will proceed was given.
A brief proposed update of Codex AMR and related Risk Assessment of Antimicrobial Resistance (AMR).

Committee Business:
Discussion on the streamlining of USAHA committees and the best fit for the Committee on Pharmaceutical Issues in the future was led by Barbara Determan from the Board of Directors and Liz Wagstrom, Chair.

- Documents summarizing this was presented at Board of Directors meeting last evening, accepting comments for 30 days.
- Examples that were brought up / discussed include:
  - Potential for combining Pharmaceutical Issues and the Committee on Biologics and Biotechnology.
  - Potential future use of this committee was brought up. It can be a useful group to bring together to address ongoing activities and issues related to monitoring antibiotic (AB) use and potential “stewardship” related activities, specifically related to data management around this topic.
  - Another potential idea was a “One Health” committee that would include this committee.

There were no resolutions proposed or discussed, and the meeting was adjourned.
REPORT OF THE COMMITTEE ON PROGRAM
Chair: Boyd Parr, SC

Gary Anderson, KS; Marianne Ash, IN; Tammy Beckham, KS; Lisa Becton, IA; Tarrie Crnic, KS; Barbara Determan, IA; Dee Ellis, TX; Donna Gatewood, IA; Colin Gillin, OR; Dale Grotelueschen, NE; Kristin Haas, VT; Amy Hendrickson, WY; Annette Jones, CA; Donna Kelly, PA; Bruce King, UT; Dale Lauer, MN; Patrick McDonough, NY; Dustin Oedekoven, SD; Boyd Parr, SC; David Schmitt, IA; Andy Schwartz, TX; Heather Simmons, TX; David Smith, NY; Harry Snelson, NC; Belinda Thompson, NY; Liz Wagstrom, DC; Peregrine Wolff, NV; Marty Zaluski, MT.

The Committee on Program met Saturday October 15, 2016, 6:00 p.m. in the Oak Room at the Greensboro Sheraton Hotel. Dr. Boyd Parr called the meeting to order. There were 26 chairs and executive committee members in attendance.

Parr reviewed the following procedural items for the committee in preparation for their respective committee meetings:

- Manual of Operating Procedures for Committee Chairs and Committees
- Robert’s Rules of Order are the prevailing method for operating.
- Quorum for Committee Meetings
  - 10 members or 30%, whichever is less
- Voting and use of proxies
- Mission Statements – Committee should be reviewing their mission statement, and make any recommendations to the President.

Ben Richey was called upon to review the process for submitting committee reports. Templates were provided electronically, and are due within 24 hours of the meeting. Richey also discussed meeting security procedures if any issues were to arise.

Richey also noted that OIE Terrestrial Code Chapters would soon be sent out for comment, and USAHA would seek input on any relevant issues from chairs through the Committee on International Standards.

Richey next made comments regarding Committee on Nominations and Resolutions, led discussion about resolutions and recommendations. He reminded chairs that resolutions should be succinct, direct and actionable. He also noted that recommendations could be used for less formal requests, and requests directed internally to the executive committee or committee on government relations. There was a question on resolutions related to funding requests, and it was noted to remember that USDA requests a budget, and Congress does the appropriations. Resolutions on that matter should reflect the request accordingly.

Richey also reminded chairs of the upcoming Committee on Government Relations meeting, which takes place typically in March. Chairs are invited to participate, particularly if there are issues that require subject matter expertise. Information will be forthcoming regarding details.
PARASITIC AND VECTOR BORNE DISEASES

Dr. David Schmitt next took a moment to recognize committee chairs that have served five years for the organization. For this year, there is one individual. Dr. Peregrine Wolff, Captive Wildlife and Alternative Livestock.

Dr. Parr next asked Dr. Schmitt to discuss Strategic Plan Updates, in particular the Committee Evaluation Concept document that was provided in advance of the meeting. There was a productive discussion regarding the proposed committee evaluation. The executive committee is planning for a comment period following the meeting on this.

With no other business, the meeting was adjourned.
REPORT OF THE USAHA COMMITTEE ON PUBLIC HEALTH AND RABIES
Chair: Tarrie Crnic, KS
Vice Chair: Skip Oertli, TX

Helen Acland, PA; Gary Anderson, KS; Robin Anderson, TX; Karen Becker, DC; Scott Bender, AZ; Joseph Corn, GA; Stephen Crawford, NH; Tarrie Crnic, KS; Susan Culp, TX; Donald Davis, TX; Ignacio dela Cruz, MP; Thomas DelLiberto, CO; Brigid Elchos, MS; François Elvinger, NY; Anna Claire Fagre, CO; Heather Fenton, GA; Katherine Flynn, CA; Nancy Frank, MI; Donna Gatewood, IA; Robert Gerlach, AK; Keith Haffer, SD; Steven Halstead, MI; Bill Hawks, DC; Rick Hill, IA; Christine Hoang, IL; Donald Hoenig, ME; Patrice Klein, DC; Daniel Kovitch, DC; Emily Lankau, GA; Donald Levin, NY; Chuck Lewis, IA; Mary Lis, CT; Margie Lyness, GA; Joanne Maki, GA; Rose Massengill, MO; Patrick McDonough, NY; Shirley McKenzie, NC; David Meeker, VA; Brenda Morningstar-Shaw, IA; Lee Myers, GA; Cheryl Nelson, KY; Megin Nichols, GA; Sandra Norman, IN; Skip Oertli, TX; Steve Parker, GA; Roger Parker, TX; David Pyburn, IA; Renate Reimschuessel, MD; Susan Rollo, TX; Larry Samples, PA; John Sanders, WV; Joni Scheftel, MN; Stacey Schwabenlender, MN; Marc Schwabenlender, MN; Michael Short, FL; Tom Sidwa, TX; Jonathan Sleeman, WI; David Smith, NY; Nick Striegel, CO; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Belinda Thompson, NY; Brad Thurston, IN; Jeff Turner, TX; Liz Wagstrom, DC; Michele Walsh, ME; Margaret Wild, CO; Michelle Willette, MN; Nora Wineland, MO; Jennifer Wishnie, IA; Raquel Wong, HI; Marty Zaluski, MT; Ernest Zirkle, NJ.

The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 1:00 to 5:30 p.m. There were 24 members and 19 guests present. Dr. Crnic welcomed members and guests and provided introductory comments. A review of the 2015 resolutions and responses were discussed and approved by the committee.

Time-Specific Paper Title
Dr. Susan Nadin-Davis of the Canadian Food Inspection Agency presented a time-specific paper on Raccoon Rabies Sequencing to Determine Origin of Recent Hamilton, Ontario Outbreak.

Presentations and Reports

Oral Rabies Vaccine Optimization Strategies and Challenges: Implementing Projects for Rabies Elimination
Richard Chipman, Wildlife Biologist and Rabies Management Coordinator, USDA-APHIS-WS, National Rabies Management Program (NRMP)

The close of FY2016 marks the 21st year that the USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services WS National Rabies Management Program (NRMP) has coordinated the distribution of oral rabies vaccine baits in the U.S. This landscape-level wildlife management program is the largest coordinated effort to control a wildlife disease ever undertaken in the U.S. Near-term programmatic goals are the continued containment of rabies in
raccoons, gray foxes, and coyotes through enhanced rabies surveillance and oral rabies vaccination (ORV), with the strategic use of natural barriers and contingency actions when needed. Long-term goals for 2017 and beyond include maintaining the U.S. canine rabies free; raccoon rabies elimination; mongoose rabies control on Puerto Rico; vampire bat surveillance in Florida, Texas, and Arizona; and continued exploration of vaccine options to better target skunks.

Cooperative ORV programs in Texas focusing on coyotes and gray foxes resulted in the U.S. being declared canine rabies free in 2007, with only one case of a unique gray fox rabies variant in Texas 2013. ORV programs in the eastern U.S. have resulted in no appreciable spread of the raccoon rabies variant west of established ORV zones as well. To accomplish these milestones, the NRMP and its partners distributed approximately 11 million baits across 183,000 km² (an area about the size of North Dakota) in 16 states between October 1, 2015 and September 30, 2016. Baiting operations typically require >100 days for completion, with more than 75% of baits being distributed during the months of October, August, and September. The distance flown across all projects was 353,520 km (just under nine times Earth’s circumference) over 1,780 flight hours. FY2016 also saw the completion of the second of a 3-year rabies elimination study using RABORAL V-RG® at 150 baits/km² in an ORV naïve area of southwestern Virginia, and the third and final year of an ONRAB (Artemis Technologies, Inc., Guelph, Ontario, Canada) field trial specifically targeting striped skunks in West Virginia.

ONRAB field trials also took place in Vermont to assess high density ground baiting strategies in high raccoon density urban/suburban habitats, and ORV in rural coniferous forest-dominated areas with low raccoon densities to evaluate ONRAB at low bait densities (37.5 baits/km²). In addition, the NRMP began exploring the Delaunay Triangulation method for analyzing fixed-wing ORV baiting data in FY2016 to characterize bait distribution patterns across landscapes to help delineate gaps and improve coverage with a trial in the Buffalo-Niagara Area, adjacent to an area of raccoon rabies reemergence in Ontario Canada. Recently, WS signed a memorandum of understanding (MOU) with the Global Alliance for Rabies Control to collaborate on the ENDRAbiesNOW Campaign. The goal of this campaign is to eliminate human deaths from canine rabies by 2030. Also, WS celebrated World Rabies Day by conducting the first ever raccoons placebo bait (RABITECH-M/IDT Biologika GmbH) field trial targeting mongoose in Puerto Rico where a total of 2,500 vaccine baits were distributed by hand during September 28 - October 1, 2016; a second field trial will occur in March of 2017. WS may undertake additional placebo field trials in Puerto Rico, or proceed directly to testing vaccine-baits pending comprehensive public input and regulatory approval. Finally, the NRMP used a DELPHI process to incorporate diverse cooperator expertise and experience on raccoon rabies elimination strategies for the eastern U.S. over the next 30 years during March 2016 in Fort Collins, Colorado. This information became inputs to risk models to evaluate the likely effectiveness of potential strategies in geographically prioritized areas and apply results to economic modeling to place benefits in the context of economic benefits. In summary, FY2016 represented a successful year for the NRMP and cooperators thanks to the hard work and dedication of all those who contributed to this national
effort to protect human and animal health, and reduce the significant cost associated with living with rabies.

**FDA Food and Veterinary Medicine Program Strategic Plan**

Renate Reimschuessel, Director for Veterinary Laboratory Investigation and Response Network (Vet-LIRN), Center for Veterinary Medicine (CVM), Food and Drug Administration (FDA)

The Office of Foods and Veterinary Medicine Strategic Plan emphasizes the public health mission. The plan is a high-level overview of FVM’s broad portfolio.

1. The [Foods and Veterinary Medicine (FVM) Program’s Strategic Plan for fiscal years 2016-2025](#) outlines goals and objectives for the next ten years to meet FVM public health mission.

2. The FVM program encompasses the Office of Foods and Veterinary Medicine, the Center for Food Safety and Applied Nutrition, and the Center for Veterinary Medicine, as well as the related activities under the Office of Global Regulatory Operations and Policy and the Office of Regulatory Affairs.

3. The strategic plan is organized under four goals: food safety, nutrition, animal health, and organizational excellence.

4. It is based on the following principles: 1.) public health is the first priority; 2.) partnerships are the key to success; 3) scientific expertise and research are the foundation of the FVM Program’s work; and 4) the FVM program is committed to operating openly and transparently.

5. The success of this plan depends on FDA working seamlessly across internal organizations; federal, state, local, tribal, and territorial regulatory partners; and international borders—as well as engaging a wide range of consumer, industry, public health, and scientific stakeholders and partners.

**Zika from the Texas Perspective**

Tom J. Sidwa, State Public Health Veterinarian, Zoonosis Control Branch Manager, Texas Department of State Health Services

Zika and the risk it could pose to the United States caught the attention of public health professionals when the Pan American Health Organization (PAHO) issued an alert on December 1, 2015 signaling growing concerns over the spread of Zika virus and its apparent neurological complications. Prior to the apparent association of Zika infection with birth defects, it was considered a relatively minor Arboviral disease.

During this presentation, I will expound on the following themes:

- The Texas Department of State Health Services (DSHS) and the state’s local health departments began planning for the travel-associated cases that would surely continue to arrive and the prospect of having local mosquito transmission established in the state.
- *Aedes aegypti* is considered the primary vector for Zika and has been documented in many Texas counties, but surveillance has been lacking in most. Risk of local transmission is thought to be greater in the lower portion of Texas’ international border with Mexico, along the coast of the Gulf of Mexico, and in large population centers. In estimating the level and seasonality of risk, *Department of Social and Health Services* (DSHS) considered the history of
local transmission of dengue virus as a surrogate for Zika virus. Dengue virus is related to Zika virus and is transmitted by the same vector(s). Reports of locally transmitted dengue in Texas have generally come from the lower Rio Grande Valley in association with large dengue outbreaks in Northern Mexico between August and December.

Mosquito control is a local responsibility in Texas. The range of mosquito control capacity varies by jurisdiction from non-existent to robust. Jurisdictions that may be well-equipped to mitigate the threat of West Nile virus transmission by Culex mosquitoes, often lack the knowledge and equipment to address Aedes aegypti which generally requires operations around private homes with hand-held equipment. DSHS has no mosquito control personnel or equipment to assist local jurisdictions if they either lack capacity or exceed their capacity to address vector mosquito populations. DSHS will consider requests from local jurisdictions for mosquito control assistance and, if justified, DSHS will assist through contracts for services.

The DSHS Birth Defects Epidemiology and Surveillance Branch (BDESB) conducted a retrospective review of infection data from another flavivirus in Texas, West Nile virus (WNV), and found no indication that WNV infections were associated with adverse pregnancy outcomes. In analyzing microcephaly data, they documented that there has been an upward trend in instances of this birth defect in Texas since 1999, probably attributed in part to a broad case definition and changes over time in the diagnosis, recording, and case ascertainment of this condition. BDESB implemented a “rapid ascertainment” project to enable timelier follow up on microcephaly cases to determine any connection with Zika infection. They have also initiated a pilot project with maternal and fetal health practitioners and neonatologists to improve real-time notification of adverse birth outcomes that may be associated with Zika infection.

ESB implemented a “rapid ascertainment” project to enable timelier follow up on microcephaly cases to determine any connection with Zika infection. They have also initiated a pilot project with maternal and fetal health practitioners and neonatologists to improve REAL-TIME notification of adverse birth outcomes that may be associated with Zika infection.

Ontario’s Wildlife Rabies Control Program
Beverly Stevenson, Wildlife Research Technician, Wildlife Research and Monitoring Section, Ministry of Natural Resources and Forestry

Ontario was once the rabies capital of North America averaging 1,500 confirmed cases per year. Due to successful rabies control programs, Ontario was able to eliminate both raccoon strain and fox strain rabies from southern Ontario. After more than ten years of being raccoon strain rabies free, cases were confirmed in December 2015 in a highly-populated area of the province. Aggressive control measures were immediately implemented and have been ongoing since then in an attempt to contain the spread of the disease with the goal of eventual elimination. Also in December 2015, fox strain rabies was again confirmed in southwestern Ontario after nearly a three year absence. This
presentation will focus on the current status, control strategies, the need for surveillance, and the need to mitigate wildlife translocation.

**Raccoon Rabies Sequencing to Determine Origin of Recent Hamilton, Ontario Outbreak**
Susan Nadin-Davis, Animal Health Microbiology Research, Canadian Food Inspection Agency

In Canada rabies diagnosis remains a federal mandate but the provinces have responsibility for implementing disease control. In eastern Canada wildlife rabies control programmes have virtually eliminated fox rabies in the southern highly populated areas but since 1999 these gains have been overshadowed by several outbreaks of raccoon rabies spreading northwards from the USA. Better understanding of the mechanisms of spread of this rabies virus strain can play a significant role in guiding cost-effective control efforts. To facilitate a detailed molecular epidemiological study of raccoon rabies virus movements a methodology to efficiently determine whole genome sequences of hundreds of viral samples was developed. The workflow involves generation of a limited number of overlapping amplicons covering the complete viral genome and use of high throughput sequencing technology. A number of examples demonstrating the value of this approach for revealing the detailed molecular epidemiological characteristics of raccoon rabies outbreaks will be described. In particular, the application of this analytical tool to explore the origins of a recent outbreak of raccoon rabies in Ontario, which had previously been free of this disease since 2005, will be described.

**Recommendations for the Diagnosis, Treatment and Management of Tuberculosis (Mycobacterium tuberculosis) in Elephants in Human Care**
Kay Backues, Director of Animal Health, Tulsa Zoo, AAZV Representative Elephant TB Care Stakeholders Task Force

This group began in 2011 as an answer to the problems, controversies and unanswered research questions surrounding Mycobacterium tuberculosis (Mtb) infection in captive U.S. elephant population. Comprised of veterinarians, elephant managers, physicians, immunologists, epidemiologists, public health officials, and state veterinarians; the stakeholders have held five meetings and produced the ‘Recommendations for the Diagnosis, Treatment and Management of Tuberculosis in Elephants in Human Care 2015’. Some of the biggest improvements of the ‘Recommendations’ include the clear separation of occupational health risks and public health risks when working with as opposed to casual contact with elephants. Improved and scientifically referenced information in the ‘Recommendations’ is designed to give a thorough overview of the disease, its diagnosis and treatment based on the state of veterinary science at this time. The stakeholders group held a one day research updates and Recommendations publication review for further updates in conjunction with the annual American Association of Zoo Veterinarians (AAZV) in Atlanta, Georgia in July of 2016 and produce the updated ‘Recommendations’ in 2017. The topic of Elephant Mtb will be moving to the USAHA Committee on Public Health and Rabies and will be proposing a
Recommendation for approval of the Stakeholder's Recommendations Publication by the USAHA committee.

Spatio-Temporal Pattern and Eco-Climatological Drivers of Striped Skunk Rabies
Ram Raghavan, Clinical Assistant Professor, Veterinary Diagnostic Laboratory, Kansas State University

Despite the long recognition that skunks are an important reservoir host for rabies, the control of this disease among this host has not been achieved, and the disease is currently only passively monitored in North America. The need for rabies control among striped skunks is, however, well acknowledged, and reports of occasional spill-over of skunk variant rabies viruses to non-reservoir species, including some domestic animals, remains a cause for public health concern and a major roadblock for eradicating rabies from North America. An understanding of the spatial and temporal dynamics of diseases is important in management and for setting future research agendas, and such knowledge could assist in effective striped skunk rabies control. In this study, we evaluated whether rabies among striped skunk cases submitted for testing in the North Central Plains exhibit discernable spatial and temporal patterns, and if there are any eco-climatic factors that influenced such patterns. Our findings indicate that the year-to-year and spatial origins of rabies incidences in the states of Kansas and Nebraska in the North Central Plains are currently stable, and certain physical environment (developed low-intensity areas and patch fragmentation) and climatic (diurnal temperature range) factors play an important role in determining such temporal and spatial patterns.

The Challenge of Vaccinating Skunks against Rabies
Joanne Maki, Director Global Veterinary Public Health, Rabies Technical Services, Merial Animal Health
Joanne Maki1, Anne Wohlers1, Emily Lankau2
1Merial, Inc.
2LandCow Consulting

Vaccinating wildlife populations against rabies using orally delivered rabies vaccines (ORV) is a time-tested cost-beneficial practice that reduces exposure of domestic animals to the virus thus indirectly reducing the public health risk of rabies in humans. Decades of ORV programs in the United States (U.S.) using RABORAL V-RG®-filled baits distributed in rural, suburban and urban environments have proven the utility of this vaccine under a variety of field conditions and in multiple species. In the U.S., wildlife rabies success stories include the elimination of the canine variant, potential elimination of the gray fox variant from Texas and stopping the raccoon variant from spreading westward beyond the Appalachian Mountains. The future of wildlife rabies prevention in the U.S. faces challenges in which the striped skunk (Mephitis mephitis) plays a central role: 1) eliminating the raccoon variant from highly populated regions of the eastern U.S. inhabited by both raccoons and skunks, and 2) eliminating skunk variant rabies in endemic areas currently unfamiliar with ORV programs and
practices. Laboratory and field data to date suggest bait access in the field and vaccine uptake are the primary hurdles to orally vaccinating skunks against rabies. Efficient vaccine delivery remains a key technical challenge in this species. Field testing of new vaccine containers, baiting materials and/or new delivery formats may lead to modification of current products which improve vaccination efficiency in skunks and possibly other species. Government-led rabies prevention programs are very small, non-commercial niche markets served by few vaccine manufacturers. The challenge we share in public health is to develop a cost-effective skunk ORV. Improvements made to current vaccines or development of new ORV products will require strategic collaboration and alignment of ORV customers, manufacturers and U.S. regulatory agencies.

Committee Business:
The Committee passed two resolutions during the business portion of the meeting. One resolution requested a minimum of $30 million in funding for the USDA-APHIS-WS oral rabies vaccination program. The second resolution requested that USDA-APHIS-WS collaborate with local, state and international partners to promote, and where legal and practical, implement the Best Management Practices (BMP) for common rabies vector species developed by Southeastern Association of Fish and Wildlife Agencies (SEAFWA). Dr. Don Lein provided background information and rationale behind both resolutions. Both resolutions were forwarded to the USAHA membership for approval.

Dr. Kay Backues introduced The Recommendations for the Diagnosis, Treatment, and Management of Tuberculosis (TB) in Elephants in Human Care 2015 and requested that the committee consider options to move the recommendations forward toward approval by the USDA. Committee members agreed to establish a task force to work with the elephant TB stakeholder group and consider possible resolutions for the 2017 committee meeting in San Diego, California.

At the close of the business meeting, Dr. Crnic encouraged committee members to provide any recommendations on topics for a 2017 One Health Symposium and annual committee meeting presentations to either the chair or vice chair or to write them on a provided worksheet. Committee members were also reminded about the One Health Symposium on Lyme Disease to be held the following morning, October 19, from 8:00 a.m. to 12:00 p.m. in the Colony B room.

With no further business before the committee, the meeting was adjourned at 5:40 p.m.
REPORT OF THE USAHA COMMITTEE ON SALMONELLA

Chair: Donna Kelly, PA
Vice Chair: Shelley Rankin, PA

Robin Anderson, TX; Chris Ashworth, AR; Deanna Baldwin, MD; Karen Becker, DC; Richard Breitmeyer, CA; Paul Brennan, IN; Brandon Doss, AR; François Elvinger, NY; Tony Frazier, AL; Mallory Gaines, CO; Eric Gingerich, IN; Jean Guard, GA; Scott Gustin, AR; Julie Helm, SC; Danny Hughes, AR; Eric Jensen, AL; Annette Jones, CA; Donna Kelly, PA; Michael Kopp, IN; Dale Lauer, MN; Elizabeth Lautner, IA; Chelsie Lawyer, IN; Tsang Long Lin, IN; Rick Linscott, ME; Mary Lis, CT; Sarah Mason, NC; Patrick McDonough, NY; David Meeker, VA; Sarah Mize, CA; Alfred Montgomery, DC; Brenda Morningstar-Shaw, IA; Thomas Myers, MD; Megin Nichols, GA; Steve Olson, MN; Kristy Pabilonia, CO; William Pittenger, MO; David Pyburn, IA; Shelley Rankin, PA; Renate Reimschuessel, MD; G. Donald Ritter, DE; Susan Rollo, TX; Gregorio Rosales, AL; Roxana Sanchez-Ingunza, KS; Travis Schaal, IA; Joni Scheftel, MN; Richard Sellers, VA; Tom Sidwa, TX; David Smith, NY; Patricia Stoner, WI; Belinda Thompson, NY; Alberto Torres, AR; Bob Tully, KS; Shauna Voss, MN; Liz Wagstrom, DC; Doug Waltman, GA; Nora Wineland, MO; Jennifer Wishnie, IA; Ching Ching Wu, IN; Andrea Zedek, SC; Bereket Zekarias, KS.

The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 8:00 a.m. to 12:00 p.m. There were 18 members and 14 guests present.

Presentations and Reports

Salmonella Enteritidis in Shell Eggs from Backyard and Other Small Flocks
Subhashinie Kariyawasam, The Pennsylvania State University

Salmonella Enteritidis (SE) is a leading foodborne pathogen in the United States with many outbreaks in humans traced back to shell eggs. Food and Drug Administration (FDA) requires shell egg producers from a farm with more than 3,000 chickens to be in compliance with the FDA Final Egg Rule. Therefore, the objective of this study was to estimate the prevalence of SE in eggs produced by backyard flocks and other small flocks thus facilitating an assessment of public health risk posed by these eggs by testing eggs purchased from on-farm roadside stalls and at local farmers' markets and determining the relatedness of these egg isolates of SE to that of human foodborne isolates.

In brief, three to four dozen eggs from 240 selling points (farmers’ markets or roadside stalls) in 67 counties of Pennsylvania, each representing one small layer flock, were collected from May to November 2015. Internal contents of the eggs and eggshells were cultured separately for Salmonella. Recovered Salmonella were serotyped and any SE isolates present were further characterized by phage typing and pulsed-field gel electrophoresis (PFGE). The PFGE designations were assigned by the PulseNet.

Of the 240 selling points included in the study, eggs from five (2.08%) selling points were positive for SE. In detail, eggs from one selling point contained SE in
REPORT OF THE COMMITTEE

egg shells whereas eggs from the other four selling points had SE in internal contents. Three different phage types (PT8, PT13, and PT13a) and four different PFGE types (JEGX01.0004, JEGX01.005, JEGX01.0021, and JEGX01.0034) were represented by these five isolates of SE.

In summary, this study demonstrated that SE is present in the eggs produced by small flocks with <3,000 birds highlighting the potential risk posed by these eggs to the consumers. The phage and PFGE types of SE present in the eggs from small flocks were also the types commonly reported to the Centers for Disease Control and Prevention from human foodborne outbreaks. These findings emphasize the importance of small producer education on SE control measures and perhaps implementation of egg quality assurance practices to prevent SE contamination of shell eggs produced by backyard and other small layer flocks.

An FSIS Update on the Prevention and Control of Foodborne *Salmonella*
Karen Becker, USDA-FSIS

The Food Safety and Inspection Service (FSIS) is the public health agency in the USDA responsible for ensuring that the nation’s commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged. *Salmonella* is the leading cause of bacterial foodborne illness in the United States. It is estimated that approximately 360,000 (30%) of *Salmonella* illnesses are associated with FSIS-regulated products.

*Salmonella* is a common cause of foodborne illness outbreaks investigation by FSIS. There were 26 investigations of salmonellosis outbreaks from 2011 through 2016. The serotypes associated with these outbreaks were as follows: 6 Enteritidis; 5 Heidelberg; 5 Typhimurium; and 4 I 4,[5],12:i- (including one outbreak that also isolated S.Infantis). These outbreaks led to 14 recalls involving several products, including ground turkey, broiled chicken livers, ground beef, hogshead cheese, chicken (including mechanically separated chicken and stuffed chicken products), and pork.

In 2015, an outbreak of *Salmonella* I 4,[5],12:i- and Infantis illnesses associated with pork consumption in Washington state sickened 192 people. This outbreak investigation required a collaborative effort including FSIS, agencies in Washington state, and Center for Disease Control and Prevention (CDC) and was the largest reported pork-associated outbreak ever investigated by FSIS. Many case-patients reported consuming pork at hog roasts which led to a traceback investigation that identified an establishment as the source of many of the whole hogs used at these roasts. Several product and environmental samples collected at this establishment were positive for the outbreak strain of *Salmonella* I 4,[5],12:i-.

The investigation led to the establishment recalling whole hogs and pork products in August 2015. In 2016, a similar outbreak associated with pork consumed at hog roasts occurred involving 10 case-patients infected with the same strain of *Salmonella* I 4,[5],12:i-. Prompt traceback confirmed the same establishment as the hog source and another recall ensued. Application of lessons learned from the 2015 outbreak allowed a more rapid, collaborative, multi-agency response with shorter timelines compared to the 2016 outbreak. Potential future steps to better understand this pathogen include collaboration among FSIS, USDA, State
colleagues and industry to identify through better surveillance and understanding of supply chains feasible and effective interventions to prevent illness.

FSIS initiated the Pathogen Reduction/Hazard Analysis and Critical Control Points (PR/HACCP) verification program in 1996. This program requires meat and poultry establishments to implement preventive controls to improve food safety. Assessing FSIS sampling results against Salmonella performance standards helps to verify PR/HACCP effectiveness. FSIS also tracks Salmonella serotype distribution to better understand emerging hazards. A comparison of the ten serotypes most frequently causing human salmonellosis with the ten serotypes most commonly isolated from FSIS-regulated products (ground beef, chicken, and turkey) shows some but not complete overlap. For example, Enteritidis and Typhimurium, the 1st and 2nd most common serotypes respectively causing human salmonellosis are the 2nd and 4th, respectively, most frequently isolated serotypes in FSIS-regulated products. In contrast, S.Kentucky and Montevideo are the 1st and 3rd, most frequently isolated serotypes from FSIS-regulated products respectively, but are not among the ten most frequent causes of human salmonellosis.

Salmonella Dublin is an emerging, One Health priority issue, most often found in cattle. Dublin is the second most frequently isolated serotype from FSIS-regulated products. It rarely infects humans, but when it does, infections are often invasive and multi-drug resistant (MDR) than other serotypes. FSIS will be working with other USDA sister agencies, CDC, FDA, and State partners to identify through surveillance and enhance our understanding of this pathogen and other emerging foodborne disease hazards.

In 2013, FSIS announced a change in Salmonella sampling from a set-based approach to a routine sampling model. Routine sampling is characterized by an analysis of sample results in an establishment over a moving 52-week window of time to assess process control. This program began for various product types in a staggered fashion in 2014 and 2015. Routine sampling provides better surveillance than set-based sampling and provides an opportunity to calculate pathogen prevalence estimates.

FSIS participates in the National Antimicrobial Resistance Monitoring System (NARMS), contributing Salmonella isolates from PR/HACCP and animal cecal samples. Among product classes tested in 2013 (i.e. chicken carcasses rinses, turkey carcass swabs, ground beef, and ground or comminuted chicken and turkey products) from PR/HACCP sampling, turkey Salmonella isolates were more frequently resistant to at least one antimicrobial, while ground beef isolates were least frequently resistant. Over the past ten years, overall rates of MDR Salmonella have remained unchanged in beef and chicken isolates in PR/HACCP sampling. Among product classes tested in 2014 (i.e. young chickens, young turkeys, dairy cows, beef cows, steers, heifers, market swine and sows) from cecal sampling, sow isolates were most frequently positive for Salmonella, and beef cow isolates were least frequently positive.

In December 2014, FSIS released its Salmonella Action Plan, which lists ten priority actions to address Salmonella in FSIS-regulated products. Highlighted actions in this plan that FSIS prioritizes include: 1.) poultry slaughter establishments using scientifically-based measures to prevent contamination,
rather than addressing it after it occurs; 2.) published final performance standards for chicken parts and comminuted poultry; 3.) updated compliance guidance for industry to address pathogens in raw poultry products; FSIS has completed nearly all of the activities listed in Salmonella Action Plan at this time, and most items that remain are in very late stages of completion, such as final document clearance with likely publication dates in 2016. FSIS therefore considers that it has accomplished the commitments made in the Plan, which are the groundwork for improved inspection, production practices, and education.

Through these actions and accomplishments, FSIS has achieved its main objective in developing the Plan: to better focus Salmonella-related activities with a long-term goal of reducing Salmonella illnesses. A number of the items in the plan are not one-time actions, but are changes that the Agency implemented in how it will conduct its business going forward. The Agency anticipates that the Plan will have long-lasting effects to reduce Salmonella illnesses. FSIS realizes that the Plan has not resulted in and could not have resulted in the elimination of Salmonella illnesses. Although the Agency will no longer monitor its accomplishments against the Plan, it will continue to explore and evaluate new approaches and methods to decrease Salmonella illnesses and will continue to monitor its progress through the number of Salmonella illnesses associated with FSIS-regulated products.

FSIS will continue to address Salmonella in its regulated products and improve reporting of testing data. In 2017, FSIS plans to begin the release of testing results in the Salmonella/Campylobacter Prevalence Analysis Report. In order to be included in this report, commodities will need to have been sampled for three years under the routine sampling program. It is expected that the report will contain estimates of annual prevalence, information on seasonality, serotype distribution, Pulse-field Gel Electrophoresis (PFGE) patterns, bacterial enumeration, and antimicrobial resistance profiles. More details on Salmonella Plan accomplishments can be found at http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/foodborne-illness-and-disease/salmonella/sap-two-year.

Additional data related to FSIS Salmonella-related testing and policy can be found on www.fsis.usda.gov.


2015 NVSL Salmonella Report
Brenda Morningstar-Shaw, USDA-NVSL

The Diagnostic Bacteriology Laboratory within the National Veterinary Services Laboratories (NVSL) routinely serotypes Salmonella isolates submitted by private, state, and federal laboratories as well as veterinarians, researchers, and other animal health officials. Most submissions were from diagnostic laboratories across the U.S. This report summarizes Salmonella serotyping submissions received at the NVSL from January 1 through December 31, 2015. Salmonella isolates are
identified as clinical (clinical signs of salmonellosis from primary or secondary infection) or non-clinical (herd and flock monitoring programs, environmental sources, food). Serotyping data from isolates submitted for research purposes are not included in the source specific summaries. Based on information provided by the submitter, the isolates were divided into animal source categories for analysis. The animal sources include Avian (avian of unknown origin, condor, crow, finch, hawk, goose, sparrow, partridge, parrot, parakeet, pheasant, pigeon quail, duck, and owl); Cattle; Chicken; Dog/Cat; Horse (horse, donkey, mule); Other Domestic (alpaca, ferret, goat, sheep, guinea pig, llama, mink); Pigs; Reptiles/Amphibians (iguana, lizard, reptile, snake, turtle, tortoise, amphibian, frog, alligator, crocodile); Turkey' Wild/Zoo (antelope, deer, fish, marine mammals, opossum, rabbit, raccoon, rodent, camel, monkey, lemur, tiger, zebra, rhinoceros, wallaby, cervid, cheetah, coyote, gazelle, jaguar, leopard, lion, warthog); and Other (environment, unknown).

*Salmonella* serotyping at the NVSL is an ISO 17025 accredited test. *Salmonellae* are typed using polyvalent and single factor antisera to determine the O and H antigens. Approximately 60% of the sera used at the NVSL is produced in house as previously described. (Ewing, 1986) The remaining antisera are purchased from commercial vendors. All sera are subject to extensive quality control testing prior to use. *Salmonella* antigenic formulae are determined as previously described (Ewing) and interpreted via the White-Kauffmann-Le Minor scheme (Grimont, 2007). The subspecies designation precedes the antigenic formula for those serotypes other than subspecies I.

In 2015, 13,880 submissions were received for *Salmonella* serotyping. *Salmonella* isolates were divided into clinical isolates (4,976), non-clinical isolates (6,396), research and other (2,508). The sources of clinical and non-clinical *Salmonella* isolates are shown in Table 1. There were 289 different serotypes identified in 2015. Table 2 lists the ten most common serotypes when all animal sources were combined. The most common isolates from chickens, turkeys, pigs, cattle, and horses are listed in Tables 3-7.

The NVSL provided a *Salmonella* Group D proficiency test to assess the ability of laboratories to isolate *Salmonella* from environmental samples and determine the serogroup (specifically group D) of any *Salmonella* isolated. The test consisted of ten lyophilized cultures containing various combinations of *Salmonella* and common contaminants that simulated an environmental swab. The 2015 test included *Salmonella* serotypes Enteritidis, Berta, Anatum, Oranienburg, and Heidelberg. Contaminant bacteria included *Enterobacter cloacae*, *Citrobacter sedlakii*, *Citrobacter amalonaticus*, *Citrobacter freundii*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Providencia rettgeri*. Laboratories were instructed to test the samples according to the procedures used in their laboratories. The NVSL randomly retained 13% of the test kits and tested them blindly for quality assurance (QA) purposes. The results of the proficiency test are shown in Table 8.

Additionally, the NVSL offered a *Salmonella* serotyping proficiency test to allow laboratories to assess their ability to serogroup or serotype *Salmonella*. The panel consisted of ten pure *Salmonella* isolates, including *Salmonella* serotypes Herston, Panama, Lome, Duisburg, Eko, Wippra/Molade, Dublin, Hato, Coeln, and
Enteritidis. Participants were given the option to perform serogrouping, partial serotyping, or full serotyping of the isolates and were graded based on appropriate identification to the level of testing that they performed. The NVSL randomly retained 15% of the test kits and tested them blindly for QA purposes. The results of the proficiency test are shown in Table 9.

Table 1: Sources of submissions to the NVSL for Salmonella serotyping in 2015

<table>
<thead>
<tr>
<th>Source</th>
<th>No. Clinical Submissions</th>
<th>No. Non-Clinical Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>1,644</td>
<td>233</td>
</tr>
<tr>
<td>Chicken</td>
<td>335</td>
<td>4,258</td>
</tr>
<tr>
<td>Horse</td>
<td>357</td>
<td>168</td>
</tr>
<tr>
<td>Swine</td>
<td>1,800</td>
<td>242</td>
</tr>
<tr>
<td>Turkey</td>
<td>163</td>
<td>780</td>
</tr>
<tr>
<td>All others</td>
<td>677</td>
<td>715</td>
</tr>
<tr>
<td>Total</td>
<td>4,976</td>
<td>6,396</td>
</tr>
</tbody>
</table>

Table 2: Most common serotypes in 2015: All sources

<table>
<thead>
<tr>
<th>Clinical Serotype</th>
<th>No. Isolates</th>
<th>Non-Clinical Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>798</td>
<td>Senftenberg</td>
<td>911</td>
</tr>
<tr>
<td>4,[5],12:i:-</td>
<td>632</td>
<td>Kentucky</td>
<td>574</td>
</tr>
<tr>
<td>Dublin</td>
<td>374</td>
<td>Montevideo</td>
<td>438</td>
</tr>
<tr>
<td>Cerro</td>
<td>310</td>
<td>Enteritidis</td>
<td>397</td>
</tr>
<tr>
<td>Enteritidis</td>
<td>197</td>
<td>Worthington</td>
<td>379</td>
</tr>
<tr>
<td>Montevideo</td>
<td>178</td>
<td>Mbandaka</td>
<td>351</td>
</tr>
<tr>
<td>Derby</td>
<td>160</td>
<td>Typhimurium</td>
<td>305</td>
</tr>
<tr>
<td>Agona/Newport</td>
<td>159</td>
<td>4,[5],12:i:-</td>
<td>183</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>144</td>
<td>Hadar</td>
<td>167</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>113</td>
<td>Newport</td>
<td>157</td>
</tr>
<tr>
<td>All others</td>
<td>1,752</td>
<td>All others</td>
<td>2,534</td>
</tr>
<tr>
<td>Total</td>
<td>4,976</td>
<td>Total</td>
<td>6,396</td>
</tr>
</tbody>
</table>

Table 3: Most common serotypes in 2015: Chickens

<table>
<thead>
<tr>
<th>Clinical Serotype</th>
<th>No. Isolates</th>
<th>Non-Clinical Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>164</td>
<td>Senftenberg</td>
<td>709</td>
</tr>
<tr>
<td>Kentucky</td>
<td>48</td>
<td>Kentucky</td>
<td>525</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>22</td>
<td>Enteritidis</td>
<td>349</td>
</tr>
<tr>
<td>Braenderup</td>
<td>11</td>
<td>Worthington</td>
<td>340</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>10</td>
<td>Montevideo</td>
<td>340</td>
</tr>
<tr>
<td>All others</td>
<td>80</td>
<td>All others</td>
<td>2,044</td>
</tr>
<tr>
<td>Total</td>
<td>335</td>
<td>Total</td>
<td>4,258</td>
</tr>
</tbody>
</table>
Table 4: Most common serotypes in 2015: Turkeys

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>44</td>
<td>Senftenberg</td>
<td>170</td>
</tr>
<tr>
<td>Ouakam</td>
<td>15</td>
<td>Hadar</td>
<td>165</td>
</tr>
<tr>
<td>Muenchen</td>
<td>13</td>
<td>Anatum</td>
<td>70</td>
</tr>
<tr>
<td>Albany</td>
<td>12</td>
<td>London</td>
<td>57</td>
</tr>
<tr>
<td>4,[5],12:i- /Typhimurium</td>
<td>9</td>
<td>Muenster</td>
<td>56</td>
</tr>
<tr>
<td>All others</td>
<td>61</td>
<td>All others</td>
<td>262</td>
</tr>
<tr>
<td>Total</td>
<td><strong>163</strong></td>
<td>Total</td>
<td><strong>780</strong></td>
</tr>
</tbody>
</table>

Table 5: Most common serotypes in 2015: Pigs

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,[5],12:i-</td>
<td>502</td>
<td>4,[5],12:i-</td>
<td>58</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>405</td>
<td>Typhimurium</td>
<td>47</td>
</tr>
<tr>
<td>Derby</td>
<td>154</td>
<td>Derby</td>
<td>21</td>
</tr>
<tr>
<td>Agona</td>
<td>104</td>
<td>Infantis/Agona</td>
<td>13</td>
</tr>
<tr>
<td>Infantis</td>
<td>67</td>
<td>Havana</td>
<td>10</td>
</tr>
<tr>
<td>All others</td>
<td>568</td>
<td>All others</td>
<td>80</td>
</tr>
<tr>
<td>Total</td>
<td><strong>1,800</strong></td>
<td>Total</td>
<td><strong>242</strong></td>
</tr>
</tbody>
</table>

Table 6: Most common serotypes in 2015: Cattle

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerro</td>
<td>375</td>
<td>Cerro</td>
<td>95</td>
</tr>
<tr>
<td>Dublin</td>
<td>325</td>
<td>Montevideo</td>
<td>34</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>174</td>
<td>Typhimurium</td>
<td>22</td>
</tr>
<tr>
<td>Montevideo</td>
<td>138</td>
<td>Newport</td>
<td>18</td>
</tr>
<tr>
<td>Newport</td>
<td>64</td>
<td>Dublin</td>
<td>17</td>
</tr>
<tr>
<td>All others</td>
<td>527</td>
<td>All others</td>
<td>104</td>
</tr>
<tr>
<td>Total</td>
<td><strong>1603</strong></td>
<td>Total</td>
<td><strong>290</strong></td>
</tr>
</tbody>
</table>

Table 7: Most common serotypes in 2015: Horses

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>58</td>
<td>Montevideo</td>
<td>40</td>
</tr>
<tr>
<td>Newport</td>
<td>50</td>
<td>Typhimurium</td>
<td>35</td>
</tr>
<tr>
<td>Anatum</td>
<td>38</td>
<td>Newport/Anatum</td>
<td>22</td>
</tr>
<tr>
<td>Mbandaka</td>
<td>22</td>
<td>Liverpool</td>
<td>8</td>
</tr>
<tr>
<td>Javiana</td>
<td>19</td>
<td>Mbandaka</td>
<td>6</td>
</tr>
<tr>
<td>All others</td>
<td>170</td>
<td>All others</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td><strong>357</strong></td>
<td>Total</td>
<td><strong>168</strong></td>
</tr>
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</table>
Table 8: Summary of NVSL Salmonella Group D proficiency test

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
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<tbody>
<tr>
<td>Participants</td>
<td>70</td>
<td>73</td>
<td>61</td>
<td>80</td>
<td>94</td>
</tr>
<tr>
<td>Mean Score</td>
<td>97%</td>
<td>92%</td>
<td>94%</td>
<td>98%</td>
<td>98%</td>
</tr>
<tr>
<td>Score Range</td>
<td>100-85%</td>
<td>100%-29%</td>
<td>100-68%</td>
<td>100-80%</td>
<td>100-68%</td>
</tr>
<tr>
<td>Below Passing</td>
<td>0</td>
<td>7</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 9: Summary of NVSL Salmonella Serotyping proficiency test

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>18</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>21</td>
</tr>
<tr>
<td>Mean Score</td>
<td>98%</td>
<td>99%</td>
<td>99%</td>
<td>97%</td>
<td>88%</td>
</tr>
<tr>
<td>Score Range</td>
<td>100-90%</td>
<td>100-80%</td>
<td>100-80%</td>
<td>100-80%</td>
<td>100-60%</td>
</tr>
</tbody>
</table>

References


The Use of Non-Accredited Veterinary Diagnostic Laboratories in Salmonella Testing of Turtles Prior to Export

Megin Nichols, Centers for Disease Control and Prevention (CDC)

Since 2015, CDC, multiple states, U.S Fish and Wildlife Service, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS), and the U.S. Food and Drug Administration (FDA) Center for Veterinary Medicine have investigated four separate multistate outbreaks of human Salmonella infections linked to contact with small turtles. In the four outbreaks, a total of 133 people infected with the outbreak strains of Salmonella were reported from 26 states between January 16, 2015 and April 8, 2016. Thirty-eight ill people were hospitalized, and no deaths were reported. Forty-one percent of ill people were children five years of age or younger. Epidemiologic and laboratory findings linked the four outbreaks of human Salmonella infections to contact with small turtles or their environments, such as water from a turtle habitat.

Salmonella Outbreaks Linked to Live Poultry in the United States 2016

Lauren Stevenson, Centers for Disease Control and Prevention (CDC)

This year we saw the largest number of illnesses linked to contact with backyard poultry ever recorded. As of September 26, 2016, 895 people infected with the outbreak strains of Salmonella were reported from 48 states. Among people for whom information is available, illnesses started on dates ranging from January 4, 2016 to September 10, 2016. Ill people ranged in age from less than 1 year to 106, with a median age of 27. Of ill people, 52% were female. Among 761 ill people with available information, 209 (27%) reported being hospitalized, and
three deaths were reported. Salmonella was considered to be a cause of death for one person in Mississippi. Although the two people who died in Kentucky and New Jersey had a Salmonella infection, the infection was not considered to be a cause of death.

Epidemiologic, traceback, and laboratory findings linked the eight outbreaks to contact with live poultry, such as chicks and ducklings, from multiple hatcheries. In interviews, ill people answered questions about contact with animals and foods consumed during the week before becoming ill. Contact with live poultry (chicks, chickens, ducks, ducklings) in the week before becoming ill was reported by 552 of 745 ill people interviewed, or 74%.

Ill people reported purchasing live baby poultry from several suppliers, including feed supply stores, Internet sites, hatcheries, and friends in multiple states. Ill people reported purchasing live poultry to produce eggs, learn about agriculture, have as a hobby, enjoy for fun, keep as pets, or to give as Easter gifts. Some of the places ill people reported contact with live poultry included their home, someone else’s home, work, or school settings.

**Topics of Interest from the Pork Industry**

Submitted by Jim Dickson, Iowa State University and National Pork Board (Presented by Dr. Shelley Rankin University of Pennsylvania)

**Multistate Outbreak of Multidrug-Resistant Salmonella 1,4,[5],12:i:- [sic] and Salmonella Infantis Infections Linked to Pork**

(Final Update)

Posted December 2, 2015 1:30 PM ET

http://www.cdc.gov/salmonella/pork-08-15/index.htm

Epidemiologic, laboratory, and traceback findings identified pork produced by Kapowsin Meats as the likely source of this outbreak of *Salmonella 1,4,[5],12: i:-* and *Salmonella Infantis* infections. Accounted for were 192 people infected with the outbreak strains of *Salmonella 1,4,[5],12: i:-* (188) and *Salmonella infantis* (4) reported from five states.

The number of ill people reported from each state was as follows: Alaska (1), California (2), Idaho (2), Oregon (3), and Washington (184). Most of the ill people infected in states other than Washington traveled to Washington in the week before their illness started. Most ill people were reported from Washington. Thirty ill people were hospitalized, and no deaths were reported. Laboratory testing confirmed the outbreak strains in environmental samples collected by Washington State Department of Health from the Kapowsin Meats facility. On August 13, 2015, Kapowsin Meats voluntarily recalled approximately 116,262 pounds of whole pigs that might be contaminated with *Salmonella 1,4,[5],12: i:-* The product was shipped to individuals, retail locations, institutions, and distributors in Alaska, Oregon, and Washington.

Among people for whom information was available, illnesses started on dates ranging from April 25, 2015, to September 25, 2015. Ill people ranged in age from less than 1 year to 90, with a median age of 35. Fifty-one percent of ill people were female. Among 180 ill people with available information, 30 (17%) were hospitalized, and no deaths were reported.
CDC’s NARMS conducted antibiotic susceptibility testing on ten isolates. All ten isolates (100%) were multidrug resistant. This included resistance to ampicillin, streptomycin, sulfisoxazole, and tetracycline (ASSuT). Antibiotic resistance may be associated with increased risk of hospitalization, development of a bloodstream infection, or treatment failure in patients.

**Increased Frequency of Isolation of Multi-drug Resistant Salmonella 1,4,[5],12:i : - From Swine with Histologic Lesions Consistent with Salmonellosis**

Orhan Sahin¹, Curt Thompson¹, Lei Dai², Adam Krull¹, Eric Burrough¹
¹Veterinary Diagnostic and Production Animal Medicine, Iowa State University
²Veterinary Microbiology and Preventive Medicine, Iowa State University

Isolation of *Salmonella* 1,4,[5],12:i : - has increased in frequency at the ISU-VDL from 3% in 2001 to >15% in 2015. This serotype is thought to be a primary pathogen in pigs. Review of the case data from clinical submissions to the Iowa State University (ISU), Veterinary Diagnostic Laboratory (VDL) showed an association of enteric disease with concurrent histologic lesions. On gross examination, a fibrinonecrotic colitis was commonly noted.

Histologic changes include superficial to deep ulceration of the large (and less commonly) the small intestinal mucosa, expansion of the lamina propria by neutrophils and luminal accumulation of fibrin and cellular debris. The lesions were observed in pigs particularly during the post-weaning nursery phase of production.

Antibiotic resistance is observed in this serotype (ASSuT).

**Genotypic and Phenotypic Characterization of Salmonella Enterica Serovar Dublin in Cattle.**

Milton Thomas¹, Anil J. Thachil², Sudeep Ghimire¹, Amy Glaser², Angela E. Pillatzki¹, Russ Daly¹, Eric A. Nelson¹, Jane Christopher-Hennings¹, Joy Scaria¹
¹Veterinary and Biomedical Sciences, South Dakota State University; ²Population Medicine and Diagnostic Sciences, Cornell University

*Salmonella enterica* subsp. *enterica* serovar Dublin predominantly infects cattle, however these organisms could infect other species of animals as well as humans. The objective of this study was to evaluate association between genomic features and phenotypic characters such as host tissue invasiveness, antibiotic sensitivity and acid tolerance for isolates from the USA. This study evaluated association between genomic features and phenotypic characters such as host tissue invasiveness, antibiotic sensitivity, and acid tolerance for isolates from the Northeast and Midwest regions of the U.S. There was no significant difference in cell invasiveness. All isolates could grow at a pH between 4 and 7. However, there was no clear correlation between cell invasiveness and ability to survive in an acidic environment.

Antibiotic sensitivity testing revealed that isolates from the Midwest were only susceptible to fluoroquinolones and aminoglycoside classes.

**FAO/WHO Guidelines for the Control of Non-typhoidal Salmonella**

Jim Dickson, Iowa State University
SALMONELLA

(Presented by Dr. Donna Kelly, University of Pennsylvania-New Bolton Center)

The 2014 Codex Committee on Food Hygiene requested Food and Agriculture Organization (FAO), World Health Organization (WHO) to review of scientific literature and convene a meeting of experts to review proposed interventions for the control of non-typhoidal salmonella in pork and beef production to processing. It was to be determined which interventions were the most appropriate point(s) of application of intervention and decontamination treatments and to verify the efficacy of these interventions in terms of salmonella reduction. FAO/WHO was requested to advise on the quantifiable level of reduction that the intervention achieves and on the appropriateness of these interventions to be included in the Codex guidelines of international food standards.


All possible interventions from primary production to the end of processing were investigated to control non-typhoidal salmonella in pork and beef. Each commodity was considered separately. An international public call for data on control measures for salmonella yielded a mass of hazard-based interventions. Selected interventions must be a part of the overall meat hygiene program – Good Hygiene Practices. All interventions would be verified at the local establishment.

**Beef Conclusions:** No hazard-based interventions were determined at primary production. Biosecurity contributes to general on-farm control of salmonella and other zoonotic food-borne pathogens but did not have significant evidence for the reduction of salmonella at processing. Interventions included decontamination of hides with chemical washes (organic acids) post-exsanguination and pre-dehiding, and carcass decontamination after hide removal and pre-chilling with hot water, steam pasteurization at 70C, or chemical washes.

**Pork Conclusions:** Biosecurity even though considered good farming practices contributed a significant amount to the reduction of salmonella contamination on the carcass. It helps to keep negative herds negative and helps to reduce salmonella prevalence in finisher pigs on positive farms. Pre-harvest salmonella reduction by on-farm hazard-based interventions include feed management (meal vs. pellets, acidification of feed), water management (acidification), and vaccination. These interventions need to be used in conjunction with other interventions along the chain. If they were only used on-farm, then they had a limited effect on carcass salmonella reduction. Other interventions for salmonella reduction in pork processing include scalding and singeing to reduce carcass contamination, carcass decontamination after hide removal and pre-chilling with hot water, steam pasteurization at 70C, or chemical washes.

Other acknowledged steps were identified for both beef and pork however these interventions lacked consistent and credible evidence as hazard specific interventions. It was suggested that these steps remain as good hygiene practices (GHP’s) for production: Hygiene during slaughter transport and in lairage, hygiene during carcass dressing to minimize contamination, bunging to reduce fecal spillage at processing, carcass trimming and steam vacuuming to remove visible contamination, chilling to prevent growth of salmonella, practices in the chilling room to prevent cross-contamination, feed withdrawal to reduce intestinal rupture
and spillage during dressing, hygiene during de-hairing and polishing to reduce cross- and re-contamination. In small establishments with limited resources, full carcass steam vacuuming was determined to be a potential alternative to hot water washes.

Interventions for packaging included irradiation for both beef and pork. Post-packaging steps for beef and pork were considered good hygiene practices and not point based interventions. These steps include cold chain management, application of hazard analysis and critical control points (HACCP) principles, and hygiene program prerequisites.

**Committee Business:**

No resolutions or recommendations were proposed. The Committee discussed the potential re-organization of the USAHA Committee structure. It was determined that the Committee on Salmonella, if necessary to be restructured, fall within the newly proposed One Health Committee due to human, animal and environmental aspects of the disease.
Celia Maria Antognoli, CO; James Averill, MI; Scott Bender, AZ; Deborah Brennan, MS; Minden Buswell, WA; Beth Carlson, ND; John Clifford, DC; Walter Cook, TX; Susan Culp, TX; Ignacio dela Cruz, MP; Linda Detwiler, NJ; William Edmiston, TX; Anita Edmondson, CA; Dee Ellis, TX; Keith Forbes, NV; Larry Forgey, MO; Michael Gilsdorf, MD; Carl Heckendorf, CO; Amy Hendrickson, WY; Russell Iselt, TX; Paul Jones, AL; Susan Keller, ND; Eileen Kuhlmann, MN; T.R. Lansford, TX; James Leafstedt, SD; Mary Lis, CT; Jim Logan, WY; Shirley McKenzie, NC; Cheryl Miller, IN; Ronald Miller, PA; Peter Mundschenk, AZ; Elisabeth Patton, WI; Justin Roach, OK; Suelee Robbe-Austerman, IA; Paul Rodgers, WV; Susan Rollo, TX; Joan Dean Rowe, CA; Ben Smith, WA; Scott Stuart, CO; Diane Sutton, MD; Manoel Tamassia, NJ; Jeff Turner, TX; Stephen White, WA; Nora Wineland, MO; David Winters, TX; Cindy Wolf, MN.

The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 9:00 a.m. to 12:00 p.m. There were 15 members and 13 guests present. Meeting was called to order by the chairman, Cheryl Miller. All attendees were asked to sign in.

Diane Sutton announced that USDA is proposing to discontinue providing the free plastic ear tags due to budgetary cut backs. T. J. Myers explained the reasoning for USDA’s proposed actions. Myers and Sutton responded to committee members’ questions and concerns relating to this issue.

Presentations and Reports

Scrapie Program Updates
Diane Sutton, USDA-APHIS-VS

Scrapie Eradication Program Results*

- The National Scrapie Eradication Program continued to make progress in FY 2016.
- As a result of the hard work of industry, the states and APHIS, we have decreased scrapie prevalence in cull sheep from 1 in 500 to less than 1 in 20,000 (based on upper confidence level). At the end of FY 2015, the percent of cull sheep found positive at slaughter and adjusted for face color was 0.0036 percent. As of September 30, 2016, this measure was 0.0014 percent (upper confidence limit 0.005%) a 61 percent decrease; however, due to sample size this is not significantly different from FY 2015.
- At the end of FY 2015, the percent of cull black face sheep found positive at slaughter was 0.025 percent. The current value of this measure is 0.009 percent, a 99 percent decrease compared to FY 2003 and a 62 percent decrease from FY 2015. The upper confidence limit of the measure is 0.025 percent so the change from FY 2015 is not statistically significant.
- One infected and three source flocks were designated in FY 2015. Two infected and three source flocks have been designated in FY 2016.
• In November 2014, the first positive goat found through Regulatory Scrapie Slaughter Surveillance (RSSS) was identified. Based on all goats sampled at slaughter, the prevalence of scrapie in U.S. cull goats is 0.003 percent with an upper 95 percent confidence limit of 0.011 percent. To date, no other goats have tested positive at slaughter.

*Slaughter Surveillance*
As of September 30, 2016, 39,978 animals have been sampled for scrapie testing in FY 2016:
• 37,878 RSSS samples and 2,100 on-farm samples;
• Of which 32,356 were sheep and 7,622 were goats.

*Scrapie Surveillance Plan*
• Implementation FY 2016
  o States with RSSS collection sites will continue to sample targeted sheep and goats.
  o The annual State-of-origin sampling minimum for sheep is 20 percent of the number required to detect a scrapie prevalence of 0.1 percent with 95 percent confidence or 1 percent of the breeding flock in the State, whichever is less. The objective is to sample sufficient sheep in a 5-year period to detect a scrapie prevalence of 0.1 percent with 95 percent confidence or 5 percent of the breeding flock in the State, whichever is less.
  o The annual State-of-origin sampling minimum for goats is determined based on the States’ goat scrapie case incidence.
    ▪ If a State has not had a goat scrapie case in the previous ten years, its annual goat sampling minimum is its prorated share of 3,000 samples, based on its proportion of the U.S. goat population as determined by the NASS Sheep and Goat annual report.
    ▪ If a State has had a goat scrapie case in the previous ten years, its annual goat sampling minimum is determined using the same method as is used for determining its annual sheep sampling minimum.

*Note:* These are minimums. The plan is to continue to collect samples from the maximum number of targeted animals given the available budget.

*ID Compliance:*
• All scrapie positive animals in FY 2016 were traced back to their flock of origin.
• APHIS is considering changes to the types of official eartags provided at no cost to producers and others who handle sheep or goats in commerce.

*Proposed Rules Published:*
• VS published proposed revisions to 9 CFR parts 54 and 79. The proposed changes are intended to improving the effectiveness and cost efficiency of surveillance and to increase animal identification compliance by addressing gaps in identification and by requiring States to meet reasonable surveillance targets to remain consistent States. States must meet these targets for VS to
demonstrate geographically appropriate surveillance to meet the criteria for freedom and have confidence that all of the remaining cases have been found.

- The rule proposes to:
  - Give the APHIS Administrator authority to relieve requirements for sheep and goats exposed to scrapie types, such as Nor98-like, that do not pose a significant risk of transmission;
  - Increase flexibility in how investigations can be conducted and allow the epidemiology in a specific flock to be given more consideration in determining flock and animal status;
  - Add a genetic-based approach to regulation;
  - Make goat identification requirements similar to those for sheep to support ongoing slaughter surveillance in goats (no changes will be made in the consistent State requirements regarding identification of goats in intrastate commerce);
  - Tighten the definition of slaughter channels;
  - Expand the individual identification requirement to all sexually intact animals unless moving as a group/lot (allows mixed-source groups moving in slaughter channels at under 18 months);
  - Limit the use of tattoos and implants to animals not moving through markets and not in slaughter channels; and
  - Reduce recordkeeping requirements by making them similar to the current uniform methods and rules compliance guidance.

- A final rule has been drafted and is in clearance.
- APHIS also published a proposed rule to revise its scrapie import regulations to bring them more in line with the OIE scrapie chapter.

**Scrapie Flock Certification Program (SFCP)**

- At the end of FY 2016 there were 410 producers enrolled in the program – 34 Export Certified, 98 Export Monitored and 278 Select

*FY 2016 numbers are not final and may change.

**“K” at Codon 171 in Sheep**

Justin Greenlee, Research Veterinary Medical Officer, National Animal Disease Center (NADC), ARS- USDA

Susceptibility or resistance to sheep scrapie is a function of genotype with polymorphisms at codon 171 in the sheep prion gene playing a major role. Glutamine (Q) at 171 contributes to scrapie susceptibility while arginine (R) is associated with resistance. In some breeds, lysine (K) occurs at codon 171, but its effect on scrapie resistance has not been determined. Biochemical similarities (charge and polarity) between K and R would suggest that they may contribute to prion disease susceptibility in a similar way, but studies have not been performed to confirm this. The purpose of this study was to compare susceptibility, tissue distribution of abnormal prion protein (PrPSc), and incubation times of AA\textsubscript{136}RR\textsubscript{154}QQ\textsubscript{171} (where the letter denotes the amino acid and the number the position) with AA\textsubscript{136}RR\textsubscript{154}QK\textsubscript{171} or AA\textsubscript{136}RR\textsubscript{154}KK\textsubscript{171} sheep after either intracranial or oronasal inoculation with scrapie. After inoculation, sheep were observed daily for clinical signs and were euthanized and necropsied after clinical signs were
unequivocal. Tissues were collected at necropsy for immunohistochemistry and enzyme-linked immunosorbent assay (ELISA) analyses. After intracranial (IC) inoculation, all genotypes of sheep developed scrapie. IC inoculated QQ_{171} sheep had clinical signs approximately nine months after inoculation with widespread PrP\textsubscript{Sc} in the brain and peripheral tissues (including retropharyngeal lymph node (RPLN) and rectal mucosal biopsy (RAMALT). IC inoculated QK_{171} animals had an average incubation time of 27 months to onset of clinical signs with PrP\textsubscript{Sc} in the brain of 6/6 and RPLN of 3/6 sheep. The incubation period of IC inoculated KK_{171} sheep was greater than 46 months and PrP\textsubscript{Sc} was only detected in the brain. After oronasal (ON) inoculation, QQ_{171} sheep had clinical signs approximately 22 months after inoculation with widespread PrP\textsubscript{Sc} in the brain, RPLN, and RAMALT. There was evidence of PrP\textsubscript{Sc} in 4/5 ON inoculated QK_{171} sheep with incubation times greater than 53 months. PrP\textsubscript{Sc} only was detected in RAMALT of one of the QK_{171} sheep. PrP\textsubscript{Sc} was not detected in oronasally inoculated KK_{171} sheep in any tissue sample collected at any time. Results of this study indicate that sheep with a single K allele at 171 are susceptible to scrapie after oronasal inoculation, but with a prolonged incubation time and less peripheral distribution of PrP\textsubscript{Sc}. In the challenge model used in this study, KK_{171} sheep appear to have a high level of resistance to challenge with the agent of scrapie.

**Genetic Resistance to Scrapie in Goats**

Stephen White, ARS, USDA

Update on Scrapie Research from the Animal Disease Research Unit

Scrapie is the transmissible spongiform encephalopathy of sheep and goats, and goats may serve as a scrapie reservoir for sheep. To date there has been no experimental inoculation confirming strong, lifelong genetic resistance in goats. Goats bearing S146 or K222 amino acid substitutions in the prion protein have been present in scrapie-exposed herds but significantly underrepresented in disease cases. In an oral scrapie challenge, all controls homozygous for the most common goat haplotype showed clinical scrapie by an average of 24 months post-inoculation; in contrast, none of the S146 and K222 heterozygotes have scrapie-positive lymphoid biopsy tests or confirmed scrapie at incubation times now approaching seven years or longer (P<0.0001). Recent reports identified natural scrapie in less than five S146 and K222 heterozygotes, suggesting heterozygotes will not have truly complete resistance. However, scrapie incubation times are now as long as or longer than many commercial operations keep goats for production purposes, so S146 or K222 may reduce the probability of clinical scrapie during commercial goat productive life spans. In a separate experiment, goats bearing S127 showed extended scrapie incubation times compared to common GG127 homozygous goats. These results suggest longer relevant trace-back histories for goats with these genotypes.

Additional experiments addressed two questions regarding scrapie transmission. Ewes experimentally infected with Nor98-like scrapie were tested for placental deposition of PrP\textsubscript{Sc}. To date none has been found, but studies are ongoing. A separate study examined transmission of classical scrapie through goat milk. Very recent work has shown this is possible, and our study extended
previous findings by demonstrating transmission with milk from later in lactation and to both lambs and goat kids.

**Committee Business:**

- Cheryl Miller presented the purpose of the Committee on Scrapie.
- The response by USDA to last year’s resolution was presented to and discussed by the committee.
- A resolution to USDA to encourage the continuation of free plastic scrapie ear tags was presented to the committee by Joan Rowe. Paul Rodgers moved that the committee accept this resolution. It was seconded by Jim Logan. After discussion by the committee, the committee voted 9 in favor of accepting the resolution, 0 opposed, and 2 abstained.
- A second resolution to USDA to allow the use of pilot programs to further explore genetic resistance to scrapie in goats was presented by Joan Rowe. Amy Hendrickson moved that we accept this resolution. It was seconded by Jim Logan. After discussion by the committee, the committee voted 9 in favor of accepting the resolution, 0 opposed, and 2 abstained.
- A third resolution to USDA to identify non-traditional marketing and slaughter channels of sheep and goats was presented to the committee by Linda Detwiler. Paul Rodgers moved that the committee accept this resolution. It was seconded by Jim Logan. After discussion by the committee, the committee voted 9 in favor of accepting the resolution, 0 opposed, and 2 abstained.
- Cheryl Miller informed the committee that USAHA is considering a new format for the committees and in the draft proposal the Committee on Scrapie would become a Subcommittee of the Committee on Sheep and Goat.
- Paul Rodgers moved that the meeting be adjourned. Joan Rowe seconded this motion.
REPORT OF THE COMMITTEE

USDA-APHIS Scrapie Free Flock Certification Program (SFCP)
National Scrapie Oversight Committee Update
Diane Sutton and Dr. Alan Huddleston
USDA-APHIS-VS

SFCP Participation
- As of September 30, 2016, there were 416 participating flocks in the SFCP
  - 281 Select Monitored
  - 102 Export Monitored
  - 33 Export Certified
- In FY2016 10 Export Monitored flocks advanced to Export Certified
- 48 sheep breeds and 17 goat breeds are represented in the SFCP
- As of September 30, 2016, there are active State SFCP boards in nine States

Canada’s Import Requirements
- February 2016, Canada published new import requirements for small ruminants imported from the United States for breeding, domestic or captive purposes.
  - Female small ruminants must be certified as originating from “Negligible Risk Premises” defined as “A premises that has maintained the flock or herd of origin and has complied with conditions equivalent to those required for Export Monitored category for at least five (5) years.”
  - Male small ruminants must meet at least one of the following conditions:
    - The animal must have originated from a “Negligible Risk Premises”;
    - The animal must be a sheep that is officially genotyped and determined to be AA/QR or AA/RR at codons 136/171, respectively; and/or
    - The animal must be imported into a Canadian SFCP flock with at least one year of status, maintained separate from the females/offspring, and tested when it dies or is euthanized.

Export Monitored Flock FY 2016 Review
- In FY 2016 APHIS continued to review Export Monitored flocks with six or more years of status to determine if they had met the required sampling threshold to advance to six years.
  - In FY 2016 APHIS identified 55 flocks with 6 or more years of status, and of these 23 had not met the sampling threshold.
  - The status dates for these flocks were reset to five years, and notification letters were sent to producers explaining their new status dates and steps they can take to regain six years of status.
- APHIS will continue to monitor flocks that are approaching six years of status to determine if they meet the sampling threshold, and will take action to address those that have not.
Select Category
- Participation in the Select category was slightly higher in FY 2016 than in FY 2015 (an approximately 1.5 percent increase).
- APHIS is currently reviewing Select category sampling compliance. Flocks that are not in compliance with the sampling requirement are placed in suspended status pending submission of a sample.
- APHIS’ goal in FY 2017 is to more robustly increase participation in this category, thereby increasing the SFCP contribution to scrapie on-farm surveillance.

SFCP Standards
In May 2016, APHIS published revised SFCP Standards. Major updates to the SFCP Standards included the following items (see Appendix for full list and citations).
- In the Select category, animals collected through Regulatory Scrapie Slaughter Surveillance (RSSS) will count toward the sampling requirement if at least ten animals are collected through RSSS in the same sampling period.
- Sampling requirements in genetically resistant Export Monitored flocks following the Standard sampling protocol: if there are no genetically susceptible animals in the flock (i.e. the flock is composed entirely of QR/RR ewes, RR rams, and no goats), the annual, 6-year, and 7-year sampling requirements are waived (assuming all other sampling requirements are met).
- Criteria for exempting lambs born in genetically resistant flocks from genotyping for Standard and Alternative 1 sampling protocol: if there are no genetically susceptible animals in the flock and the owner only has mature RR rams on the premises from that point forward lambs do not need to be genotyped. Note: these conditions will be confirmed at each subsequent annual inspection, and if an inspector believes at any time that one or more of the animals in the flock may be a QQ animal, the inspector will require that the animal(s) be officially genotyped.
- How to treat “Lost to Inventory” animals in Export Monitored flocks following the Alternative 1 sampling protocol:
  o The flock owner may elect to switch to the standard sampling protocol, and the flock’s status date will be reset to the lesser of the flock’s current status date or 12 months of status for each test eligible animal sampled and must meet the additional sampling requirements of the standard sampling protocol to retain more than five years in status; or
  o The flock owner may elect to stay in the Alternative 1 category, and the flock’s status date will be reset to the date the VS office was notified (or the lost to inventory animal became known to the VS office) that the animal was lost to inventory.
- Alternative testing protocol allowed in place of a status reduction when a found dead/euthanized animal is not tested for scrapie, limited to rare circumstances when VS determines that the flock owner was in a situation that made him/her fail to comply with this testing requirement.
• Animals from Inconsistent States not in slaughter channels must be from either an Export Monitored/Export Certified flock or from a Select Monitored flock in which it was born. There are no changes for animals in slaughter channels.

• Retesting animals to meet the annual sampling requirement:
  - If a flock following the Standard sampling protocol has live-animal tested all genetically susceptible test eligible animals at least once and must test an additional animal to meet the annual sampling requirement, previously tested animals can be repeat live-animal tested.
  - If all genetically susceptible animals in the flock have been live animal tested four times, the annual sampling requirement is waived.

• Export category flocks must report the use of milk/colostrum from a lower status flock.

• Animals tested within 12 months of another animal being “Lost to Inventory” can meet the lost to inventory sampling requirement in Export Certified flocks if the flock had already tested 30 animals (this does not apply to “Found Dead” animals).

• How to treat previously live-animal tested “Found Dead” and “Lost to Inventory” animals in Export Monitored flocks:
  - Lost to inventory – if the animal had been tested in the previous 12 months, no change in status and no additional animals need to be tested (and if the flock is following the Alternative 1 sampling protocol it does not have to switch to the Standard sampling protocol).
  - Found dead – APHIS will determine if the animal reasonably could have been sampled. If so, the animal will be treated as any other found dead. If not the animal is considered lost to inventory and will treated the same as other lost to inventory animals.

In FY 2017, APHIS will review and update the Standards as needed, with the goal of publishing updated Standards June 2017.

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1 The genotype test must meet all of the following requirements to be recognized as official:

- The blood is drawn by an authorized Federal or State animal health employee or an accredited veterinarian;
- The sheep is officially identified;
- The sample is submitted with a VS Form 5-29, “Cooperative State-Federal Scrapie Control Program, Scrapie Test Record” or an electronic or State issued equivalent; and
- APHIS has approved the laboratory (a list of approved laboratories is available on the APHIS Web page).
REPORT OF THE USAHA COMMITTEE ON SHEEP AND GOATS  
Chair: Amy Hendrickson, WY  
Vice Chair: Maggie Highland, WA

Scott Bender, AZ; Deborah Brennan, MS; John Clifford, DC; Walter Cook, TX; William Edmiston, TX; Amy Hendrickson, WY; Maggie Highland, WA; Joseph Huff, CO; Paul Jones, AL; Don Knowles, WA; Eileen Kuhlmann, MN; James Leafstedt, SD; Mary Lis, CT; Linda Logan, TX; Jim Logan, WY; David Marshall, NC; Chuck Massengill, MO; Cheryl Miller, IN; Ronald Miller, PA; Jeffrey Nelson, IA; Suelee Robbe-Austerman, IA; Paul Rodgers, WV; Joan Dean Rowe, CA; Mo Salman, CO; David Scarfe, IL; Diane Sutton, MD; Stephen White, WA; Margaret Wild, CO; William Wilson, KS; Nora Wineland, MO; David Winters, TX; Cindy Wolf, MN.

The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 1:00 p.m. to 5:54 p.m. There were nine members and 33 guests present. All present were encouraged to sign in and if not a member of the committee, indicate if interested in becoming a member.

Presentations and Reports

**Brucella ovis: Seroprevalence in U.S. Sheep Flocks**  
Kerry Sondgeroth, Wyoming State Veterinary Laboratory  

*Brucella ovis* (*B.ovis*) is a gram negative bacterial pathogen that is present in most major sheep-producing regions of the world. Infection is introduced into a flock through an infected ram, and historically is associated with epididymitis. However, less than half of infected rams have palpable clinical abnormalities of the epididymis, so if blood testing is not being utilized as part of the breeding soundness exam, *B. ovis* infection can persist. The implications of *B.ovis* infection for the flock include: ram infertility, decreased ewe conception rates, more abortions in pregnant ewes, and higher numbers of premature lambs. *B. ovis* has direct negative effects on lamb production, and is of major concern for sheep producers as lamb production accounts for approximately 35% of gross sales. The effect of *B.ovis* infection is not only economic, valuable genetics are also lost when infected rams are culled from the flock.

Infection spreads throughout a flock of sheep by multiple routes. Most commonly, transmission of *B. ovis* occurs via direct contact between rams, but can also be transmitted via the ewe when multiple rams mate with the same ewe during the breeding season. Clinical detection of the organism includes bacterial culture of infected tissues, but this is not a practical ante-mortem test. Serology can be used to detect exposure, and is variably used for males as part of the breeding soundness exam. While ewes are not typically tested, there is evidence that they can harbor the bacteria for multiple estrus cycles and be a source of ram re-infection. Additionally, some infected rams do not develop antibodies, and by testing the ewes, an infected but sero-negative ram would be identified. The enzyme-linked immunosorbent assay (ELISA) is utilized by most veterinary diagnostic laboratories in the United States that test for *B.ovis.*
A national study on the seroprevalence of *B. ovis* in sheep flocks, has not been performed in the United States. The NAHMS 2001 sera will not only provide historical data on the prevalence of this disease in the U.S., but also evaluate risk factors that are associated with infection (i.e. flock size, location, management system, etc.). Since *B. ovis* negatively impacts sheep production, this information is valuable to producers in order to increase the health of their animals and increase economic return.

The overall objective of this study is to determine the seroprevalence and risk factors associated with *B. ovis* in sheep flocks across the United States utilizing the National Animal Health Monitoring System (NAHMS) 2001 serum samples. The following objectives will be addressed:

1) Determine historical seroprevalence of *Brucella ovis* from samples collected from domestic sheep in 2001 using the National Veterinary Services Laboratory (NVSL), ELISA. Since there are not widespread control programs for *B. ovis*, the national seroprevalence estimates will likely remain unchanged from 2001.

2) Compare seroprevalence between 2001 samples and the more recent (2015/2016) samples collected in Wyoming as part of another *B. ovis* project.

**Validation of a rBP26-based Commercial Brucella ovis Antibody ELISA**

SA Hines, AL Grimm, CB Bandaranayaka-Mudiyanselage, and CJ Chung, Veterinary Medical Research and Development (VMRD)

Accurate and consistent serologic diagnosis of *Brucella ovis* has been a historic challenge for the sheep industry, one that has been identified and described previously by several USAHA Resolutions. This challenge can result in significant effects on trade and complicate successful flock management. The enzyme-linked immunosorbent assay components currently used for diagnosis in the United States are supplied to testing laboratories by the USDA, Veterinary Services (VS) National Veterinary Services Laboratory (NVSL). These components are not assembled into a standardized kit, however, and discrepant results can subsequently occur based on individual laboratory variation in procedures such as plate coating. To address this issue and provide a consistent commercial product, VMRD has developed an antibody ELISA utilizing recombinant *B. ovis* BP26 protein. This assay has been validated with over 450 samples characterized by the NVSL assay and western blot, with the goal of improving specificity and resolution as well as minimizing variation in results between laboratories. This should also serve to address the problematic “indeterminate” sample range found with the current testing method. Overall, an improved, standardized commercial ELISA will facilitate appropriate and precise management of sheep flocks to prevent unnecessary economic loss. The presentation can be found at [http://www.usaha.org/Portals/6/3Hines-Brucella%20ovis%20USAHA%20final_Sheep.pdf](http://www.usaha.org/Portals/6/3Hines-Brucella%20ovis%20USAHA%20final_Sheep.pdf).
**Sheep and Goats**

**No Kidding: Connecticut’s Largest Outbreak of Human *E.coli* O157 Infections Linked to a Goat Dairy Farm**
Kelly Gambino-Shirley, Centers for Disease Control and Prevention (CDC)

Dr. Gambino-Shirley discussed an investigation initiated by the Connecticut Departments of Public Health and Agriculture, CDC, and the local health district on an outbreak of human *Escherichia coli* O157 infections linked to a goat dairy farm. In addition, she discussed recommendations to prevent further illnesses when individuals have contact with animals, such as goats, and their environment. The presentation can be found at http://www.usaha.org/Portals/6/4Gambino-Shirley_USAHA_Final.pdf.

**Caprine Uterine Amyloid Syndrome: Clinical and Pathologic Features of Abortion and Fetal Death**
Joan Dean Rowe and Leslie W. Woods, University of California, Davis

An apparent increase in abortion of multiparous dairy goat does in several Northern California herds was noted by in 2010 and has continued. Detailed complete herd diagnostic and reproductive data were available from one of the affected herds. In that herd, with 22-29 kiddings per year, crude annual herd abortion rates ranged from 0 to 3.4% in the 4 years preceding the outbreak, and 4.5 to 27.3% in the 7 years since the outbreak began. Does that kidded in years 2010 and later had 10.88 (2.47, 47.96 95%CI) the odds of aborting or having term stillbirth/mummies compared to does kidding previous to 2010. Of 26 abortions in the herd, 1 doe aborted at 80 gestation days, 14 does aborted at 100-120 gestation days, 7 does aborted at 130-140 gestation days, and 4 does went to term with stillbirths or mummies only. Does in third or greater gestation had 11.6 (2.6, 51.4 95%CI) the odds of aborting or having term stillbirths or mummies compared to first gestation does, while second gestation does' risk was not significantly higher than first gestation does (OR=1.88; 0.25, 13.9 95%CI). The proportion of abortions attributable to amyloidosis could not be determined for all years, but in 2016 caruncular tissue was available by necropsy or biopsy on all aborting does; uterine amyloidosis was confirmed in all six cases of abortion in the herd.

Seventeen cases of abortion associated with caruncular amyloidosis have been submitted to the California Animal Health and Food Safety (CAHFS) Laboratory since it was recognized in 2012, including one retrospective diagnosis from 2010. Cases have been diagnosed in four different herds and in Toggenburg, Saanen and LaMancha goats. Amyloid is typically demonstrated in the interstitium of the caruncle when the doe or caruncular biopsy is submitted or there are some fragments of caruncle remaining in the expelled placenta. Full diagnostic workups on the fetuses have included: aerobic culture of the lung, liver, and abomasal fluid, culture for *Campylobacter* sp. on abomasal fluid and liver, gram stain and darkfield on abomasal fluid, PCR on kidney for *Leptospira interrogans*, serologic testing for *Leptospira interrogans*, bluetongue virus, *Coxiella burnetii*, *Toxoplasma gondii* and *Brucella melitensis*, histopathology and immunohistochemistry for *Chlamydophila* sp. and *Coxiella burnetii*. Diagnostic workup on the does have included: aerobic culture on uterus, lung and liver, culture for *Ureaplasma* sp., fecal flotation, heavy metal screen including selenium, congo red stain and immunohistochemistry for...
Chlamyphila sp. and Coxiella burnetii on placentomes and serologic testing for caprine arthritis encephalitis virus, Corynebacterium pseudotuberculosis and Leptospira interrogans. There have been no consistent diagnostic test results on full examination of the does or fetuses thus far. Pathology on the fetuses include: leukoencephalomalacia and mineralization of the brain in fetuses from 10 cases, myocardial necrosis in 4 cases of the 17 cases. In addition to the caruncular amyloidosis, nonsuppurative endometritis is the most frequent finding in the does. Amyloid in the caruncles has been identified as serum amyloid A 3 which is locally produced in the uterus. This serum amyloid 3 protein has not previously been reported as a cause of amyloidosis until now.

Does aborting with uterine amyloidosis do not show signs of illness and so does are not usually submitted for necropsy, making diagnosis of uterine amyloidosis difficult. Caruncular biopsy is possible at the time of abortion and can increase likelihood of diagnosis. Minimal uterine discharge is present at time of abortion, making observation of abortion and submission of fetuses and placenta difficult, and placentas are usually retained. Detection of fetal death by ultrasound monitoring of pregnancy can help predict abortions in the herd and increase the ability to attain maternal and fetal diagnostic samples. Caprine uterine amyloid syndrome is a significant cause of abortion/fetal death in the herds examined. Further work is needed to understand the underlying cause of the amyloid production in the uterine caruncle and identify potential pathogens that may be responsible for this disease.

References

Medically Important Antimicrobials in Animal Agriculture
Mike Murphy, U.S. Food and Drug Administration
Dr. Murphy’s presentation summarized policy and rule changes regarding the use of medically important antibiotics in food-producing animals. The presentation can be found at http://www.usaha.org/Portals/6/1Updated%20VFD%20Web%20Slide%20Set%20modification%20Nov%2017th_2016.pdf.

Emergence and Predominance of a Hypervirulent Tetracycline-resistant Campylobacter Jejuni Clone as a Major Cause of Sheep Abortion in the United States
Paul J. Plummer, Michael J. Yaeger, and Qijing Zhang
Presented by Orhan Sahin, Iowa State University
Abortion in ewes causes significant economic losses to sheep industry. Campylobacter infection is one of the most prevalent causes of infectious ovine abortion worldwide. Historically, Campylobacter fetus subsp. fetus (C. fetus) accounted for the majority of the Campylobacter species associated with sheep abortion.
abortion worldwide, but recent studies have indicated a clear trend for *Campylobacter jejuni* as increasingly prevalent in some parts of the world. In the United States, the species shift (from *C. fetus* to *C. jejuni*) occurred during the early 1980s, and by late 1980s and 1990s, *C. jejuni* became the predominant species causing sheep abortion. This species shift is further confirmed by our recent studies, in which more than 90% of the *Campylobacter* isolates from ovine abortions occurred on different lambing seasons and farms located in IA, CA, ID, OR, NV, and SD during 2003-2011 were identified as *C. jejuni*. Strikingly, genotype analysis of these *C. jejuni* strains indicated that majority (91%) belonged to a single genetic clone (named clone SA, for sheep abortion). This finding represents a paradigm shift, considering the fact that sheep carry heterogenic *Campylobacter* strains in the bile and the intestine and that genetically diverse strains of *Campylobacter* were traditionally associated with sheep abortion. Interestingly, all clone SA isolates were found to be resistant to tetracycline, the only class of antibiotics approved for control and prevention of *Campylobacter* abortion in sheep in the United States. We confirmed the hypervirulence of clone SA in abortion induction in a pregnant guinea pig model. In addition, clone SA was shown to be associated with human foodborne infections, causing mainly gastroenteritis. In contrast to the situation in the United States, *C. fetus* continues to be the major cause of *Campylobacter*-associated abortion in sheep in New Zealand and Great Britain, where both *C. fetus* and *C. jejuni* abortion isolates are of multiple genotypes and not predominated by a single clone. Notably, the Great Britain *C. jejuni* abortion isolates are essentially susceptible to tetracycline (as opposed to the universal tetracycline resistance in the U.S. strains), which could be associated with the common use of tetracyclines for control of sheep abortions in the United States but not Great Britain. These results suggest that tetracyclines are no longer effective in the treatment of abortion storms caused by *Campylobacter* in the United States, corroborating the anecdotal evidence for the ineffectiveness of these drugs against *Campylobacter* abortions as observed by veterinary practitioners.

The presentation is available on the Committee web page.

**Genetics Update**

Stephen White, USDA, Agricultural Research Service (ARS), Animal Disease Research Unit (ADRU)

The major histocompatibility complex (MHC) is a cluster of genes known for immunological functions but it also includes some non-immunological genes. One important classical MHC gene is DRB1, which has been associated with many infectious disease traits in sheep. However, its relationship to sheep production has not been well-studied. For example, to our knowledge no studies have examined DRB1 in connection with ewe lifetime prolificacy traits. Therefore, this study analyzed association between DRB1 and production traits including individual growth and ewe lifetime prolificacy in U.S. sheep. A specific combination of markers in the DRB1 gene (*0404 and *0141 haplotypes) were associated with growth traits like weaning weight, mature weight, and average daily gain, as well as lifetime total number of lambs born to an ewe. These results suggest there is at least one functional mutation in or near the DRB1 gene that influences growth and
prolificacy traits. While there have been other reports of genetic association with growth traits, to our knowledge this is the first report of an association between any gene on ovine chromosome 20 and ewe lifetime prolificacy. These data will spur additional mutation discovery work by comparison of haplotypes *0404 and *0141, and may lead to improvements in sheep breeding for growth and reproductive performance balanced with susceptibility to infectious disease. Furthermore, such association data in the important MHC gene DRB1 highlight the need to test production traits for genetic markers associated with infectious disease susceptibility to avoid undesirable correlated responses to selection.

PPR Global Eradication Program (GEP)
Buona Diop, FAO

Peste des petits ruminants (PPR), or sheep and goat plague, is a destructive, fast spreading viral disease that kills sheep and goats (referred to as small ruminants) and devastates livelihoods throughout most of Africa, the Middle East, West, Central and South Asia, and most recently East Asia. The PPR situation is dynamic and threatening. In 2016, the disease was reported for the first time in Georgia and Mongolia. Sheep and goats (2.1 billion heads worldwide) are the primary livestock resource of many low-income, food-insecure rural families worldwide. They are reared within a variety of production systems and provide milk, meat, wool, fibre (cashmere and angora, and skins). They also support the livelihoods of traders, processors, wholesalers, and retailers involved in local, national, regional and international trade of live animals and their products.

The annual global losses due to PPR have been estimated at between US$ 1.4 billion to US$ 2.1 billion. PPR’s impact on sheep and goat populations adversely affects livelihoods, food security, and employment, including for women and youth. It both entrenches and exacerbates poverty and malnutrition.

Based on the experience of the successful eradication of Rinderpest in 2011 through a massive global effort spearheaded by FAO and OIE, PPR was identified as the most suitable and feasible animal disease to next be targeted for global eradication. The global eradication of PPR is readily achievable provided sufficient political, financial and technical investment. PPR is readily diagnosed and there is a reliable, inexpensive vaccine available that confers life-long immunity in vaccinated animals. In addition, there are no latent carrier states or wildlife reservoirs for PPR which simplifies the eradication efforts.

The PPR GEP aims to eradicate PPR by 2030, greatly contributing to small ruminant production for a growing world population, estimated to be 9.7 billion by 2050. Consumption of small ruminant meat and dairy products is forecast to increase by 1.7 million metric tonnes and 1.8 million metric tonnes per year respectively. In a recent benefit-cost analysis of global PPR eradication, the ratio is estimated at 33.8. Investing in PPR eradication will pay for itself many times over as a contribution to improving the lives of the world’s most vulnerable pastoral and rural communities (over 300 million rural families). The PPR-GEP will contribute to the 2030 Agenda for Sustainable Development, supporting the achievement of many of the Sustainable Development Goals. The PPR global eradication effort is framed as a 15-year process running through to 2030, divided into three five year
SHEEP AND GOATS

phases. The first five years of activities are important catalysts to support and target the control and eradication achievements set forth in the Global Strategy, particularly in affected and at risk countries. The 62 countries (as of September 2016), that report infection with PPR and the 14 suspected of being infected or at risk are the major focus of the PPR GEP (total of 76 countries). The PPR GEP objectives for the first five-year phase are to:

- lay the foundation for and commence the eradication of PPR by reducing its prevalence in currently infected countries.
- develop capacity for non-infected countries to demonstrate the absence of PPR virus as a basis for official recognition of PPR free status by the OIE.
- strengthen national Veterinary Services (VS) and their systems as the key players in the successful implementation of the PPR GEP.
- where appropriate support activities to reduce the prevalence of other priority small ruminant diseases.

The program approach comprises a multi-country, multi-stage process involving assessment, control, eradication and maintenance (of PPR virus freedom) stages. The four stages described in the PPR, Global Control and Eradication Strategy (GCES) correspond to a combination of decreasing levels of epidemiological risk and corresponding levels of prevention and control.

Key components of the program:

- Building an enabling environment for PPR GEP implementation: logical and structured framework, full support and involvement of farmers, the adaptation of the legal framework, and the strengthening of Veterinary Services.
- Support efforts to better understand the presence (or possibly the absence) of PPR in a country or region, its distribution among the different farming systems, the patterns of spread and, ultimately, to establish a decisive control plan based on the information acquired. This requires both an assessment of the epidemiological situation and establishment of a functional surveillance system.
- Implement measures toward PPR eradication: different measures will be combined namely vaccination, improved biosecurity, animal identification, movement control, quarantine and stamping out. Vaccination will play a vital role. Depending on the assessment and surveillance data, the total number of animals to be vaccinated during the programme is estimated at around 1.5 billion. The 79 countries historically free from PPR will be assisted to prepare their dossiers to apply for OIE PPR free status on a historical basis.
- Functional coordination mechanisms established at global, regional and country levels will ensure successful implementation of the programme. The FAO/OIE PPR Global Secretariat established in Rome will insure coordination with regional and national stakeholders.

The estimated budget for the five-year programme is around: US$996 Million.

By improving the livelihoods and increasing the resilience of hundreds of millions of the world’s poorest people, PPR eradication is a key contributor to
sustainable development and building peace through security in some of the most vulnerable and unstable regions on Earth. In this regard, the broad international consensus and political support, the high rates of return of investment in disease eradication, which spans generations, and the proven FAO-OIE partnership, are strong guarantees of success.

*Mycoplasma ovis*: Investigating an Under-Recognized Sheep Pathogen in the United States
Margaret Highland, USDA, Agricultural Research Service (ARS), Animal Disease Research Unit (ADRU)

*Mycoplasma ovis*, referred to as *Eperythrozoon ovis* prior to 2004, is an erythrocytic agent with worldwide distribution that is reported to infect sheep, goats, deer, and reindeer. Transmission of this bacterium is currently known to occur via biting insects or iatrogenically (i.e. reusing needles). Attachment to the surface of the host’s red blood cells can cause hemolytic anemia, particularly in acute infections or during bouts of high bacterial loads in chronically infected hosts. Sequelae to infection can also include jaundice, submandibular edema (“bottle jaw”) and weight loss, in addition to anemia. Personal observation of infection in lambs also indicates that infection can cause ill-thrift (poor weight gain and stunted growth) and may be associated with bouts of transient diarrhea. Often though, infected animals show no overt signs of clinical disease and consequences of subclinical infection with this microbe have yet to be thoroughly investigated. The vast majority of research reporting the importance of *M. ovis* as a relevant pathogen in domestic sheep has been done in Australia, with fewer publications and reports from other countries, including New Zealand, Turkey, Norway, and Japan.

We are currently investigating the prevalence and distribution of the bacterium in sheep within the U.S. and impacts of infection on health and production. Work in our laboratory has shown that *M. ovis* can be detected by standard polymerase chain reaction (PCR) from deoxyribonucleic acid (DNA) isolated from fresh or frozen-thawed whole blood and from frozen-thawed sera or plasma. In order to investigate the prevalence and distribution of *M. ovis* in the U.S., we tested sheep serum collected from 22 states during 2001 and 2011 by the USDA, Animal and Plant Health Inspection Service (APHIS), National Animal Health Monitoring System (NAHMS) Program Unit. Results indicate that *M. ovis* is widespread across the U.S., with an overall prevalence of 24.5% in 7,391 sheep sampled in 2001 and 30.2% in 12,506 sheep sampled in 2011. Collaborative efforts with the USDA, Agricultural Research Service (ARS) Range Sheep Production Efficiency Research Unit at the U.S. Experimental Sheep Station in Dubois, Idaho are ongoing and to date we have collected and tested blood samples from sheep of all ages over the last two years. Ongoing analyses include investigating prevalence (seasonal and age), effects of infection on production, and transplacental transmission.
Committee Business:

The Committee reviewed the status of resolutions from the previous year. Four new resolutions were discussed and approved. Resolution topics included ensuring sound animal health policies, continued availability of plastic scrapie tags, goat genetic resistance to scrapie and laboratory approval for regulatory diseases.

There being no further business to come before the Committee, a motion to adjourn was accepted at 6:54 p.m.
REPORT OF THE USAHA COMMITTEE ON TRANSMISSIBLE DISEASES OF
POULTRY AND OTHER AVIAN SPECIES

Chair: Dale Lauer, MN
Vice Chair: Sarah Mason, NC

Bruce Akey, TX; Celia Maria Antognoli, CO; Lyndon Badcoe, WA; Deanna Baldwin, MD; Richard Breitmeyer, CA; Paul Brennan, IN; Deborah Brennan, MS; Becky Brewer-Walker, AR; Gary Brickler, CA; Charlie Broaddus, VA; Steven Clark, NC; Robert Cobb, GA; Stephen Crawford, NH; Tarrie Crnic, KS; Susan Culp, TX; Thomas DeLiberto, CO; Linda Detwiler, NJ; Brandon Doss, AR; John Dunn, MI; Brigid Elchos, MS; Mohamed El-Gazzar, OH; Naola Ferguson-Noel, GA; Larry Forgey, MO; Tony Forshey, OH; Nancy Frank, MI; Tony Frazier, AL; Samantha Gibbs, FL; Isabel Gimeno, NC; Eric Gingerich, IN; John Glisson, GA; Eric Gonder, NC; James Grimm, TX; Paul Grosdidier, KS; Scott Gustin, AR; Rod Hall, OK; Steven Halstead, MI; Burke Healey, CO; Julie Helm, SC; Michael Herrin, OK; Linda Hickam, MO; Heather Hirst, DE; Donald Hoening, ME; Guy Hohenhaus, MD; Dennis Hughes, NE; Danny Hughes, AR; John Huntley, AZ; Russell Iselt, TX; Mark Jackwood, GA; Jarra Jagne, NY; Eric Jensen, AL; Deirdre Johnson, MD; Rebecca Johnson, MN; Annette Jones, CA; Brian Jordan, GA; Calvin Keeler, DE; Donna Kelly, PA; Bradley Keough, KY; Bruce King, UT; Michael Kopp, IN; Dale Lauer, MN; Elizabeth Lautner, IA; John Lawrence, ME; Chelsie Lawyer, IN; Chang-Won Lee, OH; Randall Levingis, IA; Tsang Long Lin, IN; Mary Lis, CT; David Marshall, NC; Sarah Mason, NC; Rose Massengill, MO; James Maxwell, FL; Paul McGraw, WI; Sara McReynolds, ND; Shelley Mehlenbacher, VT; Gay Miller, IL; Sarah Mize, CA; Brenda Morningstar-Shaw, IA; Lee Myers, GA; Thomas Myers, MD; Steve Olson, MN; Kristy Pabilonia, CO; Mary Pantin-Jackwood, GA; Boyd Parr, SC; William Pittenger, MO; Michael Radebaugh, MD; Willie Reed, IN; G. Donald Ritter, DE; Keith Roehr, CO; Susan Rollo, TX; Gregorio Rosales, AL; James Roth, IA; Roxana Sanchez-Ingunza, KS; John Sanders, WV; Travis Schaal, IA; Joni Scheftel, MN; David Schmitt, IA; Andy Schwartz, TX; Sheryl Shaw, WI; Diane Stacy, LA; Patricia Stoner, WI; Nick Striegel, CO; Darrel Styles, MD; David Swayne, GA; Manoel Tamassia, NJ; Lee Ann Thomas, MD; John Thomson, IA; Mia Torchetti, IA; Alberto Torres, AR; Susan Trock, GA; Jeff Turner, TX; Shauna Voss, MN; Doug Waltman, GA; James Watson, MS; Ben Wileman, MN; Dennis Wilson, CA; Ching Ching Wu, IN; Andrea Zedek, SC; Bereket Zekarias, KS; Ernest Zirkle, NJ.

The Committee met on Monday, October 17, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 1:00-6:25 p.m. and on Tuesday, October 18, 2016 from 1:00-6:35 p.m. There were 57 Committee members and 75 guests present for a total of 132 meeting attendees. Due to circumstances beyond their control the Chair and Vice Chair were unable to attend the 2016 Committee on Transmissible Diseases of Poultry and Other Avian Species (TDP) meeting in person. As a result, the meeting was chaired by Acting Chair Dr. Julie Helm, assisted by Dr. Michael Kopp, Vice Chair. Dr. Helm welcomed the TDP Committee members, summarized the 2015 meeting and provided responses from USDA-APHIS, Veterinary Services (VS) to the 2015 TDP Resolutions:
Resolution 20 – Use of Highly Pathogenic Avian Influenza (HPAI) Secure Egg Supply Plans, Secure Broiler Supply Plans and Secure Turkey Supply Plans during an HPAI Event: The United States Animal Health Association (USAHA) requests that regulatory and industry entities involved in Highly Pathogenic Avian Influenza (HPAI) control strategies, utilize the Secure Poultry Supply Plans in the development of their HPAI response efforts. USAHA requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service consider including proposed revisions of the Secure Poultry Supply Plans as a responsibility of the National Poultry Improvement Plan to review and update at biennial conference meetings of Plan participants.

USDA-APHIS-VS Response: VS utilized the National Poultry Improvement Plan (NPIP) 43rd Biennial Conference that was held in Bellevue, Washington, from August 30-September 1, 2016, as a mechanism for discussion and comment on updated and/or revised Secure Poultry Supply (SPS) Plans. Dr. Carol Cardona presented an overview of the SPS Plans during the NPIP Technical Advisory Committee. In attendance at this meeting were the NPIP General Conference Committee (Federal Advisory Committee to the USDA Secretary of Agriculture) and more than 320 members of the primary breeding industry, commercial poultry industry, poultry federations/associations, diagnostic laboratory personnel, allied industry, State animal health officials, and others. Comments and questions were captured and provided back to the organizers of the SPS Plans so that they could be considered when further updates are made to the Plans. The next NPIP Biennial Conference will be held in 2018. Updates on the SPS plans will be presented at the conference, and attendees will again have the opportunity to provide comments.

Resolution 21 – Use of Ventilation Shut Down for Mass Depopulation of Poultry to Control Highly Pathogenic Avian Influenza – The USAHA requests regulatory authorities employ ventilation shut down (VSD) if appropriate and as needed for control of Highly Pathogenic Avian Influenza (HPAI) in order to achieve depopulation within 24 hours of diagnosis if other methods of mass depopulation cannot achieve this goal. USAHA requests that the Center for Epidemiology and Animal Health (CEAH) conduct a risk assessment to determine the outcome if VSD had been employed where appropriate in the 2015 United States HPAI outbreak. USAHA requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service develop a Request for Proposal (RFP) and conduct research to determine the conditions under which VSD may be appropriately employed and what additional measures may make the use of VSD more clearly defined.

USDA-APHIS-VS Response: VS is committed to determining the most effective methods of achieving depopulation within 24 hours of a presumptive positive diagnosis of highly pathogenic avian influenza (HPAI) in poultry flocks. VS has adopted “HPAI Stamping-Out & Depopulation Policy” to support 24-hour depopulation goal, and “Ventilation Shutdown Evidence & Policy” to define the
criteria for use of ventilation shutdown. Also, the Center for Epidemiology and Animal Health (CEAH) evaluated a variety of control strategies in response to simulated outbreaks of HPAI to provide information relevant to decision-making on rapid depopulation of infected poultry. The results of these analyses emphasize the need for multiple integrated strategies to reduce the time between sample submission and reporting, enhance biosecurity and restrict animal movement, rapidly depopulate and prevent high virus contamination levels, and enhance disposal efficiency. In addition, analyses of the economic benefits associated with rapid depopulation demonstrated that decisions must consider consumer reactions that may result in declines in poultry and poultry product purchases. Consequently, implementation of an effective emergency response must consider potential epidemiological and economic impacts when selecting and implementing control strategies. An article summarizing work assessing the effect of time to depopulation on the potential level of environmental contamination for different poultry species has been drafted for publication in a peer-reviewed journal.

Resolution 22 – Incorporation of Poultry Industry Biosecurity Oversight into the National Poultry Improvement Plan – The United States Animal Health Association requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services evaluate the use of the National Poultry Improvement Plan for oversight of poultry industry biosecurity programs.

USDA-APHIS-VS Response: APHIS issued an interim rule on February 9, 2016, that required owners and contractors of large poultry operations to provide a statement that at the time of detection of highly pathogenic avian influenza in their facilities, they had in place and were following a written biosecurity plan. The National Poultry Improvement Plan (NPIP) General Conference Committee (GCC) submitted a proposal at the 43rd NPIP Biennial Conference that consisted of a set of poultry biosecurity principles to be added to the NPIP Program Standards. These principles will serve as the minimum biosecurity principles that any poultry operation should follow. Site-specific plans will be extrapolated from these minimum biosecurity principles. The set of biosecurity principles, including auditing, was unanimously adopted by the NPIP 43rd NPIP delegation at the Biennial Conference. Next steps will include publication of the Biosecurity Principles in the NPIP Program Standards. Further, APHIS and the GCC will work with the poultry industry to develop an audit form, along with auditing guidelines to enhance the biosecurity principles and ensure that the auditing language is clear and not misinterpreted. We value industry input, as progress is currently underway with the development of the audit form and guidelines. We plan to have those in place by February 2017.

2016 Avian Influenza Presentations and Reports – Session 1

Indiana HPAI H7N8 was presented by Dr. Bret Marsh, Indiana Board of Animal Health. A summary of the report is included in these proceedings.
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Processing of AI Wastes at Covanta Energy from Waste Facility was presented by Ms. Rebecca Eifert Joniskan, Indiana Department of Environmental Management. A summary of the report is included in these proceedings.

Missouri LPAI H5N1 was presented by Dr. Linda Hickam, Missouri Department of Agriculture. A summary of the report is included in these proceedings.

2016 Live Bird Marketing System Working Group Report was given by Dr. Patricia Fox, USDA-APHIS-VS. A summary of the report is included in these proceedings.

FY 2015-2016 FAD PreP HPAI Updates was presented by Dr. Jon Zack, USDA-APHIS-VS. A summary of the report is included in these proceedings.

AI and NDV Disease Subcommittee Report was given by Dr. David Suarez, USDA, Agriculture Research Service (ARS), Southeast Poultry Research Laboratory (SEPRIL). A summary of the report is included in these proceedings.

Harmonization of Secure Poultry Supply Plans was presented by Dr. Marie Culhane, University of Minnesota. A summary of the report is included in these proceedings.

NPIP Biosecurity Principles was presented by Dr. TJ Myers, USDA-APHIS-VS. A summary of the report is included in these proceedings.

Poultry Disease Planning Tool was presented by Clara Brandt, University of Minnesota. A summary of the report is included in these proceedings.

Drinker Biofilm Testing in Turkeys was presented by Dr. Ben Wileman, Ag Forte. A summary of the report is included in these proceedings.

Characterization of the 2016 Indiana H7N8 Avian Influenza Virus Isolates was presented by Dr. Erica Spackman, USDA-ARS-SEPRL. A summary of the report is included in these proceedings.

Update on Avian Influenza was presented by Dr. Mia Kim Torchetti, USDA-APHIS-VS, National Veterinary Services Laboratory (NVSL). A summary of the report is included in these proceedings.

Highly Pathogenic Avian Influenza Surveillance in Wild Birds across the United States of America was presented by Dr. Tom DeLiberto, USDA-APHIS, Wildlife Services (WS). A summary of the report is included in these proceedings.

The Monday session adjourned at 6:25 p.m. The Committee reconvened at 1:00 p.m. on Tuesday October 18, 2016.

Poultry Industry and Regulatory Presentations and Reports – Session 2

Veterinary Feed Directive was presented by Dr. Michael Murphy, Food and Drug Administration, Center for Veterinary Medicine (FDA-CVM). A summary of the report is included in these proceedings.

Broiler Industry Report was given Dr. Deirdre Johnson, Mountaire Farms. A summary of the report is included in these proceedings.

Table Egg Industry Report was given Dr. Eric Gingerich, Diamond V. A summary of the report is included in these proceedings.
Turkey Industry Report was given by Dr. Ben Wileman, Ag Forte. A summary of the report is included in these proceedings.

Gamebird Industry and Secure Upland Gamebird Supply Plan Report was given by Mr. Bill MacFarlane. A summary of the report is included in these proceedings.

National Poultry Improvement Plan Report was given by Dr. Elena Behnke, USDA-APHIS-VS. A summary of the report is included in these proceedings.

Compartmentalization, What Does It Mean? was presented by Dr. Alberto Torres, Cobb-Vantress. A summary of the report is included in these proceedings.

Avian Disease and Oncology Lab (ADOL) Research Update was given by Dr. John Dunn, USDA Agricultural Research Service (ARS), Avian Disease and Oncology Laboratory (ADOL). A summary of the report is included in these proceedings.

Endemic Poultry Viral Diseases and Exotic and Emerging Avian Viral Diseases Report was given by Dr. Michael Day, USDA-ARS-SEPRL. A summary of the report is included in these proceedings.

SEPRL-ADOL Merger, Reorganization Report was given by Dr. David Swayne, USDA-ARS-SEPRL. A summary of the report is included in these proceedings.

NVSL Avian Influenza and NDV Diagnostic Report was given by Dr. Mia Kim Torchetti, USDA-APHIS-VS-NVSL. A summary of the report is included in these proceedings.

NVSL Salmonella, Mycoplasma, and Pasteurella multocida Update was given by Ms. Brenda Morningstar, USDA-APHIS-VS-NVSL. A summary of the report is included in these proceedings.

Overview of Emerging Disease Preparedness Plan was presented by Dr. Lee Ann Thomas, USDA-APHIS-VS. A summary of the report is included in these proceedings.

U.S. National List of Reportable Animal Diseases was presented by Dr. Dana Cole, USDA-APHIS-VS in lieu of Dr. Theresa Boyle who was unable to attend. A summary of the report is included in these proceedings.

Committee on Salmonella Report was given by Dr. Donna Kelly, University of Pennsylvania. A summary of the report is included in these proceedings.

Committee Business:

Sub-Committee Report: The Avian Influenza/Newcastle Disease Subcommittee Report as presented by Dr. David Suarez was approved by the Committee.

Old Committee Business: USAHA committee restructuring was discussed.

New Committee Business:

Dr. TJ Myers was presented with a plaque by the Committee in recognition for his years of service with USDA-APHIS-VS and his commitment to the Committee and U.S. Poultry Industry.
Recommendations: No Recommendations were proposed

Resolutions: There were four resolutions that were brought before the Committee, three resolutions were approved:

1) **Approval of RRT-PCR matrix assay for avian influenza surveillance in NPIP authorized laboratories** – The USAHA urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to approve the use of a USDA approved real time reverse transcription (RRT)-polymerase chain reaction (PCR) matrix assay for influenza A in *National Poultry Improvement Plan* (NPIP) authorized primary breeder company laboratories as outlined in the above NPIP proposed and passed change to the 9 CFR 145.14 and 146.13 (Testing).

2) **Laboratory Approval for Regulatory Diseases** – The USAHA urges the USDA-APHIS-VS to restrict commercial foreign animal disease diagnostic testing to laboratories approved by the USDA and to take regulatory enforcement action against non-approved laboratories conducting testing for foreign animal diseases. If USDA doesn’t currently have authority for these actions, USAHA urges USDA to take measures to establish those authorities. The intent of this Resolution is not to inhibit testing, surveillance or preliminary screening at research or academic facilities.

3) **Upland Gamebird Secure Poultry Supply Plan** – The USAHA supports the current funding from USDA-APHIS-VS for the Upland Gamebird Secure Poultry Supply Plan risk assessments and encourages continued funding for these risk assessments beyond the current cooperative agreement.

There being no further business the Committee adjourned the Tuesday session at 6:37 p.m.
REPORTS AND PRESENTATIONS

2016 HPAI H7N8 in Indiana
Bret Marsh, Indiana Board of Animal Health

After the 2014–2015 outbreak of highly pathogenic avian influenza (HPAI) in the United States, the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) and poultry producers remained on high alert for the virus in 2016. Based on the appearance of clinical signs, an Indiana commercial turkey flock was suspected to have HPAI: a National Animal Health Laboratory Network (NAHLN) laboratory had a presumptive positive HPAI result on January 14, 2016, and the next day, the National Veterinary Services Laboratories (NVSL) confirmed HPAI on the premises and identified the virus as H7N8. Immediately, samples were collected from premises that were presumed to be epidemiologically linked or geographically near the Infected Premises. By January 16, 2016, nine additional premises were identified as presumptive positive by a NAHLN laboratory; on January 17, 2016, NVSL confirmed low pathogenicity avian influenza (LPAI) H7N8 on eight of these premises (virus was not isolated on the ninth premises). In addition to these HPAI/LPAI infected premises, there were two dangerous contact (DC) premises—one turkey producer and one chicken layer—that were also depopulated.

This event was isolated: after the initial, single HPAI detection and eight premises infected with LPAI, there were no additional HPAI/LPAI detections in either commercial or backyard flocks. Wild bird surveillance on and around these premises also yielded no positive HPAI results. All HPAI and LPAI Infected Premises, as well as Direct Contacts, were depopulated. In all, over 414,000 birds were depopulated or died from HPAI. Given the scope of the 2014–2015 HPAI outbreak, the Indiana 2016 incident provided an opportunity to test improved processes and procedures that had been implemented. While challenges remain, the lessons learned from the 2014–2015 outbreak helped USDA-APHIS, States, and industry mount an effective and rapid response to the Indiana LPAI/HPAI incident.

There were no new detections after the one initial HPAI detection and eight LPAI detections, including one presumptive positive premises (not confirmed) and two Direct Contacts. Response operations, including cleaning and disinfection, environmental sampling, and restocking approvals, continued throughout the spring. The Control Area was released on February 22, 2016 after 38 days, and the last Infected Premises quarantine was released on May 1, 2016. For this 2016 H7N8 incident in Indiana, approximately $30 million was obligated for response activities and indemnity payments.

Processing of AI Wastes at Covanta Energy from Waste Facility
Rebecca Eifert Joniskan, Indiana Department of Environmental Management

In May 2015, during the highly pathogenic avian influenza (HPAI) disease incident in the upper Midwest, the Indiana Department of Environmental Management (IDEM) received a call from representatives of Covanta Environmental Solutions (Covanta) inquiring whether wastes generated from the
HPAI incident in Iowa could be transported to Indiana, and treated in their municipal solid waste combustion facility in Indianapolis (Covanta Energy-from-Waste (EfW) facility.) IDEM was uncertain if the facility was permitted to accept wastes infectious to animals, and the Indiana Board of Animal Health (BOAH) was uncertain if the waste could be managed in a biosecure manner at the Covanta EfW facility to prevent the spread of the disease. Further, there was concern about transporting infected materials across state lines and through commercial, poultry-dense areas. Covanta was instructed not to accept HPAI wastes at the Indianapolis Covanta EfW facility until it could be determined the wastes could be safely managed at the facility.

As part of avian influenza (AI) incident preparedness, the Indiana poultry industry and the agencies that supported it wanted to determine the viability of using the Covanta EfW facility in Indianapolis for treatment of AI wastes. Covanta also needed to determine for their own purposes whether the facility could manage AI wastes and what operational parameters and procedures were required to satisfactorily destroy the wastes. To answer these questions, a trial processing of AI-type wastes at the facility was proposed as a joint project between Covanta and stakeholders from the Indiana poultry industry and the agencies that support it.

On May 23, 2016, representatives from the Indiana poultry industry and other stakeholder agencies gathered at a large, commercial egg-laying hen facility and conducted a full-scale exercise to depopulate, package, transport, and combust uninfected egg-laying hens. The purpose of the exercise was to establish the feasibility of using combustion at a fixed-location municipal solid waste processing facility for treatment of wastes generated during an AI disease incident. Twelve thousand, two hundred egg-laying hens (equivalent to 42,000 lbs. poultry) were depopulated and packaged in 30 - 1 yd3 boxes fitted with leak-proof liners puncture resistant to poultry beaks, feet, and bones. The boxes were then loaded in a 53’ semi-tractor trailer, and transported to the Indianapolis Covanta facility for treatment and disposal. The containers were inspected, off-loaded, and staged for treatment upon receipt at Covanta. Each container was systematically placed in the waste storage pit and then collected by the grapple. The grapple then transported the container to the combustor feed chute for introduction into the combustor. Ash generated as a result of the activities was collected and sent to a municipal solid waste landfill for final disposal.

The exercise was successful. BOAH representatives established the necessary biosecurity methods at the farm, and they observed and were satisfied with biosecurity methods in place at Covanta. Covanta was able to establish operating parameters for AI wastes through information gathered during the trial processing for use at the Indianapolis EfW facility and other Covanta facilities with comparable combustion units. BOAH is seeking input from USDA-APHIS on the acceptability of this kind of waste management method for AI wastes.

The establishment of this tool for management of AI waste is significant because it can manage wastes from the index premise during a disease incident while the need for other waste management options like landfilling and composting is evaluated based on the scale of the incident. This rapid response capability has the potential to limit the spread of the disease by containing the diseased material.
The size and number of containers to contain AI wastes can be adjusted according to the type of poultry involved and its source allowing response to both backyard flocks and larger facilities. Covanta can also accept and effectively treat other wastes generated from an AI incident like poultry litter and feed. Additionally, by removing AI wastes from the infected premise entirely, decontamination and disinfection procedures can begin more quickly allowing a faster return to production and a reduction in the length of time national and international trade restrictions are in place. This could lessen the economic impact of the incident.

2016 LPAI H5N1 in Missouri
Linda Hickam, Missouri Department of Agriculture

Missouri Department of Agriculture Veterinary Diagnostic Laboratory reported LPAI H5N1 results on April 29, 2016. The samples were collected to comply with NPIP pre-slaughter surveillance testing on commercial meat turkeys. The turkeys were approximately 18 weeks of age and scheduled for slaughter on May 2, 2016. NVSL confirmed the results on April 30, 2016 and completed sequencing of the virus. The HA sequence was 98% similar to A/mallard/Ohio/11OS2229/2011 (H5). The NA sequence was 99% similar to A/blue-winged teal/Louisiana/UGA114-2494/2014 (N1).

There were six commercial poultry premises within 10K of the index premises. The initial sampling of the units was completed within 24 hours of the NAHLN positive results. The commercial premises were tested weekly for three weeks and were negative. There were eight backyard flocks located within the 3K radius around the infected premises. The backyard flocks were tested once and were negative.

The depopulation was completed within 24 hours of confirmation. In-house composting was utilized for disposal and the compost piles were all capped by May 11, 2016. The compost piles were moved outside of the buildings after the disposal was completed on June 30, 2016. The contractor began cleaning and repairing the buildings. The virus elimination was completed on September 6, 2016 and environmental samples were reported as negative on September 12, 2016. The premises began restocking the week of October 5, 2016. The poult's were AI tested prior to placement and will be tested at 14 and 21 days post placement. The premises will be released from quarantine upon receipt of negative test results from the 21-day post movement samples.

Live Bird Marketing System Working Group Update
Patricia Fox, USDA-APHIS-VS

The 2017 Live Bird Marketing System Working Group (LBMS-WG) Meeting is scheduled for February 22-23 2017 in San Antonio, Texas. At our annual (February 2016) LBMS-WG meeting, we received over 60 proposed changes from stakeholders to the 2012 LBMS Uniform Standards. These guidelines are updated every four years. Major changes include:

- The title of the Uniform Standard was changed to address H5/H7 Avian Influenza (low pathogenicity avian influenza (LPAI) and high pathogenicity...
avian influenza (HPAI) in the LBMS; these changes were made throughout the document.

• The requirement of having a memorandum of understanding (MOU) in place to be a participant of the LBMS program was removed.

• The verbiage throughout the document was changed to reflect the APHIS reorganization.

• The five official (approved) tests were updated to align with National Veterinary Services Laboratories (NVSL) protocol: Agar Gel Immunodiffusion, Enzyme-Linked Immuno-assay (ELISA), Real-Time Reverse-Transcriptase Polymerase Chain Reaction (rRT-PCR), Antigen Capture Immunoassay Tests (ACIA).

• The ELISA was added as an official test.

• Better guidance was provided on the use of USDA-licensed type A influenza ACIA test: The ACIA is an NPIP-LBMS approved test used for the detection of influenza A nucleoprotein in swab specimens from birds exhibiting clinical signs of disease (sick birds) or dead birds and must be conducted using test kits approved by USDA and the State. It is less sensitive than molecular tests; therefore, those collecting samples should collect additional swab samples and forward both the non-negative samples and additional samples to an approved lab for molecular testing to determine the virus status of the flock following any non-negative ACIA result.

• Test definitions were significantly shortened as more detail is described in Part IV.

• The term “appropriate sample” was defined: Samples collected by an animal health official or personnel authorized by the animal health official according to the target species, and type of testing planned (Refer to: WI-AV-0020 “Avian Sample Collection” https://www.aphis.usda.gov/animal_health/lab_info_services/downloads/WIAV0020.pdf )

• Collection of appropriate swab samples for molecular testing to determine the virus status of the flock following antibody detection in production flocks was explained.

• Collection of appropriate swab samples for molecular testing to determine the virus status of the flock following antibody detection in egg yolk from production flocks was explained.

• The term “presumptive positive, presumptive, and suspect positive” was replaced with “non-negative” throughout the document.

• The term non-negative flock/sample/specimen was defined: A flock, distribution system or market from which specimens yielded non-negative results for AI by an official and appropriate test performed at an approved laboratory. Any specimen non-negative for AI must be confirmed by the NVSL. Confirmation of a non-negative flock or market will be based on results of diagnostic testing and epidemiological data; collection of additional samples for testing may be needed.

• Environmental PCR was added as an option for post Cleaning and Disinfection (C&D) environmental samples. For States that are interested in running post
C&D environmental PCR, we encourage them to contact NVSL for use of a specific virus isolation protocol (NVSL approved internal control to monitor for PCR inhibitors is required).


On June 28, 2016, routine surveillance samples were collected from a live bird market in Philadelphia. No signs of clinical illness were noted. On June 29, 2016, a live bird market in Pennsylvania was tested and confirmed by NVSL to be positive for LPAI H5. This same day a live bird market in New York was also confirmed positive for low pathogenicity avian influenza (LPAI) H5. A common New York distributor was identified and trace out shipments from this distributor had been ongoing. There were shipments of Muscovy ducks, delivered to several markets in New York, Pennsylvania, and New Jersey on shipment dates June 14, 17, 21, 24, 28 and July 1, 2016 from the same distributor in New York. The distributor in New York, sourced birds from a supplier in Ontario, Canada.

Pennsylvania (Total of ten LBMs): Depopulation of the Pennsylvania market in Philadelphia County by USDA and Pennsylvania Department of Agriculture (PDA) staff was completed the morning of June 30, 2016 and included 240 chickens, 11 guineas and 35 Muscovy ducks. Carcasses were disposed of by incineration. An Appraisal and Indemnity Request Form was completed and forwarded to USDA-APHIS-VS. Pennsylvania had seven additional markets that received these ducks from the index poultry distributor in New York. These seven markets were quarantine by the Pennsylvania Department of Agriculture and were instructed on sell down procedures and to have all poultry in the market slaughtered within a minimum of three days, and start cleaning and disinfection immediately. All Pennsylvania Markets were officially released from quarantine on July 14, 2016.

New Jersey (Total of 37 LBMs): New Jersey had traces to 18 LBMs that received ducks from the index poultry distributor in New York. Ten LBMs were confirmed LPAI H5 positive by NVSL. Nine were linked to the index poultry distributor in New York – positive from Muscovy ducks. One not linked to the same distributor – positive from guinea fowl sampled during routine quarterly testing. The LBMs involved were in the following counties (Passaic-3, Essex-3, Camden-1, Hudson-2, and Union-1). New Jersey requested APHIS-VS assistance and District 1 provided resources for a timely testing strategy. As of July 16, 2016, all H5 LPAI positive markets have completed disease mitigation, had quarantines released, and restocked.

New York (Total of 88 LBMs): New York had approximately 58 LBMs that were known to have received or exposed to duck shipments from the same distributor on these dates: June 14, 17, 21, 24, 27 and July 1, 2016. Seven LBMs (5 in Kings County, 1 in Queens County and 1 in Bronx County) were confirmed LPAI H5 positive by NVSL. New York worked on testing all markets that were exposed or received shipments from this distributor, with a priority on markets that received ducks during the above shipment dates. Markets that tested positive were quarantined and allowed a five day sell down period followed by a complete depopulation and cleaning and disinfection (C&D). New York requested APHIS-VS
assistance and District 1 provided resources for a timely testing strategy. Cleaning and disinfection was completed at all H5 LPAI positive LBMs by 7/14/2016. All H5 LPAI positive LBMs had completed disease mitigation, and had their quarantine released by the NYSDAM by July 15, 2016. All H5 LPAI positive LBMs were approved to reopen and restock by the NYSDAM by July 19, 2016.

Most testing of these markets were done at the NAHLN laboratories, in each state, and any positive samples were sent to the NVSL for confirmation. All samples were negative by the icA H5 rRT-PCR assay targeting the Eurasian H5 gene. Partial sequence attempted was direct to all specimen: all confirmed H5N2 LPAI – except PA=H5 LPAI confirmed but repeated NA attempts unsuccessful; preliminary analysis of partial H5s (including PA) and N2s indicates all viruses are highly similar. Full genome completed for A/Muscovy ducks/New Jersey/16-021456-4/2016 (H5N2) – all gene segments are of North American Lineages. Duck deliveries from the source farm (a farm located in Ontario, Canada), was stopped. The existing data establishes a clear link between the Ontario farm and the spread in U.S. The virus has high identity to the U.S. LBMs (>99%) from full genome sequence.

Canada Food and Inspection Agency (CFIA) established an Avian Influenza Control Zone with a 3-km radius around the single confirmed premise confirmed to be infected with LPAI H5N2 in St. Catherines, Ontario. The movement of animals, products and equipment in the area were controlled to minimize the spread of the disease. All premises within the control zone were placed under quarantine, and CFIA continued to monitor for signs of disease. The poultry industry sector was notified to adopt enhanced biosecurity practices. Three other farms owned by the family of the index farm were also placed under CFIA quarantine – total of four premises; one was empty; owned by different brothers; all one biosecurity unit. Enhanced surveillance testing was conducted for a 21-day period. All baseline results on these associated premises had been AI negative. CFIA also implemented dead bird surveillance.

CFIA and VS Conference Call regarding LPAI H5N2 in the U.S. North East LBMs:

- Are these ducks fully confined (are they all housed completely indoors?)
  Yes, complete housed indoors. No access to outside.
- What qualifications does the private practitioner in Canada have to take the samples? He is a very experienced Accredited Veterinarian. Was hired in 2014.
- How are samples taken (e.g. from representative sample of birds, from cloacae, using proper swabs and media, etc.)
  30 random samples. All cloacal swabs.
- What type of test was performed on the ducks for shipment? PCR.
- What are the program provisions for a monitored poultry flock in Canada?
  Test every 3-4 weeks. Owner has volunteered to test 30 random samples every week moving forward.
- CFIA was asked for a final epidemiology report: The report has not been done. Report will be finalized and shared with USDA when the Post Outbreak Surveillance is complete and CFIA declares freedom to OIE.
The H5N2 viruses from Canada and U.S. LBMs were highly similar across the entire genome. Introduction into U.S. LBMs appeared to be due to distribution from a single source based upon available epidemiological and phylogenetic data.

**HPAI in the LBMS – General Guidance**

USDA will handle findings of HPAI in any component of the LBMS the same way it handled detection in a commercial poultry facility. This includes the finding of HPAI in LBMS environmental samples or when birds are no longer on a LBMS premises. Specifically, premises with non-negative HPAI results must be quarantined and inventoried. An epidemiological investigation will be conducted that includes all components of the LBMS. Rapid and diligent trace back and trace forward investigations of movements from infected hauler, dealer, and wholesaler premises must be implemented. This tracing will aid in the control of the spread of HPAI virus and limit the impact of the outbreak. Infected premises will be depopulated and cleaned and disinfected in accordance with the guidelines available in the HPAI Response Plan: The Red Book (www.aphis.usda.gov/fadprep). The results of the epidemiological investigation will determine if additional components of the LBMS, such as haulers’ trucks and dealer and wholesaler facilities require depopulation, disposal, and cleaning and disinfection. Control areas will be drawn around infected production premises, according to the HPAI Response Plan: The Red Book.

**2015-2016 FAD PreP HPAI Updates**

Jon Zack, USDA-APHIS-VS

HPAI Response Plans and Secure Poultry Supply Plans are being constantly updated. Please refer to the FAD PReP websites for the most up-to-date information.

For Foreign Animal Disease Preparedness and Response Plan (FAD PReP) HPAI updates for FY 2015-2016: https://www.aphis.usda.gov/FADPREP or Google “FADPRReP”.

For all HPAI Response and Policy Information, go to: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/fadprep-hpai

**HPAI Response Plan**
- HPAI Response Plan: The Red Book (DRAFT August 2015)
  - Red Book Powerpoint (Long / Short)
- HPAI Response Goals (Nov. 18, 2015)

**Initial Response**
- Stamping-Out & Depopulation Policy (Sept. 18, 2015)
- Ventilation Shutdown Evidence & Policy (Sept. 18, 2015)
- New State Checklist (Feb. 16, 2016)
- Initial Contact Epi Report (June 27, 2016)

**Finance and Administration Processes**
- Overview of Finance and Administration Procedures (June 24, 2016)
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

- Details for Bird and Egg Appraisal and Indemnity Procedures (June 24, 2016)
- Details for Virus Elimination Financial Processes (Feb. 9, 2016)
- Details for Materials Destroyed Financial Processes (Feb. 9, 2016)
- Appraisal and Indemnity Request Form Appendix A1: Form for Poultry Owner (Feb. 9, 2016)
- Appraisal and Indemnity Request Form Appendix A2: Form for Contract Grower (Feb. 9, 2016)
- Appraisal and Indemnity Request Procedures Appendix B1: Contract Grower Worksheet for Meat Birds (Feb. 8, 2016)
- Appraisal and Indemnity Request Procedures Appendix B2: Contract Grower Worksheet for Layers (Feb. 8, 2016)
- Appraisal and Indemnity Procedures Appendix C: DUNS and SAM (Feb. 9, 2016)
- Commercial Flock Plan: H5/H7 AI Euthanasia/Depopulation, Disposal, & Virus Elimination Procedures for Commercial Infected Premises (June 3, 2016)
- Backyard Flock Plan: H5/H7 AI Euthanasia/Depopulation, Disposal, & Virus Elimination Procedures for Backyard Infected Premises (June 3, 2016)

Surveillance & Diagnostics
- Avian Sample Collection for Influenza A and Newcastle Disease (Mar. 23, 2016)
- Surveillance of Backyard Flocks Around Infected Premises (Mar. 2, 2016)
  - Training Powerpoint
- Surveillance Sampling for Commercial Premises in Control Area (Mar. 2, 2016)
  - Training Powerpoint

Quarantine, Movement Control, and Continuity of Business
- HPAI Zones and Premises (Apr. 19, 2016)
  - Training Powerpoint
- Movement Control (Sept. 21, 2015)
- Overview: HPAI Control Area Permitting Process (July 25, 2016)
- Overview of the EMRS Customer Permit Gateway (July 25, 2016)
- Testing Requirements for Movement from the Control Area (Sept. 14, 2015)
  - Training Powerpoint
- Contact Premises (Dec. 17, 2015)
  - Training Powerpoint
- HPAI in the Live Bird Marketing System (Sept. 15, 2015)

Disposal & Cleaning/Disinfection (Virus Elimination)
- Mortality Composting Protocol for AI Infected Flocks (Feb. 5, 2016)
  - Job Aid: Overview of the Composting Process (May 12, 2016)
  - Job Aid: Pre-Compost Windrows for Avian Influenza Infected Flocks (May 11, 2016)
  - Job Aid: Carbon Sources for Windrow Construction (May 9, 2016)
  - Job Aid: Windrow Construction Protocol for Avian Influenza Infected Flocks (May 9, 2016)
  - Job Aid: Temperature Monitoring Protocol of Avian Influenza Infected Flocks (May 9, 2016)
REPORT OF THE COMMITTEE

- Job Aid: Calibration of Analog Thermometers (Mar. 22, 2016)
- Compost Windrow Construction Approval Checklist for Avian Influenza Infected Flocks (May 11, 2016)
- Phase 1 Windrow Evaluation Checklist Days 1-14 for Avian Influenza Infected Flocks (May 11, 2016)
- Phase 2 Windrow Evaluation Checklist Days 14-28 for Avian Influenza Infected Flocks (May 11, 2016)
- Cleaning & Disinfection Basics: Virus Elimination (Feb. 19, 2016)
  - Training Powerpoint
- Using Heat Treatment for Virus Elimination (Feb. 19, 2016)
- Landfill Disposal Guidance--
  - Recommended Waste Acceptance Practices for Landfills (Apr. 18, 2016)
    - CDC Interim Guidance for Landfill Workers
    - Landfills and HPAI Response Presentation

Recovery and Restocking
- Control Area Release (Sept. 18, 2015)
  - Training Powerpoint
- Timeline, Eligibility, and Approval for Restocking (Mar. 30, 2016)
  - Training Powerpoint
- Example Restocking Form (Apr. 25, 2016)
  - Training Powerpoint

Health & Safety Information
- Quick Response Card
- PPE Recommendations for HPAI Responders (Apr. 25, 2015)

For More Information on HPAI & Response
- General Resources and Information (Aug. 19, 2015)
- H5/H7 Avian Influenza Case Definition (Dec. 4, 2015)
- Use of the Antigen Capture Immunoassay (Sept. 10, 2015)
- NEW! APHIS HPAI Planning Web Map (link to interactive map)

Documenting & Visualizing the 2016 Indiana Outbreak
- HPAI/LPAI 2016 Infected Premises List (PDF)
- Detailed HPAI 2016 Mapbook (PDF)

Documenting & Visualizing the 2014-2015 Outbreak
- HPAI 2014-2015 Infected Premises List (PDF)
- Detailed HPAI 2014-2015 Mapbook (PDF)
- All HPAI Detections Dec. 2014-Present (GIF)
- Number of HPAI Detections by County Dec. 2014-Aug. 2015 (GIF)
- Control Area Releases for the 2014-2015 Outbreak (by County) (GIF)
- Epidemiological Curve for 2014-2015 Outbreak (GIF)

Links to Biosecurity Resources
• Poultry Biosecurity Training Materials (http://www.poultrybiosecurity.org)
• Powerpoint of the Poultry Grower Webinar Series: Biosecurity Can Keep AI Out of Your Poultry House (by Iowa State University)
A review of World Organization of Animal Health (OIE), Food and Agriculture Organization (FAO), World Health Organization (WHO), and other sources were reviewed to provide an overview of international avian influenza outbreaks of consequence worldwide for the past year.

The goose/Guangdong/96 lineage continues to be the largest source of highly pathogenic avian influenza (HPAI) outbreaks worldwide. The virus remains endemic in China, Indonesia, Vietnam, Egypt, and Bangladesh. The virus continues to be reported from other Asian countries and may represent endemic nature of the virus including in India. The biggest change has been the widespread outbreaks in West Africa, including in Nigeria, C’ote D’Ivoire, and Ghana for the second year, and new outbreaks were reported in Cameroon and Togo. No new outbreaks were reported from Burkina Faso or Niger. Despite international support to control the outbreaks from the FAO, this likely represents a new area of endemicity in Africa. Sequence information is now available from the West Africa outbreak and all the viruses are the goose/Guangdong/96 lineage classified as clade 2.3.2.1c. This lineage is part of the second major wildlife spillover event that was first reported in 2008. This lineage of virus has been reported in wild birds sporadically since it was first identified, and it has caused outbreaks in poultry on several different occasions including becoming the predominant endemic variant found in Bangladesh. Blast analysis shows the African viruses are closest in sequence to viruses from India, China, and Vietnam, but unrelated to the Egyptian viruses that are clade 2.2. This lineage of virus continues to be a major concern for wild bird spread back to domestic poultry.

Outbreaks of H5N8 have been reported, but less frequently in the last year. Wild bird isolates from Russia and poultry outbreaks in South Korea and Taiwan were reported that are presumably the clade 2.3.4.4 isolate that are similar to the virus that caused the outbreak in the U.S. last year. One molecular detection of H5N8 was found in Alaska in August 2016. This lineage continues to be present in low levels in wild birds and should still be considered an important risk factor for U.S. poultry.

Outbreaks of H5N6 appear to be increasing in China and Vietnam and was also reported from Hong Kong. This reassortment virus is also clade 2.3.4.4 but with a different neuraminidase gene. An association with live bird markets has been suggested to be a risk factor. No new human infections with this subtype of virus was reported in the last year.

Two notable new outbreaks were reported or were continued from last year. A new H7N7 HPAI outbreak was reported from Italy, but appears to have limited spread and has been controlled. However, in France additional outbreaks of H5 HPAI of different neuraminidase subtypes, including H5N1, H5N2, and H5N9 were reported. The hemagglutinin gene is of Eurasian origin, but it is not a goose/Guangdong/96 lineage virus. The outbreaks continue centered in the duck.
and goose industry, but outbreaks in chickens have also occurred. It is not clear what the origins of the virus are, but a low pathogenic H5 virus may have been circulating in the duck industry preceding the HPAI outbreak.

H7N3 HPAI continues to circulate in Mexico where widespread vaccination continues. The H9N2 low pathogenic avian influenza (LPAI) continues to be a major problem in Asia, the Middle East and parts of Africa. Two major lineages continue to circulate and a small number of human infections are reported each year. This year six human cases from China were reported, but the virus infection in humans still appears to cause milder disease with no mortality than H5N1 HPAI infections. The number of H5N1 cases has dropped in 2016 with only 13 cases, all from Egypt, being reported. The reason for the spike in human cases in 2015 from Egypt and its drop this year is unknown. Human cases of H7N9 in China have also continued to decline in 2016, but this is the fourth year of primarily seasonal outbreaks occurring in December through March. However, eight human cases were reported to WHO in July-Sept 2016 showing the virus is still present in China. A H9N2 LPAI outbreak appears to be common in Germany in the turkey industry. The virus is different from the Asian lineage viruses.

Newcastle disease virus continues to be reported from a large number of countries every year and is endemic in many parts of Central and South America, Asia, and Africa. Wild bird virulent virus in cormorants and pigeons continues to occur in the United States. The virus can be divided into different genotypes based on sequence, and genotypes V and VI are found in the United States. Genotype V is prevalent in Mexico. Genotypes VII and XII have been introduced into South America in the last ten years. Genotype VII is probably the most commonly found genotype worldwide. Considerable genetic diversity occurs in Africa and Asia.

Harmonization of the Secure Poultry Supply Plans

Marie Culhane, University of Minnesota In 2005, state, industry, and academic collaborators at the University of Minnesota and Iowa State University, working with USDA-APHIS, began developing the Secure Egg, Secure Turkey, and Secure Broiler Supply Plans (SES, STS, SBS, respectively). These multi-year collaborative efforts by federal, state, industry, and academic representatives have common elements and approaches that are collectively called the Secure Poultry Supply (SPS) Plan. The purpose of the SPS is to facilitate poultry industry and state regulatory agency preparedness for product movement in an HPAI outbreak. The SPS plan provides guidance for the managed movement of not known to be infected poultry and poultry industry products from Monitored Premises in an HPAI Control Area while effectively managing the risk of spread of HPAI virus and maintaining consumer confidence. The SES, STS and SBS plans contain specific risk-based science which provides the basis for determining if and how products could move. The University of Minnesota coordinates the science-based risk assessments by forming working groups of federal and state agents, modelers, epidemiologists, virologists, industry veterinarians, and researchers to evaluate the virus transmission pathways, risks, and mitigation measures. The result of that cooperative multi-year work is the SPS plan that consists of risk assessments that address commodity movements with mitigations to reduce risk of disease spread.
during an outbreak yet facilitating continuity of business. The SPS is a harmonized approach to permitted movements of products. Through the SPS, federal and state agencies along with their poultry industries are creating a permitting process that balances the work required for permitting between industry and the state. The criteria for movement of poultry and poultry products are harmonized where possible. However, it is important to recognize that different commodities use different approaches for risk mitigation. Therefore, individual and detailed guidance from the SES, STS, and SBS plans will always be needed because some things are too biologically distinct to be harmonized. Harmonization is needed to streamline the permitted movement processes for the states and industry and cross-commodity workgroups will be formed to properly assess risk associated with movements affecting all species. In conclusion, when used in an outbreak, the SPS provides a high degree of confidence that the managed movement of poultry and poultry products does not contribute to spread of the HPAI virus in an outbreak.

NPIP Biosecurity Principles
T.J. Myers, USDA-APHIS-VS

The 2014-2015 Highly Pathogenic Avian Influenza Outbreak was the largest animal health emergency response in U.S. history which required approximately one billion dollars in emergency funding. Attention was focused on inadequate biosecurity after epidemiological studies indicated that many of the 2015 HPAI cases were due to farm to farm spread. As a result, Animal and Plant Health Inspection Service (APHIS) issued an interim rule on February 9, 2016, that required owners and contractors of large flocks to provide a statement that at the time of detection of HPAI in their facilities, they had in place and were following a written biosecurity plan. The National Poultry Improvement Plan (NPIP) General Conference Committee (GCC) passed a proposal at the 43rd NPIP Biennial Conference, which consisted of a set of poultry biosecurity principles, including auditing, to be added to the NPIP Program Standards. These principles will serve as the minimum biosecurity principles that any poultry operation should follow. Site-specific plans will be extrapolated from these minimum biosecurity principles.

Next steps will include publication of the Biosecurity Principles in the NPIP Program Standards. Further, APHIS and the GCC will work with the poultry industry to develop an audit form, along with auditing guidelines to enhance the biosecurity principles and ensure that the auditing language is clear and not misinterpreted. Industry input will be valued as progress is currently underway with the development of the audit form and guidelines. The audit guidelines and audit form are set to be in place by February of 2017. Official training and implementation of the biosecurity principles will begin in summer of 2017.

Lastly, APHIS is in the process of finalizing the interim rule “Conditions for Payment of Highly Pathogenic Avian Influenza (HPAI) Indemnity Claims” that addresses splitting indemnity payments between contractors and owners. The final rule will also address how APHIS will link the implementation of the biosecurity principles with the payment of indemnity.
Poultry Disease Planning Tool
Clara Brandt, University of Minnesota

The HPAI outbreak in the Midwest may not have been preventable, but it could have been much smaller. With better alignment of information between the poultry industry and regulators, disease control could have been improved. In addition, the numerous forms, scattered guidance, and confusing information resulted in paperwork and procedures that were difficult to complete and understand. These misalignments caused delays in depopulation and disposal, which led to spread of the disease to uninfected farms. We developed a planning tool that will provide industry and state/federal agencies with the information and tools they need to plan a future HPAI outbreak.

This web tool will enable producers to create a HPAI response plan, obtain relevant educational materials, learn how to be involved and improve response readiness. Gathering previously published requirements/recommendations and interviewing key stakeholders has been the primary way the content for this tool has been created. We were able to recognize a need for an aerial mapping function that will capture relevant information for response teams. The program will have six different modules (Self Quarantine and Alert, Testing, Appraisal, Depopulation, Disposal, Virus Elimination) each will have unique functionalities that will allow the three user types of the tool (producers, response teams, and the Minnesota Board of Animal Health) to navigate a HPAI response more smoothly. This tool has been designed to serve only the MN poultry industry, but with the hope to expand it to other states in the future. The website’s URL is www.poultrydiseaseplanning.com.

Drinker Biofilm Testing in Turkeys
Ben Wileman, Ag Forte

In Minnesota, we have dealt with seasonal avian influenza (AI) for several decades in our turkey populations. It was one of the most significant diseases in turkeys on range and by default was one of the most positively impacted health areas when turkey production moved indoors. Minnesota has a controlled marketing program for AI thus serologically positive birds may move to market with approval. But how do you know what the true status of a turkey farm is based on serology? Are they actually shedding virus or were the exposed 60 days ago, and now are just serologically positive? We feel that one of the best ways to spread AI virus to other birds is to put it on a truck and drive it around on the roads, so how do we keep that from happening? We wanted to develop a virus based testing method that was easy to collect and robust enough to determine the true AI shedding state of a flock of turkeys for use specifically with controlled marketing of birds.

With help from the turkey industry in Minnesota, Carol Cardona’s laboratory at the University of Minnesota has developed a drinker biofilm testing method for use in turkeys. This method samples open drinker systems that are common in turkey production. A gauze sponge is used to scrub the inner lip of the drinkers to obtain biofilm and then is processed for PCR testing using the matrix, or any other desired primer set. By our estimations, a single drinker biofilm sample is sampling up to
150 birds in one sample due to the nature of how birds and how many birds use a single drinker in a two-hour timespan. This test was, and still is, used heavily in surveillance of premises located outside of control zones in the Highly Pathogenic Avian Influenza (HPAI) outbreak that occurred in 2015. In some testing done during the outbreak this testing method was able to detect HPAI 1-2 days earlier than dead bird biased oropharyngeal sampling. The nature and ease of this sampling method was more comfortable for producers than oropharyngeal sampling and resulted in increased compliance and thus increased surveillance during high risk periods. Through our use of this test during the HPAI outbreak and before and since we have developed a high degree of trust in this method.

There are some caveats to this test however. The use of this test will ultimately come down to the regulatory and/or political climate of your state’s industry and laboratory system. This test is really an environmental test and not a direct bird test thus interpretation or acceptance may have to be determined in your individual situation. This test is not an official commercial test nor a National Animal Health Laboratory Network (NAHLN) approved test so that may also determine its use. And this test is only limited to open drinker systems of raising birds, so birds such as caged layers that use nipple style drinkers don’t seem to be able to use this testing method. The appropriate environmental testing method for these housing systems is an ongoing project. The positive side of this test however is that it is diagnostic method agnostic, meaning you can test for other things than just AI. And we have developed methods for using this for diagnostics related to avian metapneumovirus and Newcastle testing as well.

Characterization of the 2016 Indiana H7N8 Avian Influenza Virus Isolates
Erica Spackman, USDA-ARS-SEPRL

In mid-January 2016, a highly pathogenic (HP) avian influenza virus (AIV) was detected in and isolated from a turkey flock in Indiana. Subsequent surveillance resulted in the detection of low pathogenicity (LP) AIV in eight turkey flocks within in the 10 Km surveillance zone. The gene sequences of the LP isolates were highly related (>99%) to the HP isolate, and the proteolytic cleavage site of the hemagglutinin (HA) protein was the only substantial sequence difference between the HP and LP isolates (1). Based on the phylogenetics of the LP and HP isolates it is concluded that it came from North American wild waterfowl (1). In depth network analysis of the virus genes and phylogenetic analysis suggests that the LP virus had been introduced into the turkeys and that the HP detection occurred in the flock where the virus mutated from LP to HP.

In order to better understand the pathobiology of this virus, both LP and HP isolates from the H7N8 outbreak were evaluated for pathogenesis, transmission and infectious dose in turkeys, chickens and Mallards. Results demonstrated that in all three species the infectious dose was lower with the HP isolate than the LP isolate. Also, the HP isolate was shed at significantly higher titers and by a significantly higher proportion of birds, particularly by the cloacal route, as compared to the LP isolate.

In contrast to the 2015 H5N2 HPAI poultry isolates, the mean death time of the H7N8 HPAIV in turkeys was 2.8 days compared to >5 days observed with the
H5N2 HPAI isolates (2). Interestingly, the H7N8 HP isolate was shed at higher titers than the H5N2 isolates orally (12-48hr post inoculation) and cloacally (36 and 48hr post inoculation). The mean infectious dose for the H7N8 HP AIV isolate was also several logs lower in turkeys than the H5N2 isolates, which may reflect a difference in replication efficiency. However, the clinical signs were similar between the lineages and most turkeys presented with neurological signs and severe depression within 24hr of death. The LP H7N8 isolate produced respiratory disease (infra-orbital swelling, snicking, rales).

The clinical signs and mean death time for the HP isolate were typical for HP AIV in chickens: severe lethargy and hemorrhagic lesions. The mean death time in chickens was 2.7 days. No disease was observed in chickens exposed to the LP isolate or Mallards exposed to either pathotype of H7N8. The mean infectious dose for the H7N8 HPAIV was lower in chickens than for the H5N2 HPAIV index isolate, but was similar to the mean infectious dose of the later H5N2 poultry isolates (3). The mean infectious dose was higher for Mallards than the H5N2 HPAIV lineage isolates (4).

A vaccine-challenge study was conducted to identify candidate vaccines if needed. Five vaccines including four inactivated vaccines and an alphavirus vaccine with the HA from the LP isolate were tested in chickens. All vaccines that were tested provided at least 90% protection against mortality. Selection of vaccines was aided by a project completed in late 2015 that characterized the antigenic landscape of H7 AIVs from North America (5). The project involved comparing and mapping the antigenic structure of 93 North American AIV isolates of the H7 subtype to inform vaccine development. Diversity in North American H7 antigenic structure was more limited than expected (5).

As a follow-up to the outbreaks, the thermal inactivation profile of AIV was determined in wet and dry chicken litter. Clean-up and recovery efforts can be streamlined if the virus can be inactivated by heating a poultry house to a target temperature rather than by removal of all organic material. Eight temperatures were evaluated in ten degree increments from 50°F (10°C) through 120°F (48.8°C). Virus was inviable after one day of treatment at 80°F (26.6°C) or above. At lower temperatures inactivation took up to five days. In application, an additional 24hr should be added to the inactivation endpoint for added safety. In executing this project, the procedure for testing environmental samples containing litter was optimized, which will aid in subsequent testing to confirm virus elimination.

Avian Influenza Update
Mia Kim Torchetti, USDA-APHIS-VS-NVSL

Influenza A viruses (IAV) from any species with high pathogenicity (HPAI) and H5 and H7 subtypes with low pathogenicity from poultry (H5/H7 LPAI) are reportable worldwide. Waterfowl are natural reservoir hosts for H1-H16 IAV subtypes, but not usually HPAI. Influenza A viruses in wild birds tend to circulate within migratory flyways seasonally; geographic origin may often be gleaned from the genome and subtype prevalence can wax/wane in multiyear cycles. The only HPAI currently recognized to circulate in aquatic migratory birds emerged in domestic poultry in Asia (goose Guangdong [GsGD] lineage H5N1); this lineage
continues to circulate and a related virus made its way to North America in late 2014.

Detections of H5 and H7 in poultry are characterized and analyzed to monitor virus evolution with infectivity and transmission work undertaken at the Southeast Poultry Research Laboratory. Analysis of sequence data includes phylogeny of all eight segments, determination of amino acid substitutions across the genome, and visualization by phylogenetic network analysis. Amino acid differences are compared to appropriate reference sequences and screened for the presence of amino acid substitutions or protein motifs that have previously been associated with either poultry or mammalian host adaptation.

Highly pathogenic (HPAI) Eurasian lineage H5 2.3.4.4 influenza viruses caused the largest animal health emergency in the U.S. from late December 2014 to June 2015. Since the last detection on June 16, 2015, the IAV viruses identified from poultry through October 2016 arise from North American lineage IAV of low pathogenicity (LPAI) with no evidence of the Eurasian H5 lineage gene segments. The 2016 H5/H7 detections follow: January Indiana turkeys H7N8 LPAI and HPAI, April Missouri turkeys H5N1 LPAI, and June H5N2 LPAI in live bird markets in the northeast. For wild birds, recall that detections of H5 and H7 are expected. There have been two Eurasian H5 PCR detections in mallards (UT and OR), and in August 2016 the Eurasian/North American reassortment H5N2 HPAI virus was identified in a single wild mallard sampled near Fairbanks, AK during a bird banding effort. This detection suggests low level persistence of the Eurasian H5 lineage in North America and the potential for re-dissemination of the virus during the 2016 fall migration.

Highly Pathogenic Avian Influenza Surveillance in Wild Birds across the United States of America
Thomas Deliberto, USDA-APHIS-WS, National Wildlife Research Center

A unique A(H5Nx) clade 2.3.4.4 highly pathogenic avian influenza virus (HPAIV) was detected in North America in late 2014. Motivated by both the alarming spread of new H5 reassortment viruses in Asia and Europe as well as by the detection of HPAIV in both domestic poultry in Canada and in wild and captive birds in Washington State, initial HPAIV surveillance was conducted among in wild birds in the Pacific Flyway of the United States. This effort was later expanded to include the Central and Mississippi Flyways. Positive HPAI H5 findings from wild waterfowl samples suggested that while some of these species exhibit no detectable morbidity or mortality, clinical disease was documented for other wild bird species similarly infected. Also, losses in U.S. domestic poultry were unprecedented. In July 2015, state and federal agencies initiated a national surveillance effort to provide information to guide management actions to address some of the issues associated with HPAIVs in birds. This includes risks to commercial poultry, backyard poultry, game bird farms, wild birds, wild bird rehabilitation facilities, falconry birds, and captive bird collections in zoos/aviaries. Specific objectives of the plan were to: 1) determine the distribution of influenza viruses of interest in the U.S.; 2) detect spread of influenzas of interest to new areas of concern; and 3) provide a flexible surveillance framework that can be
modified to monitor wild waterfowl populations for avian influenza, detect reassortant avian influenza viruses, and estimate apparent prevalence of important influenzas once detected in an area of concern.

Since the last confirmation of Eurasian reassortment H5N2 during the 2015 U.S. outbreak from Canada geese in Michigan 17 June, there were only two PCR-only detections (no viable virus, sequencing unsuccessful): July 2015 from a mallard during a bird banding effort in Utah, and a hunter harvested mallard from Oregon in November 2015. However, during a live-bird banding effort from 6-14 August, near Fairbanks, Alaska, 188 dabbling ducks were sampled at the Creamer’s Field State Migratory Waterfowl Refuge. Influenza A was detected in 48 of the 188 samples, and a single H5 from an adult mallard was confirmed as the HPAIV reassortant clade 2.3.4.4 H5N2 (full 8 gene constellation). The detection of H5N2 HPAIV in a migratory species in Alaska confirms low frequency persistence in North America and the potential for re-dissemination of the virus during the 2016 fall migration. There have been no detections in poultry since June 2015.

Veterinary Feed Directive
Michael Murphy, FDA-CVM

The current status of the Center for Veterinary Medicine (CVM) FDA policy and regulation regarding the use of medically important antimicrobials in food-producing animals was presented. A change in marketing status from over-the-counter (OTC) to prescription (Rx) or veterinary feed directive (VFD) is expected in December of 2016 for those medically important antibiotics administered to food-producing animals in drinking water, or in or on feed, respectively. Following these changes a licensed veterinarian will need to provide an order (prescription-medicated drinking water or VFD order - medicated feed) in order for the client/producer to legally obtain and use medically important antibiotics.

Broiler Industry Report
Deirdre Johnson, Mountaire Farms

**Broiler Production:** Production thus far in 2016 (January-August) is slightly reduced compared to the same period for 2015. Average broiler age and weight are increased. Average feed cost is reduced from 2015.

**Mortality:** First week mortality has increased from 2015. The trend towards removal of hatchery antibiotics may be contributing to this increase. The same trend was reported last year. Chick quality/early mortality ranked fourth in the 2016 Association on Veterinarians in Broiler Production (AVBP) poll as displayed later in this report. Total mortality thus far in 2016 is reduced compared to the previous year. This was reflected in all weight classes but the 4.4-5.2 pound weight class.

**Condemnations:** Whole Body Farm Condemnations + Parts Condemnations decreased from 0.654% in 2015 to 0.615% in the first half of 2016. Septicemia/Toxemia and Infectious Process account for the majority of this decrease.

**Key Broiler Health Issues:** In 2015, HPAI ranked first in the AVBP disease poll. This year, coccidiosis ranked first among the disease issues. This reflects not only the actual frequency of diagnosis but also the cost and challenge of
maintaining effective anticoccidial programs. Eimeria maxima was the coccidial species most often mentioned by broiler veterinarians. Necrotic enteritis ranked second (5th in 2015) as a disease issue and is often associated with inadequate control of E. maxima. Necrotic enteritis is negatively impacted by the removal of in-feed antibiotics, as they help control secondary Clostridial overgrowth. Antibiotic removal and its effects on bird health ranked third. This issue will likely continue as we approach the 2017 implementation of Veterinary Feed Directive (VFDs) and field scripting of antibiotics. Further results for the 2016 AVBP disease poll are displayed later in this report.

**Key Non-Disease Broiler Issues:** The highest ranked non-disease issue was antibiotic removal due to increased production and demand for antibiotic free poultry by both customers and broiler production companies. Drug availability by FDA as well as the implementation of VFD regulations ranked second. In 2017, all antibiotics that are considered medically important to humans will require a Veterinary Feed Directive if used. Also, antibiotic treatment in drinking water in broiler houses will require a prescription. Meat quality and specifically woody breast ranked third in our poll. Woody breast is a major issue for the large bird programs. Customer complaints are driving increased grading and routing of product in processing plants.

**Supporting Data:**

![Broiler Production Chart](image-url)
As in previous years, AVBP membership was polled concerning disease and non-disease issues. Topic issues were force ranked for both areas. All disease and non-disease issues were also rated in a second graph for each issue. AVBP is comprised exclusively of Veterinarians employed full-time by U.S. broiler
The Veterinarians responding the 2016 survey represented 56% of the membership and 77% of USA broiler production.

**Ranking:**

<table>
<thead>
<tr>
<th>Top Disease Issues</th>
<th>Composite Forced Rank</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coccidiosis</td>
<td>1</td>
<td>1.82</td>
</tr>
<tr>
<td>Necrotic Enteritis</td>
<td>2</td>
<td>3.27</td>
</tr>
<tr>
<td>Antibiotic Free/Health Issues</td>
<td>3</td>
<td>5.76</td>
</tr>
<tr>
<td>Chick Quality and Early Mortality</td>
<td>4</td>
<td>5.81</td>
</tr>
<tr>
<td>Infectious Bronchitis- Respiratory</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Novel Reovirus</td>
<td>6</td>
<td>7.05</td>
</tr>
<tr>
<td>Bacterial Osteomyelitis of the Legs</td>
<td>7</td>
<td>7.36</td>
</tr>
<tr>
<td>Gangrenous Dermatitis</td>
<td>8</td>
<td>7.41</td>
</tr>
<tr>
<td>Avian Influenza</td>
<td>9</td>
<td>7.95</td>
</tr>
<tr>
<td>Infectious Laryngotracheitis</td>
<td>10</td>
<td>8.1</td>
</tr>
<tr>
<td>Infectious Bursal Disease</td>
<td>11</td>
<td>8.57</td>
</tr>
<tr>
<td>Vertebral Osteomyelitis</td>
<td>12</td>
<td>9.43</td>
</tr>
<tr>
<td>Histomoniasis</td>
<td>13</td>
<td>9.81</td>
</tr>
<tr>
<td>Mycoplasmosis</td>
<td>14</td>
<td>10.29</td>
</tr>
<tr>
<td>Polyserositis</td>
<td>15</td>
<td>11.05</td>
</tr>
<tr>
<td>Infectious Bronchitis- Kidney</td>
<td>16</td>
<td>11.9</td>
</tr>
<tr>
<td>Marek's Disease</td>
<td>17</td>
<td>13.43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top Non-Disease Issues</th>
<th>Composite Forced Rank</th>
<th>Mean Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic-Free Issues (Customer or Media)</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>FDA-Drug Availability/VFD Implementation</td>
<td>2</td>
<td>2.29</td>
</tr>
<tr>
<td>Meat Quality (White Stripping, Woody Breast)</td>
<td>3</td>
<td>2.77</td>
</tr>
<tr>
<td>Increased Food Safety Regulations by USDA</td>
<td>4</td>
<td>3.23</td>
</tr>
<tr>
<td>Biosecurity- HPAI Threat</td>
<td>5</td>
<td>3.25</td>
</tr>
<tr>
<td>Poultry Welfare (Internal Programs/Activist Threats)</td>
<td>6</td>
<td>3.5</td>
</tr>
<tr>
<td>Exportation Issues (Drug, MRLs, Paws, AI, etc.)</td>
<td>7</td>
<td>5.43</td>
</tr>
<tr>
<td>CVB- Vaccine Approval</td>
<td>8</td>
<td>6.38</td>
</tr>
<tr>
<td>Increased Environmental Regulations</td>
<td>9</td>
<td>6.6</td>
</tr>
</tbody>
</table>
Broiler Disease Issue Ratings 2016

- VOA/VOM
- Twisted Leg (Varus/Valgus)
- Tibial Dyschondroplasia
- Tapeworms
- Salmonellosis
- Salmonella enteritis with Chick Mortality
- RSS
- Roundworms
- Rickets
- Proventriculitis
- GRE
- Novel Reovirus
- Necrotic Enteritis
- Mycotoxins
- Mycoplasma synoviae
- Mycoplasma gallisepticum
- Mites
- Marek’s Disease
- Lentogenic Newcastle Disease
- Infectious Process
- Infectious Laryngotracheitis
- Infectious Bursal Disease
- Inclusion Body Hepatitis
- IBV-Other
- IBV-Nephropathogenic
- IBV-Mass
- IBV-Ark
- IBV-072
- HPAI
- Histomoniasis/Blackhead
- Gastroenteritis
- Foot Pad Dermatitis
- Femoral Head Necrosis
- Feed Passage
- Enteritis-Other
- Eimeria-Other
- E. tenella
- E. maxima
- E. acervulina
- Colisepticemia
- Coccidiosis
- Chick Quality/Early Mortality- Bacteria Related
- Chick Quality- Incubation/Developmental Related
- Bacterial Synovitis
- Aspergillosis
Overall health of the national table egg layer flock continues to be very good. There are no major clinical disease problems occurring at this time. This is due to the several resources and practices available to the industry:

- Continued availability of high quality vaccines
- Flock supervision from professional, well-trained flock service technicians
- Readily available veterinary technical assistance from primary breeder, vaccine company, diagnostic laboratory, feed additive suppliers, and consulting veterinarians
- High quality nutrition provided by professional nutritionists
• Housing of a majority of layers in environmentally controlled facilities in cages without exposure to litter. This will change with the move to cage-free facilities.
• Use of sound biosecurity practices.
• Continual surveillance for foreign animal diseases or potentially highly pathogenic agents such as Newcastle and avian influenza by our state and federal laboratory system.

A poll of the Association of Veterinarians in Egg Production (AVEP) was conducted within the last month. The members were asked to rate a list of common diseases of caged and cage-free pullets (22 and 23 conditions listed respectively) and caged and cage-free layers (32 and 36 conditions listed respectively) as to their prevalence and their importance in their area of service on a scale of 0 to 3 with 0 = not seen, 1 = seen but not common, 2 = commonly seen, and 3 = seen in a majority of flocks. For the importance question, they were asked to give a value of each disease to a company in their area of service on a scale of 0 to 3 with 0 = not important issue for flock health or economics to 3 = very important issue for flock health and economics. 18 members of the total membership of 100 answered the survey.

To follow are the results of prevalence and importance of chick issues:

<table>
<thead>
<tr>
<th>Caged Pullets</th>
<th>Cage-Free Pullets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prevalence</td>
</tr>
<tr>
<td>Yolk Infections</td>
<td>1.59 (1.39)*</td>
</tr>
<tr>
<td>Starveouts</td>
<td>1.53 (1.61)</td>
</tr>
</tbody>
</table>

*2015 survey results are in parenthesis

Yolk infections and starveouts are associated with hatch egg quality, hatchery sanitation, and hatchery management of incubation, sanitation, chick processing, holding, and delivery. Compared to last year’s survey, these problems continue to be present at about the same level. The removal of antibiotics from hatcheries may lead to more yolk sac infections.

The survey revealed the following top three diseases of concern occurring in U.S. for growing pullets excluding chick yolk infections and starveouts:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Caged Pullets</th>
<th>Cagefree Pullets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prevalence</td>
<td>Importance</td>
</tr>
<tr>
<td>1</td>
<td>Cocci/diosis – 1.41</td>
<td>Cocci/diosis – 1.88</td>
</tr>
<tr>
<td>2</td>
<td>Post SE Bacterin Hepatitis – 1.24</td>
<td>Post SE Bacterin Hepatitis – 1.71</td>
</tr>
<tr>
<td>3</td>
<td>Necrotic enteritis – 1.12</td>
<td>Infectious laryngotracheitis (ILT) – 1.65</td>
</tr>
</tbody>
</table>

All disease conditions in caged and cage-free pullets are in the below “2” category of prevalence meaning that the conditions are not seen commonly but only occasionally. Cocci/diosis and secondary necrotic enteritis remain as high on the lists of prevalence and concern in pullets. It is a problem in caged pullets as well with vaccine usage as an intervention on the rise.

Piling issues continue to plague the cage free pullet grower.
Salmonella enteritidis (SE) bacterin induced hepatitis syndrome can result in up to seven percent mortality starting two weeks after the administration of SE bacterin and seen more often in caged pullets compared to cage-free. This syndrome has a genetic susceptibility base as it is seen in all white strains of layers except one. It also has not been seen in brown egg layers. The cause of this problem continues to be unknown at this time.

Infectious laryngotracheitis is causing losses of pullet flocks in enzootic areas and growers continue to adjust vaccination programs and biosecurity to address the issue.

To follow are the top three diseases for caged and cage-free layers from the survey:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Caged Layers</th>
<th>Cagefree Layers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prevalence</td>
<td>Importance</td>
</tr>
<tr>
<td>1</td>
<td>E. coli – 2.17</td>
<td>E. coli – 2.33</td>
</tr>
<tr>
<td>2</td>
<td>Mycoplasma synoviae – 1.67 tie</td>
<td>Calcium depletion – 2.00 tie</td>
</tr>
<tr>
<td>3</td>
<td>Cannibalism – 1.67 tie</td>
<td>Cannibalism – 2.00 tie</td>
</tr>
</tbody>
</table>

Colibacillosis continues as the top disease problem in caged and cage-free flocks and is a problem mainly of young flocks with mortality rates of 0.5 to 4% per week starting shortly after housing can occur. The problem appears to be on the increase in cage-free production due to the birds’ access to contaminated litter, poor feathering issues, and vent trauma. It is felt that this condition is most often secondary to upper respiratory challenges with MG, Mycoplasma synoviae (MS), ammonia, infectious bronchitis (IB), etc. in early lay. It also may be a primary problem if water lines are contaminated with E. coli. The overall prevalence and importance of colibacillosis was about the same as last year. 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. The live E. coli vaccine, introduced in mid to late 2006, has been increasingly used successfully as both a preventative and as a treatment in the face of an outbreak in most areas. Some producers are now applying the live E. coli vaccine by eyedrop during the growing period to assure that each bird receives a dose.

Cannibalism was shown to be an important issue in both cage and cage-free layers. In cage-free production, the 10-day or younger rule for beak trimming results in longer beaks than desired compared to a beak trim at four to eight weeks and may result in an increase in incidence and severity of cannibalism. The increasing use of large colony cages may also increase the level of cannibalism. In cage-free operations, light intensity and feathering problems have led to problems.

Calcium depletion continues to maintain high importance in caged flocks and is normally associated with either late onset of switching to lay feeds with high levels of calcium or low feed intake during early production with the lack of proper formulation to account for the low feed intake. This condition will be an ongoing issue with increasingly higher egg production rates accompanied with lower feed consumption through improvements in management and genetics.
Mycoplasma synoviae (MS) continues to be highly prevalent amongst layers in multi-age facilities but its importance is quite low as the isolates are relatively non-pathogenic.

Ascarids are increasingly being found in cage-free operations with the concern being the possibility of a consumer finding an egg with a roundworm contained inside. Most all cage-free egg producers have had such an occurrence. At this point, there is no FDA cleared product for use in layers in production for treatment. Diatomaceous earth is added to the feed in an attempt to reduce problems in addition to sanitation measures.

Focal duodenal necrosis (FDN) continues to be found in both caged and cage-free layers. Apparently, preventative measures are working and the prevalence is low. Coccidiosis can be an important issue for both caged and cage-free layers in some operations indicating problems with developing immunity during growing.

Mycoplasma gallisepticum (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 or where the Ts-11 or 6/85 vaccines are no longer effective. The live pox-vectored recombinant Mg vaccine is being used in a variety of situations and appears to be useful in low challenge situations. Vaccine failures with all vaccines are somewhat common and the unit must resort to medication programs using tylosin or tetracycline antibiotics before alterations in the immunity program are made. Most all operators are now applying the F-strain vaccine by eyedrop rather than spray in an effort to increase its efficacy.

The Association of Veterinarians in Egg Production (AVEP) survey also asked about other issues and diseases of concern on a scale of 0 to 3 with 0 = no concern, 1 = some concern, 2 = moderately concerned, and 3 = very high concern. The opinions of the respondents this year and in past years is as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian Influenza (AI)</td>
<td>1.55</td>
<td>2.00</td>
<td>2.19</td>
<td>3.00+</td>
<td>2.50</td>
</tr>
<tr>
<td>Lack of Effective Treatments</td>
<td>2.15</td>
<td>2.43</td>
<td>2.56</td>
<td>2.14</td>
<td>2.56</td>
</tr>
<tr>
<td>SE and FDA Egg Safety Rule</td>
<td>2.55</td>
<td>2.29</td>
<td>2.31</td>
<td>2.29</td>
<td>1.88</td>
</tr>
<tr>
<td>S. heidelberg and Egg Safety Rule</td>
<td>2.45</td>
<td>1.90</td>
<td>2.13</td>
<td>2.05</td>
<td>1.81</td>
</tr>
<tr>
<td>Welfare in General</td>
<td>2.33</td>
<td>2.15</td>
<td>2.31</td>
<td>2.21</td>
<td>2.31</td>
</tr>
<tr>
<td>Beak Trimming</td>
<td>1.70</td>
<td>1.50</td>
<td>1.88</td>
<td>1.91</td>
<td>1.88</td>
</tr>
<tr>
<td>Disposal of male chicks</td>
<td>1.40</td>
<td>1.25</td>
<td>2.00</td>
<td>1.64</td>
<td>2.13</td>
</tr>
<tr>
<td>On-Farm Euthanasia</td>
<td>1.95</td>
<td>1.80</td>
<td>1.88</td>
<td>1.73</td>
<td>1.88</td>
</tr>
<tr>
<td>Molting of Layers</td>
<td>1.60</td>
<td>1.35</td>
<td>1.31</td>
<td>1.27</td>
<td>1.25</td>
</tr>
<tr>
<td>Banning of Cages</td>
<td>2.60</td>
<td>2.35</td>
<td>2.69</td>
<td>2.27</td>
<td>---</td>
</tr>
<tr>
<td>Adoption of Enriched Cages</td>
<td>N/A</td>
<td>2.11</td>
<td>2.44</td>
<td>1.86</td>
<td>---</td>
</tr>
<tr>
<td>Move to cagefree</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>2.56</td>
</tr>
<tr>
<td>Supply of Useful Vaccines</td>
<td>1.20</td>
<td>1.05</td>
<td>1.56</td>
<td>1.45</td>
<td>1.19</td>
</tr>
<tr>
<td>Number of Responses</td>
<td>20</td>
<td>17</td>
<td>16</td>
<td>22</td>
<td>16</td>
</tr>
</tbody>
</table>
The concern for AI continues as this disease is very unpredictable. Veterinarians are becoming more involved with producers’ biosecurity programs due to actions by the National Poultry Improvement Plan (NPIP) to get all producers to establish a biosecurity plan that incorporates the 14 basic principles as set forth in the proposal adopted at the NPIP 43rd Biennial Conference this year in Seattle. An audit procedure is to be developed by the summer of 2017 and will be implemented starting at that time.

The lack of effective treatments for diseases such as colibacillosis, necrotic enteritis, ascarids, *Capillaria spp.*, spirochetosis, fowl cholera, etc. is a very high concern and a welfare issue for the diseases that can cause much suffering due to illness. The list of antibiotics that can be used in egg layers is quite short – bacitracin, tylosin, and chlortetracycline. Tylosin is to be withdrawn from the market in 2017. The lack of an anti-parasitic product for used in controlling ascarids during lay, or other nematodes, is especially troublesome as these conditions are becoming increasingly common in cage-free production. Amprolium continues to be available to prevent and treat coccidiosis. Hygromycin is also now approved for use in egg layers in production for roundworms, *Capillaria spp.*, and cecal worms but the supply ceased due to a factory problem in China hence hygromycin is not available until another source can be found. There is no effective treatment of organic layers. There is an increase in the usage of non-antibiotic, preventative feed and water additives containing probiotics, prebiotics, and fermentation metabolites.

Concern for *Salmonella enteritidis* (SE) and its consequences is waning as the prevalence of SE swab positive farms is very, very low and no egg associated outbreaks of SE in humans has occurred in many years. Inspections by FDA are ongoing however. A moderate degree of concern for adding other serotypes to the plan is apparent.

The FDA Egg Safety Program entails obtaining chicks from NPIP SE Clean breeders, rodent and fly monitoring and control programs, biosecurity, cleaning and disinfection of premises, training of persons involved, testing of manure samples at 14-16 weeks, 40 to 45 weeks, and 6 weeks after molt. If any of the manure tests are positive for SE, egg testing must take place. The producer funds all testing and compliance efforts. Laboratories have managed to gear up to handle the increased testing load this requires. Producers with a manure positive swab test are holding eggs from the market until after the test results of eggs are obtained. The use of DNA based tests are now being used that minimize the time of testing from the formerly required 10 days for culture to as low as 27 hours with the new tests. There is no provision in the program for compensating a producer who has an egg-positive flock and does not have a pasteurization or hard-cooking plant that will take their eggs. In response to the initiation of the FDA Egg Safety Rule in 2010, producers ramped up measures to reduce risk of SE infection by increased use of vaccines, intestinal health feed additives, rodent and fly control measures, and biosecurity practices as was intended by the plan.

The possible addition of *Salmonella heidelberg* (SH) to the FDA Egg Safety Plan has the industry questioning why and how this will be initiated. SH in humans
has not recently been attributed to eggs and the prevalence of SH in humans has dropped since the late 1990’s to 2011 from 1 per 100,000 population to 0.35 per 100,000 in CDC figures from FoodNet. Also, there is no breeder program as there is for SE and it may take five to 10 years before one can be fully assured of a clean product once a breeder program is started. Also, no specific SH vaccines are available as they are for SE. It is estimated that a much higher contamination rate of flocks with SH is present compared to SE.

Poultry welfare concerns continue to be of high to very high concern due to continued activities by activist groups. The increase in concern over day old male euthanasia has come about by some companies stating they are going to require egg products from flocks where day old male euthanasia is not used.

The dramatic transition to cagefree egg production across the U.S. has shaken the industry. This is due to food retailers and fast food restaurants desiring to appear compassionate and improve their markets and brand identity by announcing their switching to all cagefree eggs in the future. The animal welfare groups were very clever by pointing this marketing tool out to the corporate executives.

Vaccine use continues to be the mainstay of disease prevention in the egg layer industry second to biosecurity. The supply of useful vaccines continues to be adequate and appears to be keeping up with the layer industry needs. It will be interesting to see if this good supply of vaccines continues with the consolidations now occurring in the poultry vaccine business.

This is the fourth year that the AVEP members have been asked for their ideas as to research needs for the layer industry. A summary of the top ten responses of the 19 responding members is as follows:

1. Colibacillosis
2 tie – Infectious bronchitis
2 tie – Improved vaccines/adjuvants
4. Avian influenza
5. Focal Duodenal Necrosis (FDN)
6. Mycoplasmosis
7 tie - Coccidiosis
7 tie - Salmonellosis
7 tie – Animal Welfare
10. Vaccine Delivery Systems

The respondents were asked to rank their top ten choices for priority in research needs from a list of 22 diseases and categories. Of note was that two respondents listed ulcerative dermatitis of cagefree brown egg layers as a #1 priority for research as this quite devastating disease with up to 50% mortality over the life of a flock, has defied diagnosticians thus far in regard to a cause. Luckily, the disease is confined to a small area in east central Indiana and west central Ohio.

This year in the egg industry has been a total opposite of the previous year’s high egg prices and profits. Reasons are an increase in cagefree houses with no reduction in caged layer numbers, continued imports of egg products due to
contracts made by producers affected by AI, and continued use of high-egg-price-induced reformulated of egg-containing baked and processed goods recipes to contain less egg product during the shortages last year due to AI. Luckily, feed prices are quite low.

Iowa (51.2 million) continues to be the lead state in egg layer numbers and has rebounded from their low of 31.2 million last year due to AI. Iowa is followed by #2 Ohio (30.2 million), #3 Indiana (27.7 million), #4 Pennsylvania (24.5 million), #5 Texas (16.3 million) and #6 California (11.4 million) according to the National Agricultural Statistics Service for August 2016. Total commercial egg layer numbers were 291 million in August 2015, up from 172 million in August of 2014.

Turkey Industry Report
Ben Wileman, Ag Forte
Steven Clark, Devenish; Andrew Bailey, National Turkey Federation (NTF)

Dr. Clark, surveyed turkey industry professionals and veterinarians representing (n=21) the U.S. turkey production regarding the health status of turkeys produced in August 2015 through August 2016. The turkey industry reports several disease challenges for this 12 months varying by geographic regions within a state and across the United States. This report will list, Table 1, the challenges by disease and issues. Of particular interest in 2016 are issues with lack of efficacious drugs, clostridial dermatitis, ORT, blackhead and colibacillosis.
The “lack of approved efficacious drugs” continues to be the top health issue (Table 1). The withdrawal of the NADA (New Animal Drug Application) for enrofloxacin in 2005 for use in poultry leaves the industry with no adequate therapeutic response to colibacillosis (ranked #2, up from #3 since 2009-2015), or fowl cholera (ranked #12 from #11). In July 2011, the sale of roxarsone was suspended; September 30, 2013, the Food and Drug Administration (FDA) marketing authorization NADA was withdrawn. The sponsor of Penicillin-100 Type A medicated article (in feed administration) withdrew the approval (NADA) June 30, 2015. Nitarson (see blackhead) approval was withdrawn December 31, 2015. Issues over the use of antibiotics in animal agriculture remains a major concern for the turkey industry and for all of animal agriculture.

**Clostridial Dermatitis** (CD), also referred to as Cellulitis, remains a major disease issue across all geographic regions; as the survey average changed slightly to a score of 3.4 (from 3.3 in prior year) and ranked #3 (from #2 since 2008-2015). Analysis indicates range of concern; 57% of respondents score CD a 4 or 5 (severe), 38% score it a 2 or 1 (mild); it was 46%, 50%, 62%, 76% and 38%, 32%, 27%, 20%, respectively for the prior years (2015, 2014, 2013, 2012). CD is most commonly seen in, but not limited to, commercial male turkeys nearing market age. *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 clinical signs: subcutaneous emphysema (crepitus); serous or serosanguineous subcutaneous fluid; vesicles on the skin, especially on the breast/inguinal area; moist, dark, wrinkled skin, especially breast/inguinal area; cellular necrosis (microscopic); organ involvement (spleen/liver); vesicles on the skin, and/or moist, dark, wrinkled skin, on the tail area. The affected flock will have mortality greater than or equal to 0.5 dead per 1,000-birds, fitting the individual bird definition, for two consecutive 24-hour periods. Opinions vary as to risk factors and potential causes of the problem. Some of the key areas to control of CD include: early recognition; removal of mortality 2-3 times per day; medicating affected flocks with appropriate antimicrobials; promptly managing all water spills and wet litter, and feed outages. There has been limited success with vaccinating at-risk flocks with autogenous bacterins and toxoids.

**ORT** (*Ornithobacterium rhinotracheale*) ranked #4 versus #7 previously, is a highly contagious respiratory disease in poultry caused by a gram-negative pleomorphic rod-shaped bacterium. It has been isolated from chickens, ducks, partridges, and guinea fowl. It was originally recognized in Europe and South Africa. ORT was first confirmed in the U.S. from turkeys in 1993. Horizontal transmission (such as, bird-to-bird, contaminated people and equipment) by direct and in-direct contact is the primary route of spread. However, vertical transmission is suspected (Hafez, 2000). In the fall of 1995 it was a major cause of respiratory disease in midwestern states and since has become endemic across most of the USA. Management systems, such as brood-and-move have increased the exposure of ORT-naive birds to ORT in the finisher barns, resulting in respiratory disease and mortality in some operations. Biosecurity procedures must be taken. Proper water sanitation can minimize the severity and spread. Vaccination is limited and results are varied (toxoids, bacterins). Bacterins are used in breeders.
**Poult enteritis of unknown etiologies** has changed in importance, to position #14 from #12. Turkey Coronavirus (TCV), as a defined cause of enteritis, was ranked #32 (Table 1), no change, with 6 reported cases, down from 119 the previous year (Table 2). In 2014-2015, the majority of TCV cases were limited to one geographic area.

**Protozoal Enteritis**, attributed to flagellated protozoa, *Cochlosoma, Tetratrichomonas* and *Hexamita*, ranked #17, changed from #22; protozoal enteritis remained relatively unchanged over past years until 2016 and associated with the loss of nitarsone. Several types of protozoa are associated with enteric disease of turkeys. Protozoal enteritis can present with general signs, including dehydration, loss of appetite (off-feed), loose droppings (diarrhea) and watery intestinal contents. Flagellated protozoa include *Cochlosoma, Tetratrichomonas* and *Hexamita*. *Eimeria* and *Cryptosporidia* are non-flagellated protozoa. *Cochlosoma* and *Hexamita* are associated with enteritis, primarily in young turkeys, especially in the summer months. There are field reports of co-infections with *Cochlosoma* and *Tetratrichomonas*, or *Cochlosoma* and *Hexamita*, or flagellated protozoa and *Eimeria*.

**Single age brooding** has been implemented during the last several years to assist in managing diseases on turkey farms, especially enteric diseases. Historically, production systems included 2 - 3 different ages on a single farm site reared in separate barns, from day-old to market age. The trend is to isolate, specialized brooding facilities. All production is separate hen and tom rearing. The brooding phase for commercial turkeys is rearing about 0 – 5 weeks of age, then the flock is moved to specialty finisher or grow-out barns. Single age brooding may be termed all-in/all-out or single-age or brooder hub. Single age brooding systems can operate in two ways. One option rears the turkeys to slaughter age at the same farm site, without other ages on the farm. Another system of single age brooding involves farm sites dedicated to brooding, then at five weeks of age birds are moved to a separate site for finishing; some systems may move birds 0.25 miles up to 20 miles away. In 2016, 60% of brooding was single age, compared to 39% in 2008. Single age brooding is more common in the Southeastern U.S. than the Midwest states. Conversion to single age brooding started in late 1990 following the emergence of Poult Enteritis Mortality Syndrome (PEMS) in North Carolina; advantages became obvious and it has expanded to other areas of the U.S. Tunnel ventilation of finisher (grow-out) barns is becoming more popular method to minimize heat stress; in 2016, 30% of the industry finisher production is tunnel ventilated, compared to 15% in 2008.

**Late mortality** ranked 7th health issue and changed from #6 the prior year. Late Mortality may be defined as mortality, in excess of 1.5% per week, in toms (males) 17-weeks and older; mortality is not diagnosed to a specific disease or cause. Excess cumulative mortality of 5-10% in toms prior to slaughter has been reported. Late mortality may be associated with physiologic or biomechanical deficiencies following early rapid growth in heavy toms achieving genetic potential; aggressive behavior noted in mature toms; cannibalism; leg problems and/or hypertension.
Leg problems (#5, prior year was #10) are ranked among the top concerns of the turkey industry. Leg problems are a common complaint, such as, spiral fractures of the tibia or femur. Leg Problems may be defined as lameness, particularly in toms, several weeks prior to slaughter. Leg problems are attributed to various conditions (refer to Table 1), including, pododermatitis, fractured femurs, fractured tibia, osteomyelitis (OM), tibial dyschondroplasia (TDC), spondylolisthesis, “Shaky Leg”, etc.

Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR) was recognized as a newly emerging disease in 2011. A unique reovirus has been isolated and identified as the cause of tenosynovitis and digital flexor tendon rupture in commercial turkeys. Clinical signs in young flocks are reportedly mild to nonexistent, but can develop into lameness and/or abnormal gait in older flocks, starting at about 12 weeks of age. Affected flocks may also report an increased incidence of aortic ruptures and poor flock performance (weight gain, uniformity). Research continues into pathogenesis, virus characterization, diagnostics and epidemiology. Research indicates that the turkey arthritis reovirus is distinct from the recently identified novel reovirus causing arthritis in chickens, and most similar to the turkey enteric reovirus. TR-DFTR was added to the survey in 2011 and ranked #11 (Table 1) with 106 “confirmed” cases or flocks (Table 2). In 2016 TR-DFTR ranked #26 with 31 cases; prior year it ranked #19 with 146 cases. A breeder company has implemented an autogenous reovirus vaccination program to induce the maximum production of antibodies and resulting transfer of maternal antibodies. Results show a significant reduction in associated clinical signs in those poult placed from vaccinated flocks. A commercial turkey lighting program of 4-8 hours of continuous dark in a 24-hour period has also been recommended. The combined efforts of breeder vaccination, commercial farm biosecurity and flock management appear to be controlling this disease. Increased recognition of TR-DFTR in 2014 - 2015 confirmed that the reovirus has mutated into three distinct strains.

Blackhead, also known as Histomoniasis, changed to position #9 (#13 prior year). There were 101 reported cases of blackhead (Table 2) an increase from 55 the prior year, and a record 108 in 2010. Histomoniasis occurs regionally and seasonally in turkeys, and can result in significant mortality. 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. Nitarsone FDA approval was withdrawn December 31, 2015, leaving the industry with no drugs approved with indications against histomoniasis. Nitarsone was approved for the prevention of histomoniasis (blackhead disease) in turkeys and chickens, and was the only approved animal drug for this indication.

Heat stress ranked #18 following another hot summer, compared to #18 the prior year. Poult Enteritis Mortality Syndrome (PEMS) ranked #29 versus #30 previously. Avian Metapneumovirus (AmPV) ranked #33 versus #25, with a few atypical cases limited to the Midwestern U.S. Bordetella avium continued as a
significant respiratory disease challenge in several geographic regions; bordetellosis ranked #8 compared to #8 the prior year.

*Mycoplasma synoviae* (MS, infectious synovitis) infections, ranked #30 (#27, prior year), 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 20 cases of MS reported (Table 2). The primary breeders have remained free of *M. gallisepticum* (MG), *M. meleagridis* (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. There were 29 cases of MG reported (Table 2).

The industry continues its efforts prepare for any possible reoccurrence of Highly Pathogenic Avian Influenza (HPAI), such as the strains that struck the Western and Midwestern United States in the winter and spring of 2015, and to improve every aspect of disease prevention and response. During that outbreak, turkey flocks in eight states were affected by H5N8 and H5N2 strains of HPAI, with H5N2 accounting for the vast majority. In total, 153 farms commercial turkey or turkey breeder flocks were infected, resulting in the loss of over 7.75 million turkeys, in addition to over 40 million chickens (layers and broiler breeders). USDA has classified this outbreak as the worst incident of animal disease in U.S. history.

These efforts proved necessary in January 2016 when the H7N8 strain was found on ten turkey farms in Dubois County, Indiana (within the Mississippi Flyway). Of these ten, one farm was confirmed Highly Pathogenic, and the others were Low Pathogenic (LPAI). The industry worked closely with the Indiana State Board of Animal Health, Indiana’s State Veterinarian and USDA's Animal and Plant Health Inspection Service to rapidly respond to these cases, and depopulate the infected flocks, as well as a suspect H7 flock and a commercial layer flock within the control zone. In total, 258,325 turkeys and 156,178 layer chickens were depopulated. Although there have been a number of wild bird detections of various AI strains during the year, there have not been significant outbreaks in the U.S. turkey industry since the winter.

The turkey industry is working to finalize development of the Secure Turkey Supply plan or STS (www.secureturkeysupply.com). STS includes Federal and State Transport (FAST) Plan for Movement of Commercial Turkeys in a High Pathogenicity Avian Influenza (HPAI) Control Area, and Turkey Risk Assessment. Draft versions of the Plan were utilized in regions affected by HPAI, and were instrumental in many instances where movement and shipping of turkeys and turkey products were at risk. The goal of the Plan is to facilitate business continuity and economic survival of participating non-infected turkey operations in a Control Area after a detection of HPAI, and to help ensure the continuous availability of safe turkey meat to consumers.

Regarding disease surveillance, the industry has continued to voice strong support for the maintenance of the National Poultry Improvement Plan (NPIP) in the face of increased government spending cuts. NPIP is a vital state-federal-private partnership for the turkey industry, as well as the broiler and egg industries, and APHIS has continued to show strong support for the program, having hired
additional staff for the program in 2014, and maintaining their offices in Conyers, Georgia, instead of moving it to the Washington, D.C. area. NPIP has been additionally helpful in addressing certain aspects of disease control and eradication in the HPAI outbreaks that have occurred. The industry was also supportive of federal efforts to update and modernize ARS’ Southeast Poultry Research Laboratory in Athens, Georgia, which proved integral to efforts to combat HPAI and develop vaccines for the relevant strains.

One of the industry’s top priorities continues to be the health of turkeys, including the ability to utilize approved drugs, especially in light of increasing questions from special interests regarding antibiotic resistance. The ability to control and prevent animal disease and/or treat those that are sick is critical to any animals’ wellbeing. But with increased outside pressure to reduce and even eliminate the use of microbial drugs in animals, an outbreak similar to avian influenza, but bacterial in nature, could have devastating consequences.

Antibiotic resistance has been a concern for many years, with animal use getting more attention than human use. The first animal related guidance, in regards to drug utilization, was published in 2003, Final Guidance #152, “Evaluating the Safety of Antimicrobial New Animal Drugs with Regard to their Microbiological Effects on Bacteria of Human Health Concern”. Discussion and debate have continued since that time, culminating to a point that the Obama Administration, through USDA, FDA and CDC, has taken numerous steps to limit antibiotic use and curb resistance, especially in animals. Major actions include: Guidance for Industry (GFI) #209 "The Judicious Use of Medically Important Antimicrobial Drugs in Food-Producing Animals", published in 2012. This document provided the pathway FDA intended to take to reduce and eliminate the use of antibiotics for the sole purpose of growth promotion. On December 11, 2013, the FDA finalized Guidance for Industry #213, “New Animal Drugs and New Animal Drug Combination Products Administered in or on Medicated Feed or Drinking Water of Food Producing Animals: Recommendations for Drug Sponsors for Voluntarily Aligning Product Use Conditions with GFI #209”. This guidance provided the details on how FDA expected to implement guidance #209. The National Turkey Federation supported these guidance documents even though they questioned the underlying science indicating a direct link between animal use of antibiotics and human antibiotic resistance. In 2015, FDA Center for Veterinary Medicine (CVM) also published the finalized Veterinary Feed Directive (VFD) regulation, which establishes the rules and responsibilities for licensed veterinarians in prescribing and administering medically important antimicrobials in animal feed. Guidance #213 established procedures for phasing out the use of medically important antimicrobials for production purposes in alignment with Guidance for Industry #209 and proposed changes to VFD drug regulations. Final implementation is scheduled for December 2016, no drugs listed as “medically important” that are exclusively labeled for production purposes can be used after this point. Next steps for the agency include developing an action plan outlining additional steps to build on the progress of guidance #213. The goal is to publish this action plan before the end of the 2016 calendar year.
In response to the 2013 Center for Disease Control (CDC) report on antibiotic resistance urging immediate action to address the issue, an Executive Order was issued in 2015 calling for a national response to antibiotic resistance through the establishment of a Presidential Advisory Council run by Health and Human Services (HHS) in consultation with USDA and the Department of Defense. Furthermore, the White House released a National Action Plan to ultimately achieve (by the implementation date in the year 2020) the five goals laid out by the Administration. USDA’s Food Safety Inspection Service (FSIS), Agricultural Research Service (ARS) and Animal and Plant Health Inspection Service (APHIS) are working with FDA/CVM to collect better data to inform these goals. The industry continues to discuss what data should be collected with these Agencies and how it will be done. In March 2016, at their second public meeting, the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB) released their first report, which highlights their initial assessment of the National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB). This report included broad recommendations for each National Action Plan goal, including fully embracing a “One Health” approach, improving coordination and collaboration among federal agencies (possibly from the White House or Cabinet), developing partnerships among states, local agencies, tribes, private sector, commodity groups, philanthropic organizations, international governments, etc., and establishing research and economic incentives for developing and deploying new diagnostic, preventative, and therapeutic tools.

For the last two decades, the U.S. animal agriculture industry has been continually challenged with numerous attempts to ban the use of antibiotics in livestock and poultry. The current attempt at the federal level is with the 114th Congress’ Preservation of Antibiotics for Medical Treatment Act of 2015, introduced into both the House and Senate [H.R.1552; S.621], otherwise known as PAMTA 2015. The Senate version is titled S. 621 Preventing Antibiotics Resistance Act (PARA) and is “to amend the Federal Food, Drug, and Cosmetic Act to preserve the effectiveness of medically important antimicrobials used in the treatment of human and animal diseases.” The legislation would disallow use of medically important antimicrobials for nontherapeutic uses. The turkey industry opposes PAMTA, a bill that would devastate the ability to protect animal health by unnecessarily and inappropriately removing several classes of important antibiotics from the market. The turkey industry welcomes honest discussion of science-based, pragmatic options which preserve animal welfare while providing consumers’ assurance the use of these vital, safe, and effective medications is professional, judicious and does not jeopardize their effectiveness in human medicine.

One new issue that has arisen in the last year is a proposed rule by the Agricultural Marketing Service (AMS) to redefine the conditions in which poultry and livestock must be raised in order to be marketed under the USDA National Organic Program (NOP). The proposed changes require an increase in square footage per turkey (roughly double the industry average), an 80% increase in available outdoor space, and overall substantial increases in land and housing requirements to raise the same number of organic birds, resulting in an increased
environmental impact from the raising of organic turkeys. Aside from economic and environmental impacts, however, there is substantial concern that mortality for organic flocks will increase substantially as a result of these changes, due to increased exposure to weather, disease, pests, and predation. AMS estimates that mortality for layer chickens, for example, would increase as much as 60% (from 5% to 8%), and industry estimates for turkey mortality are even higher. Turkeys as young as four weeks of age would be required to have year-round access to the outdoors, exposing them to both extreme weather prior to maturity and full plumage, as well as to potential disease vectors prior to full vaccination. Feed conversion would also suffer as turkeys suffer added stress. There is also substantial concern that these requirements go against many of the lessons learned from the 2015 HPAI outbreak, and contradict guidance from APHIS and other agencies on how birds should be housed in the event of disease in a state, region, or flyway. The turkey industry has submitted comments on this proposed rule, and continues to work with the agency, the department, and other stakeholders to attempt to address concerns about the substantial negative impacts on turkey health and welfare that would result from this rule’s implementation.

In 2015, turkey production decreased to 7,038,065,000 from 7,217,006,000 pounds (live weight). Overall, domestic per capita consumption for turkey products increased from 15.80 in 2014 to 16.00 in 2015. The projected number for 2016 is 16.5 lbs turkey consumption per capita, which is the highest level since 2010. Live production in 2015 decreased to 233,100,000 head with an average live weight of 30.19 lbs. In 2014, 237,500,000 head were produced with an average live weight of 30.39 lbs. (Reference: National Turkey Federation Sourcebook, pending October 2016).
Table 1. Turkey health survey (August 2015 - 2016) of professionals in US turkey production ranking current disease issues (1= no issue to 5 = severe problem). n=21.

<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>
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<tr>
<td>Clostridiosis</td>
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<td>5</td>
</tr>
<tr>
<td>Clostridial Dermatitis (Cellulitis)</td>
<td>3.4</td>
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<tr>
<td>Ornithobacterium rhinotracheale (ORT)</td>
<td>3.2</td>
<td>5</td>
</tr>
<tr>
<td>Leg Problems</td>
<td>3.1</td>
<td>3</td>
</tr>
<tr>
<td>Salmonella</td>
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<td>3</td>
</tr>
<tr>
<td>Late Mortality</td>
<td>3.0</td>
<td>4</td>
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<tr>
<td>Bordetella avium</td>
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<td>3</td>
</tr>
<tr>
<td>Blackhead (Histomoniasis)</td>
<td>2.9</td>
<td>1</td>
</tr>
<tr>
<td>Avian Influenza</td>
<td>2.8</td>
<td>1</td>
</tr>
<tr>
<td>Cannibalism</td>
<td>2.8</td>
<td>2</td>
</tr>
<tr>
<td>Cholera</td>
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<td>2</td>
</tr>
<tr>
<td>Coccidiosis</td>
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<td>1</td>
</tr>
<tr>
<td>Poul Enteritis of unknown etiologies</td>
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<td>2</td>
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<td>Thyoid Dyschondroplasia (TDC, Osteochondrosis)</td>
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<td>Protozoal Enteritis (Flagellated)</td>
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<td>Heat stress</td>
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<td>Round Worms (Ascaris duodimilis)</td>
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<td>Breast Blisters and Breast Buttons</td>
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<td>Newcastle Disease Virus (NDV)</td>
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<tr>
<td>Fractures</td>
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<tr>
<td>H3N2 (H1N1) Swine Influenza</td>
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<tr>
<td>Necrotic enteritis</td>
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</tr>
<tr>
<td>Bleeders (aortic, hepatic ruptures)</td>
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<tr>
<td>TR-DFTR (Turkey Reovirus Digital Flexor Tendon Rupture)</td>
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<td>Shaky Leg Syndrome</td>
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<td>Mycoplasma gallisepticum (MG)</td>
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<td>PEMS (Poul Enteritis Mortality Syndrome)</td>
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<td>Mycoplasma iowae (MI)</td>
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<td>Mycoplasma meleagridis (MM)</td>
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Table 2. Turkey health survey (August 2015 - 2016) of professionals in US turkey production. *One respondent noted that their operation processed over 300 flocks with varying degrees of severity, but not included in the reporting of 2011 confirmed cases; Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR). N=21.

<table>
<thead>
<tr>
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<tbody>
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<td>Blackhead (Histomoniasis)</td>
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<td>61</td>
<td>52</td>
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<td>Mycoplasma synoviae (MS)</td>
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<td>Turkey Reovirus Digital Flexor Tendon Rupture</td>
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<td>146</td>
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<td>131</td>
<td>106*</td>
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<tr>
<td>Mycoplasma galispecticum (MG)</td>
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<td>45</td>
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Table 3. Turkey research priorities (August 2015 - 2016) of industry professionals in turkey production (1= low to 5 = high). n=20.

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<thead>
<tr>
<th>Issue</th>
<th>Score Average (1-5)</th>
<th>Score Mode (1-5)</th>
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<td>Disease</td>
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<tr>
<td>Welfare</td>
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<td>Food Safety</td>
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<td>Poultry Management</td>
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<td>Nutrition</td>
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<td>2.5</td>
<td>3</td>
</tr>
<tr>
<td>Waste Disposal</td>
<td>2.5</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4a. Percentage (%) of brooding (commercial; farm) production is all-in/all-out (single-age; brooder hub); average of respondents (n=18).

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>59.8</td>
</tr>
<tr>
<td>2008</td>
<td>39.3</td>
</tr>
</tbody>
</table>

Table 4b. Percentage (%) of finisher (grow-out; farm) production is tunnel ventilated; average of respondents (n=18).

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>30.3</td>
</tr>
<tr>
<td>2008</td>
<td>14.5</td>
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</tbody>
</table>
Upland Gamebird Report
Bill MacFarlane, MacFarlane Pheasants

Our industry is of course represented by the North American Gamebird Association, also known as NAGA. NAGA was founded 85 years ago, in 1931 to represent gamebird producers like myself, and gamebird hunt club businesses. I am a past president of the association, and currently serve on its executive board, and as chairman of the Health Committee.

The NAGA Health Committee was the tip of the spear for the association’s reaction to the highly-pathogenic avian influenza (HPAI) outbreak in 2015. Once the crisis became clear, our president at the time gave our committee wide latitude in shaping the reaction of the association. We quickly recruited a great panel of experts to serve alongside our industry members of the committee. Participants on this committee included Dr. Dale Lauer from the Minnesota Board of Animal Health, Dr. Eva Pendleton of Penn State University, Dr. David Frame of Utah State University, and Washington State University’s Dr. Rocio Crespo. From the
industry’s side, we had producers hailing from all parts of the country from New Mexico and California out west, to Wisconsin and Ohio in the Midwest, and Pennsylvania in the east.

Together, we produced timely updates to our industry about the outbreaks, and a series of educational pieces designed to improve our community’s awareness of the essential nature of sound biosecurity. Building on this awareness, we produced over a 4-month period a steady stream of materials to aid NAGA members in improving their biosecurity protocols. I am very proud of the work our committee produced during this crisis.

During the outbreak crisis itself, a new problem confronted our industry, one that threatened our very existence. That issue was the ability to ship gamebirds to customers. As state veterinarians and animal health departments scrambled to contain the disease where it occurred, and prevent its spread, rules governing shipping were hastily put into place that prevented businesses like mine from moving birds.

**Wisconsin Example:**

In 2015, there were several HPAI incidents in Wisconsin. Our ability to ship our pheasants was questioned, just because we were from Wisconsin. At the time of the outbreak, we were preparing to ship 800,000 pheasant hatching eggs to France and the U.K., and the immediate EU ban embargoed poultry from the entire state of Wisconsin. Domestically we continued to be able to ship our birds, but there were questions and additional health requirements from some States. Again, we were not in a control area, and obviously, we weren’t infected, but just because we were from Wisconsin brought additional scrutiny.

- 2015 HPAI outbreak in WI
- 10 cases
  - Jefferson
  - Chippewa
  - Barron
  - Juneau
- Upland gamebirds were not in Control Areas in 2015

**Ohio Example:**

Even as we were confronting this issue in Wisconsin, the state of Ohio, which had not experienced an outbreak, was implementing rules intended to prevent the
spread of the disease to the Buckeye state. Unfortunately, initial drafts of the emergency rule would have prevented the shipment of birds at the highest months of delivery, just prior to the fall hunting seasons.

In both cases, with some assistance from folks in this room, we were able to negotiate and work together to find solutions to enable us to move birds. But we learned a chilling lesson. If our industry hopes to continue in the event of the next outbreak, we will have to have done a better job to convince state and federal authorities and the commercial poultry industries of our efforts to prevent and stop the spread of avian influenza and other diseases.

**Secure Upland Gamebird Supply Taskforce**

At the recommendation of Dr. Fidelis Hegngi from the USDA’s Animal and Plant Health Inspection Service (APHIS), North American Gamebird Association (NAGA) formed a task force to help find a way to move birds in the event of an outbreak without spreading disease. Our first mission was to recruit a group of experts to advise those of us in the gamebird industry. Our process began with Dr. Andrew Rhorer of Global Poultry Improvement and Dr. Doug Anderson of the Georgia Poultry Laboratory, who helped us get off the ground. Soon after that we partnered with Dr. Carol Cardona, Dr. Dave Halvorson and Ms. Clara Brandt from the University of Minnesota who have taken the lead in our risk assessment discussions. Clemson University’s Dr. Julie Helm, along with Dr. Lauer and Dr. Pendleton round out our panel of experts on the task force. Without the help of all of these folks we’d be lost. We are grateful for the time they have put into this project.

Our group is called the Secure Upland Gamebird Supply Task Force. Our mission is to create a Secure Upland Gamebird Supply Plan. The plan will enable our industry to recognize the highest risk pathways for HPAI introductions, take steps to address those areas in order to mitigate risk, and implement biosecurity protocols for the industry. Like other segments of the poultry business, we hope that recognition of this work will provide a level of comfort to both state and federal agencies going forward.

**The Need for Secure Upland Gamebirds**

- Just like any other industry, gamebirds can’t be held indefinitely
- In 2015, in some cases the ability to move gamebirds was restricted even though the birds were not in a Control Area
- Recognized the need for a Secure Upland Gamebird Supply plan that would provide scientific guidance upon which these decisions could be based
Our expectation is not that we will be permitted to move live birds from an actual control zone during an outbreak. However, because we have experienced restricted shipping from a state where an outbreak occurred, we hope that our work toward this Supply Plan, and the actual finished product will go a long way toward assuring authorities to allow the movement of birds from unaffected areas, even in states where an outbreak has occurred, provided it does not originate from a control zone.

Dr. Rohrer described our mission succinctly in an article he recently wrote for Poultry Times. “The current plan is for the SSP to use science and risk based preparedness and response components to provide guidance on permitting the movement of upland gamebirds…” Dr. Rohrer continued, “Hopefully this plan will provide a high degree of confidence that the upland gamebird industry products that are moved into market channels will not contain HPAI virus.”

- Upland gamebirds released from a state with HPAI sounds risky but what is the real risk of spreading an outbreak?

- SGS will help us to understand risk, how to mitigate it and give us a place to start a conversation about movement

These folks on our task force are literally hand walking us through the risk assessment process from top to bottom in incredible detail. Our discussions have included our facilities, types of birds, our customers, our transportation delivery, bird crates, sanitation and much more. We are identifying the most likely pathways of infection. The worst-case scenarios for an infection to spread if not identified.

Like other poultry industries, our very survival depends on our ability to ship a perishable product in a timely fashion. Our hope from this process will be to
demonstrate the degree of risk, and the steps we take as an industry segment to mitigate against those risks.

Conclusion

The work of the task force goes farther than the essential stated purpose. It is also a large step for the gamebird business to demonstrate to the poultry business as a whole and the state and federal agencies that oversee them, that we take these issues as seriously as you do. Like the chicken, turkey, and egg businesses, we were on the edge of our seats throughout 2015, praying that our facilities would be spared from Hi-Path Avian Influenza (HPAI). While we were fortunate that our businesses were spared from infections across the country, we recognize it could have been different, and are diligently taking every step possible to prevent that occurrence, and to be ready to act quickly and in concert should the worst occur.

National Poultry Improvement Plan Report

Elena Behnke, USDA-APHIS-VS-NPIP


Pullorum-Typhoid Status: There were no isolations of Salmonella pullorum in commercial poultry in FY2012, FY2013, FY2014, FY2015 or FY2016. There were no isolations of Salmonella pullorum in backyard birds in FY2013, FY2014, FY2015, or FY2016. There have been no isolations of Salmonella gallinarum since 1987 in any type of poultry in the U.S. The U.S. Pullorum-Typhoid Clean participating hatcheries include: 248 egg and meat-type chicken hatcheries, 50 turkey hatcheries, and 665 waterfowl, exhibition poultry and game bird hatcheries.

U.S. Pullorum-Typhoid Clean Participating Breeding Flocks and Number of Birds are listed below:
- Egg-Type Chickens – 242 Flocks with 6,181,077 birds
- Meat-Type Chickens – 4,991 Flocks with 101,168,290 birds
- Turkeys – 374 Flocks with 3,734,002 birds
- Waterfowl, Exhibition Poultry, and Game Birds – 6,793 Flocks with 1,964,487 birds
- Meat-Type Waterfowl – 123 Flocks with 312,584 birds

Avian Influenza Status: In FY2016 (July 1, 2015-June 30, 2016), there were nine isolations of Low Pathogenicity Avian Influenza in commercial poultry in the U.S.: H5N1 isolated in a Missouri commercial turkey flock – April 26, 2016
Table 1: 2016 NPIP U.S. Avian Influenza Clean and U.S. H5/H7 Clean Participating Breeding Flocks; and U.S. H5/H7 Avian Influenza Monitored Participating Commercial Flocks:

<table>
<thead>
<tr>
<th>Subpart</th>
<th>Flocks</th>
<th>Birds</th>
<th>Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg-Type Chicken Breeders</td>
<td>240</td>
<td>6,107,329</td>
<td>21,039</td>
</tr>
<tr>
<td>Table-Egg Layers-Commercial</td>
<td>4,900</td>
<td>326,785,690</td>
<td>145,655</td>
</tr>
<tr>
<td>Chicken Breeders</td>
<td>8,825</td>
<td>130,046,071</td>
<td>402,103</td>
</tr>
<tr>
<td>Chickens-Commercial</td>
<td>75,314</td>
<td>9,947,594,447</td>
<td>2,151,364</td>
</tr>
<tr>
<td>Turkey Breeders</td>
<td>887</td>
<td>7,465,098</td>
<td>49,122</td>
</tr>
<tr>
<td>Turkeys-Commercial</td>
<td>15,272</td>
<td>101,671,715</td>
<td>163,413</td>
</tr>
<tr>
<td>Waterfowl, Upland Game birds, Ex. Poultry</td>
<td>3,553</td>
<td>1,569,703</td>
<td>70,199</td>
</tr>
<tr>
<td>Upland Game birds, Waterfowl, Raised for Release Upland Game birds, Raised for Release Waterfowl-Commercial</td>
<td>3,128</td>
<td>43,433,478</td>
<td>48,173</td>
</tr>
<tr>
<td>Total</td>
<td>112,119</td>
<td>10,564,673,531</td>
<td>3,051,068</td>
</tr>
</tbody>
</table>

NPIP Authorized Laboratories activities include collaboration with National Veterinary Services Laboratories (NVSL) to issue Group D and Salmonella serotyping check tests in September 2016. An AI serology panel for agar gel immuno diffusion (AGID) and enzyme-linked immunosorbent assay (ELISA) should become available in the winter of 2016-2017. NPIP is also working with the Poultry Diagnostic Research Center to distribute Mycoplasma serology and PCR check tests available in October 2016. Laboratory training provided to the authorized laboratories in FY2016 included a Mycoplasma Diagnostic Workshop in March, an Avian Influenza Diagnostic Workshop in April, and a Salmonella Isolation and Identification Workshop in May.

Compartmentalization: What Does it Mean?
Alberto Torres, Cobb-Vantress

For the purposes of the Compartmentalization for Primary Breeders Program in the USA, compartmentalization means fair movement of breeding stock (fair trade) for secure global food production.

For international trade, and particularly to the interests of trade policy-makers, the ideal scenario is to have supplying countries completely free of diseases of interest such as Avian Influenza (AI) (the case for the U.S. Compartmentalization Program). However, keeping a country free of AI can be a daunting task, given the epidemiology of this disease (e.g. not exclusive of poultry species, the virus can infect wild birds and even some mammal species, becoming vectors and carriers of the disease, broad range of production systems with a wide scope of biosecurity...
It takes only one incident in commercial poultry, and sometimes even a single finding in wild birds for the entire country to be the subject of sanctions by trading partners either for protectionist purposes or because of poor understanding of the epidemiology of the disease (e.g. risk of transmission via hatching eggs and day-old birds is considered as negligible.) For breeding stock of poultry, the situation takes an additional level of complexity because of the implications for domestic production of poultry products (broiler meat or turkey, and table eggs) in the importing country when long-ahead scheduled imports suddenly get banned.

The alternative for trade of breeding stock under circumstances of disease presence in an exporting country is through working with animal subpopulations free of disease. These animal subpopulations can be defined either by geography (e.g. distance and natural or artificial barriers) or by management practices specifically applied to that animal subpopulation. Here is where the concepts of Regionalization and Compartmentalization come into play.

Both concepts are often used interchangeably in conversations but they are not the same. Regionalization describes animal subpopulations free of disease, based on geographical separation. Compartmentalization, on the other hand, defines animal subpopulations based on management practices that allow an epidemiological separation from other animal populations, and ensuring to keep a compartment free of disease through the application and consistent execution of biosecurity practices across all compartment components, and with particular emphasis on critical points of risk of disease introduction.

While Regionalization permits the continuation of trade by regions proved to remain free of AI, it excludes animal subpopulations within affected regions even if these animal subpopulations remain free of disease. Compartmentalization goes further and deeper by looking at specific animal subpopulations under a management program based on biosecurity procedures that separates functionally and epidemiologically those animal subpopulations from others within the same region, even in the presence of disease outbreaks.

For Compartmentalization to work, the private sector (i.e. the primary breeders) and the veterinary services authority (i.e. APHIS-VS, National Poultry Improvement Plan (NPIP)) need to work in partnership to develop a specific program to tackle the disease of concern (e.g. AI). At the same time, the veterinary authorities of the exporting countries need to work at building reciprocal trust and confidence with their counterparts in the importing countries in order for the latter to accept and recognize Compartments in the exporting countries. It also makes sense for those efforts to take place in times where there is no presence of disease rather than during an active outbreak.

Besides trust, recognition of a necessity or dependence [for breeding stock] is also a factor that can favor acceptance of Compartments. Primary breeders of poultry are only a handful of companies with global dominance in the supply of breeding stock of poultry. Their production facilities are also present in only a handful of countries. It makes sense thus to focus efforts by government authorities to initiate talks aiming at mutual recognition of primary breeding Compartments along with those countries which have recognized their dependence on a continued
supply of breeding stock for uninterrupted domestic food production. Other nations less amicable to trust or reluctant to accept dependence, are less likely to engage in conversations about allowing trade to continue in the event of disease outbreaks, based on Compartment status, but might be more likely to be persuaded to accept Compartmentalization after seeing examples from early adopters of this concept.

Thus, Compartmentalization means fair trade for breeding stock of poultry as noted at the top of this page, but it also means the following:

- It is tailored to specific disease (a developed program cannot be applied to all diseases, and certainly other animal species and expected to function fully effectively). In our case in the USA, it is applied to Avian Influenza
- It is based on the principle of maintaining animal subpopulations under epidemiological separation from other subpopulations of different health status, and with a strong traceability system (auditable)
- High standards of consistently well executed biosecurity practices addressing critical points of risk for disease introduction to compartment components
- A negligible risk of spreading AI through movement of breeding stock from premises under Compartmentalization Program
- It implies a partnership between company and veterinary authority with respective responsibilities
- It represents an opportunity for countries dependent of breeding stock to secure continuous supply in the event of disease outbreak in the supplying.

While this concept offers a sound risk-based approach to keep animal subpopulations disease-free, its execution has to be flawless (i.e. moving product free of AI). It would take only one failed movement of breeding stock from a compartment to deem the whole concept as a failure with very grim prospects for expansion onto more countries and to other poultry products and even other animal species (as it is expected after successful stories of its implementation.) We have only one shot at this concept. Compartmentalization may be a silver bullet for fair trade of breeding stock in regions with disease presence, but it is highly vulnerable to tainted experiences and thus it has to be executed just right, every single time. The primary breeding sector is the ideal candidate to take this task of bringing Compartmentalization to a successful implementation.

Avian Disease and Oncology Laboratory (ADOL) Research Update
John Dunn, USDA-ARS-ADOL

Employing Genomics, Epigenetics, and Immunogenetics to Control Diseases Induced by Avian Tumor Viruses: Improved genetic map to aid genome assembly and biological studies. Molecular genetics for chicken is hampered by not having a complete genome assembly, e.g., 8 of the 38 chicken autosomes lack any sequence information. To help resolve this limitation, Agricultural Research Service (ARS) scientists at East Lansing, MI, in collaboration with investigators at Washington University School of Medicine in St. Louis, MO, identified sequence contigs that were not found in the latest chicken genome assembly and placed them on the genetic map, which allowed for the identification of 29 new linkage
groups. This improved genetic map will help scientists complete the genome assembly as well as identify specific genes and pathways that control agronomically important traits such as growth, reproduction, health, and well-being. As chicken is the primary meat consumed, this will benefit consumers and society by reducing the amount of feed and waste produced, and increasing health and well-being of reared birds.

The association of CD8 and cecal microbiome with Marek’s disease genetic resistance. Marek’s disease (MD) is an important neoplastic disease of chickens caused by Marek’s disease virus (MDV), an oncogenic alphaherpesvirus. In a recent study using two chicken lines, one resistant (line 6) and another susceptible (line 7) to MD, ADOL scientists profiled splenic T cells and the cecal microbiome in both uninfected and MDV-infected birds to gain a better understanding of the primary differences associated with MD phenotype in these lines. They found that the percent of splenic CD4⁺ T cells were similar regardless of MDV challenge status in both resistant and susceptible birds. In contrast, CD8αα profiles were different (P < 0.005) between the chicken lines under mock control and MDV challenge, suggesting that CD8αα T cells play a key role in mediating MDV infection. Genera level analysis of the microbiome composition showed differences between lines in both control and MDV challenged treatments (P < 0.05) in both chicken lines, suggesting that MDV affects cecal microbial community structure during the course of infection. Furthermore, community metabolic profiles profile due to MDV infection relates to changes in functional metabolic profile in the birds. These results provide insights into the immune response and the potential interplay with the microbiome during infection with an oncogenic virus.

Identifying driver mutations for Marek’s disease. MDV is a highly oncogenic virus in susceptible chickens as lymphomas, characteristic of MD, are induced as early as 2-4 weeks after infection. Unlike other herpesviruses, MDV integrates into the chicken genome and encodes an oncoprotein, known as Meq, a bZIP transcription factor that homodimerizes or heterodimerizes preferably with c-Jun. However, as all MDV-infected chicken do not develop gross tumors and most tumors are clonal, it is likely that somatic driver mutations are required for transformation. To identify potential driver mutations, ~200 line 6 x 7 F₁ progeny were challenged with MDV by ADOL scientists, which produced 72 tumor samples. All samples were genotyped with a 15K single nucleotide polymorphisms (SNP) array to screen mainly for copy number variants (CNV) and loss of heterozygosity (LOH). Twenty-two samples that were the most homogeneous had both their deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) sequenced. To aid in the screens, even though lines 6 and 7 are highly inbred, germline and CD4 T cells also had their DNA and RNAs sequenced. After establishing computational pipelines, preliminary results indicate there are ~0.6 SNPs per Mb, which is similar to juvenile cancers in human, though this varies greatly depending on the algorithm used. Commonly called SNPs give a relatively small list of candidate genes. Similar results have been obtained based on screens to find structural variations.

Identification of genes that confer resistance to Marek’s disease. A comprehensive or genome-wide association study using SNP DNA markers was performed using specific chickens that were vaccinated and then challenged with
very virulent MDV. Preliminary analyses resulted in the identification of genes that are highly associated with disease incidence in this vaccinated flock of chickens. The significance is these DNA markers or genes can be used to predict vaccine protective efficiency against the tumors rather than disease resistance itself alone, and may provide new strategies in vaccination practice to choose specific vaccines for specific genetic lines of chickens, such that the best possible protective efficiency could be achieved. Genetic and Biological Determinants of Avian Tumor Virus Pathogenicity, Transmission, and Evolution:

**Characterization of Marek’s disease virus (MDV) field strains.** It has been over 20 years since a comprehensive set of Marek’s disease virus (MDV) field strains have been solicited from poultry companies for pathotyping. ARS researchers in East Lansing, Michigan pathotyped virus isolates from farms currently experiencing MD outbreaks in the USA, but found that virulence did not exceed previously archived isolates. This suggests that current management and vaccine practices may have slowed the evolution of MDV, or that Rispens vaccine protects by a different mechanism than serotype 2 and 3 MD vaccines, which may slow the rate of MDV evolution. To investigate whether sequence variants in the MDV genome could be correlated with virulence, they also sequenced 32 selected regions in the MDV genome using 70 archived MDV isolates of known pathotype ranging from low to highly virulent collected over 53 years. Several DNA base changes were detected that segregated with low or high virulence. Phylogenetic trees based on the variant sequence alignments show that isolates tended to cluster together by geography, including isolates from the same farm regardless of whether they were collected at the same time or years apart. These results demonstrate the ease with which viruses can persist and spread between flocks and the difficulty in eradicating the virus from a farm.

**Novel attenuation strategy for Marek’s disease virus.** All species studied to date demonstrate a preference for certain codons over other synonymous codons (codon bias), a preference which is also observed for pairs of codons (di-codon bias). Previous studies using poliovirus and influenza virus as models have demonstrated the ability to cause attenuation by replacing frequently used di-codons with infrequently used synonymous di-codons. ARS Researchers in East Lansing, MI analyzed di-codon usage in the 18,742 referenced chicken genes and 86 protein-coding genes in the Md5 strain of Marek’s disease virus (MDV) and found a clear bias for preferential use of some di-codons and rare utilization of other di-codons. They have replaced commonly used di-codons with synonymous uncommonly used di-codons for the MDV genes UL19 (major capsid protein), UL27 (glycoprotein B), UL53 (glycoprotein K), and UL54 (ICP27), a transactivator of immediate early genes. Although no effect was seen with mutations introduced in UL19 and UL53, mutations in UL27 and UL54 each led to reduced pathogenicity including a pronounced decrease in tumors and increased survivability compared to the control. These results demonstrate that altering the di-codon bias of select herpesvirus genes can affect the pathogenicity of the virus and may provide a novel method for MDV vaccine attenuation.
The effect of probiotics on Marek’s disease vaccination. There is growing interest in probiotic and fermentation products as alternatives to antibiotics as growth promoters, or to inhibit pathogens such as Salmonella. ARS Researchers in East Lansing, Michigan tested two commercially available products for the purpose of evaluating potential interference with Marek’s disease (MD) vaccines when administered in ovo, as well as to see if the products were beneficial to MD protection. The first product, from Company A, was a live lactic acid bacteria probiotic. The second product, from Company B, was a yeast (Saccharomyces cerevisiae) fermentation product. Three trials were conducted with birds that were vaccinated with HVT, treated with probiotic or fermentation product (administered in ovo or in feed), and challenged with various MDV strains. The first two trials resulted in low incidence of MD in HVT-vaccinated groups with and without both products, demonstrating there was no interference with the MD vaccine. The third trial, using more virulent challenge strains, resulted in higher incidence of MD in all HVT-vaccinated groups. Across all three trials, MD incidence was slightly lower in vaccinated birds given the probiotic or fermentation products when challenged with the two lower virulent strains, although differences were not statistically significant. These studies demonstrate that probiotic and fermentation products may have value in MD protection when faced with lower virulent MDV strains.

Global gene expression profiling in the feather follicle epithelium (FFE) of MDV-infected chickens. A comprehensive gene expression profiling between the FFE of MDV-infected and control chickens of a highly-inbred MD-susceptible chicken line was conducted via next generation RNA sequencing. ARS researchers in East Lansing, Michigan identified 923 up- and 409 down-regulated genes in the skin of MDV-infected chickens when compared with uninfected controls. Analysis of the up-regulated genes resulted in the identification of multiple gene ontology categories, with most falling under the host immune response. Searching these immune related gene ontology categories, six genes were identified (gga-let-7d, IL22RA2, TNFRSF21, Pstpip2, SOCS1 and SOCS3) with known immunosuppressive activities. Additionally, many MDV genes were significantly up-regulated in the skin of infected chickens. Identification and characterization of these genes with high transcriptional activities in the skin of virus-infected chickens could lead to the development of new recombinant vaccines to block the replication and shedding of MDV. This study will be the base for the development of specific recombinant vaccine to block the production and dissemination of such virus particles into the environment.

Role of innate immune system in vaccine-induced protection. Although MD vaccines have been in use for several decades, the exact mechanism of vaccine-induced protection is unknown. It is believed that the innate immune system plays a role in vaccine-induced immunity against pathogenic strains of MDV. To shed light on the possible role of the innate immunity on vaccine-mediated protection, ARS researchers in East Lansing, Michigan investigated the effect of vaccination (Rispens/CVI988) on the activation of cellular components of the innate immune system (NK cells and macrophages) by analyzing the expression pattern of a select immune related genes in the spleen, cecal tonsils and duodenum of two MD-susceptible and resistant chicken lines. The differential expression patterns of the
tested genes revealed the activation of the innate immune system in the susceptible lines. The activation of the innate immune system in the resistant line was minimal in comparison to the susceptible line. Immunohistochemistry analysis showed no increase in the number of CD3+ T cells in the vaccinated birds of either line, suggesting the lack of activation of adaptive immune system. There was, however, an increase in the macrophage populations in the vaccinated birds of the susceptible line. Results of this study will be used for development of effective vaccines by immunomodulation of cellular components of the innate immune system.

**SEPRL Endemic Poultry Viral Diseases Update**

J. Michael Day, USDA-ARS, National Poultry Research Center, Southeast Poultry Research Laboratory (SEPRL)

Enteric viral diseases of poultry are responsible for substantial economic losses to the poultry industry in the United States and abroad. To discover novel vaccine platforms and vaccination strategies for control of enteric diseases, project scientists are developing tissue tropic multivalent vaccine vectors using Newcastle disease virus (NDV) vaccine strains. A systematic evaluation of the NDV vaccine vectors has demonstrated that the noncoding region between the P and M genes and the non-coding region after the N gene are the optimal insertion sites for foreign gene expression. Infectious clones containing reporter genes in the optimal insertion sites have been constructed. The recombinant viruses rescued from these infectious clones are currently being characterized in cell culture and animals for safety, stability, and suitability as multivalent vaccine vectors. Turkey enteric coronavirus (TCoV) causes clinical enteric disease in turkeys, causing economic losses to the turkey industry in the U.S. TCoV does not readily grow in tissue culture, which hampers conventional vaccine development. To overcome the barrier of vaccine development, project scientists are developing a novel approach using an enterotropic Newcastle disease virus (NDV) vaccine as a vector. TCoV spike glycoprotein (S) subunit 1 (S1) and subunit 2 (S2) have been cloned into the enteric NDV vaccine vector. The rescued NDV/TCoV recombinant viruses are being evaluated in cell culture and animals for the safety and stability as vaccine candidates.

Viral infections of the avian gastrointestinal tract negatively impact poultry production; however, determining the complex etiologies of the viral enteric diseases in poultry has been difficult. Project scientists are continuing to investigate the species specificity, molecular phylogenetics, and pathogenesis of novel viruses initially discovered in the poultry gut using a metagenomic approach (Day and Zsak 2016). These investigations have been facilitated by enteric virus molecular diagnostic assays, designed and validated by project scientists, specifically targeting novel circulating strains of the enteric poultry picornaviruses, small viruses that appear to be associated with enteric disease and in poultry. Our recent investigations, focusing on the avian enteric picornaviruses in the United States, coupled with ongoing investigations in Europe and Asia have revealed that these viruses are common, non-transient constituents of the poultry gut that may contribute to performance problems during poultry production (Boros et al. 2016).
In this study, all currently known chicken picornaviruses including a novel one (chicken phacovirus 1) were identified by viral metagenomic and RT-PCR methods from a single sample of a diarrheic chicken in Hungary suffering from an infection with a total of eight picornaviruses. Hungarian collaborators determined the complete genomes of six of the eight picornaviruses and analyzed them in detail, including genomic and phylogenetic analyses and secondary RNA structural modeling of 5'/3' UTRs. The identified picornaviruses belong to genera Sicinivirus (first complete genome), Gallivirus, Tremovirus, Avisivirus, “Orivirus” (two potential genotypes) and “Phacovirus” which is a novel proposed genus. As a result, similar sequences were discovered in the online enteric metagenomic public databases deposited and analyzed by our laboratory at USDA-ARS-SEPRL. As a result, we also detected the novel phacoviruses in multiple samples of chickens from USA (multiple regions in Arkansas). Phylogenetic analyses of these novel phacoviruses from turkeys and chickens continues. The newly expanded Picornaviridae Family of viruses now contains 29 recognized genera, by far the largest Family within the larger Picornavirales Order.

The avian alphaherpesviruses, Marek’s disease virus type I and infectious laryngotracheitis virus are responsible for substantial economic losses to the poultry industry worldwide. To discover novel vaccine platforms, we have embarked on two strategies to generate bivalent vaccines against both infectious laryngotracheitis virus (ILTV) and Newcastle disease virus (NDV). The first stratagem involved the generation of NDV recombinants expressing either glycoprotein B (gB) or glycoprotein D (gD) of ILTV (Zhao et al. 2016). In previous years, we have demonstrated that these vaccine candidates are protective against both virulent NDV and ILTV challenges. In 2016, we have demonstrated that these vaccine candidates are also protective in the presence of maternal antibodies to both NDV and ILTV. Since vectored NDV constructs cannot be delivered in ovo, we have developed a plan for a “prime boost” vaccination strategy involving an attenuated ILTV strain expressing the major antigens (F and HN) of NDV. In the strategy, eggs will be vaccinated using the ILTV recombinants and at two weeks’ post hatch, the chicks would be “boosted” with the NDV recombinants via drinking water or spray. To this end, two ILTV loci were chosen for insertion of the NDV genes. These loci are open reading frame (ORF) C and glycoprotein G (gG), both of which have been shown to encode virulence factors. In order to insert these genes into the ILTV genome, donor plasmids containing with ORF C or gG flanking sequences were constructed. These sequences will allow for homologous recombination within the ILTV gene. Between the two-flanking sequence we inserted gene “cassettes” containing the genes encoding the NDV antigens and a marker gene (green fluorescent protein). To ensure maximal expression the genes encoding NDV antigens were optimize for codon usage. In a series of transfection experiments we demonstrated that cells fluorescing green expressed the NDV antigens using an indirect immunofluorescence assay.

To rescue the genes encoding NDV antigens within the ILTV genome, two approaches were tried. The first involved the construct of yeast artificial chromosomes containing whole ILTV genomes or overlapping fragment. We have identified a number of yeast recombinants containing ILTV sequences as verified
using polymerase chain reaction (PCR) mediated techniques and are in the process of determining their nucleotide sequences. The second approach involves classic marker rescue experiments in which donor plasmid and deoxyribonucleic acid (DNA) purified from ILT virions are co-transfected into avian cells and recombinant viruses extensively plaque purified. To this end, we have isolate genomic ILTV DNA from gradient purified ILT virions, characterized them using restriction endonuclease analysis and plan to begin the marker rescue experiment in the first quarter of 2017.

Thermostable Newcastle disease virus (NDV) vaccines have been used widely to protect village chickens against Newcastle disease (ND) for decades. However, the genetic basis underlying the NDV thermostability is poorly understood. Project scientists generated chimeric viruses by exchanging viral genes between the thermostable TS09-C strain and thermolabile LaSota strain using reverse genetics technology. Evaluations of these chimeric NDVs demonstrated that the HN protein of NDV is a crucial determinant of thermostability, and the HN gene from a thermostable NDV could be engineered into a thermolabile NDV vaccine strain for developing a novel NDV vaccine which will improve vaccine thermostability and protection efficacy (Wen et al. 2016).

U.S. National Poultry Research Center
David Swayne, USDA-ARS, Southeast Poultry Research Laboratory (SEPRL)

Dr. Swayne reported on the merger of USDA laboratories and research centers within the newly reorganized U.S. National Poultry Research Center.

NVSL AVIAN INFLUENZA and NEWCASTLE DISEASE ACTIVITIES REPORT
Mia Kim Torchetti, USDA-APHIS-VS-NVSL

The National Veterinary Services Laboratories (NVSL) in Ames, Iowa, in coordination with the National Animal Health Laboratory Network (NAHLN), receive avian samples for detection of reportable avian diseases such as avian influenza (AI) and Newcastle disease (ND) caused by virulent avian paramyxovirus serotype-1 viruses [APMV-1]). Samples from National Poultry Improvement Plan (NPIP) and Live Bird Market (LBM-BYD) surveillance programs, foreign animal disease (FAD) investigations, import and export activities, wild bird surveillance, and other diagnostics are tested. While majority of the samples are received for confirmation testing, first line testing is also conducted, as well as diagnostic support to other countries as a World Organization for Animal Health (OIE), Food and Agriculture Organization (FAO) Reference Laboratory for AI and ND. The 2016 report format has been updated and data are compiled by calendar year unless otherwise noted.

Highlights: Highly pathogenic (HPAI) Eurasian lineage H5 2.3.4.4 influenza viruses caused the largest animal health emergency in the U.S. from late December 2014 to June 2015. Since the last detection on June 16, 2015, the influenza A viruses (IAV) identified from poultry through October 2016 arise from North American lineage IAV of low pathogenicity (LPAI) with no evidence of the Eurasian H5 lineage gene segments. For wild birds, there have been two Eurasian
H5 PCR detections in mallards (UT, OR),\(^1\) and in August 2016 the Eurasian/North American reassortant H5N2 HPAI virus was identified in a single wild mallard sampled near Fairbanks, AK during a bird banding effort.\(^2\) This detection suggests low level persistence of the Eurasian H5 lineage in North America and the potential for re-dissemination of the virus during the 2016 fall migration. There have been no detections of virulent Newcastle disease viruses (vNDV) in U.S. poultry; however, vNDV was identified as the cause of morbidity and mortality in wild cormorants in IL, MN, and WI. First reported in the U.S. in 1992 and last reported in Oregon during 2013, this species-associated virus lineage represents a potential risk to poultry and caused an outbreak in turkeys from Minnesota in 2008.

**Assay Updates:** Real-time RT-PCR (rRT-PCR) specific for Type A influenza (IAV) targeting the matrix gene is the primary molecular surveillance tool used across the National Animal Health Laboratory Network (NAHLN) in the U.S. An update to this assay was deployed in 2016 to improve detection of the H1N1pdm09 lineage matrix gene, now found in many swine lineage viruses isolated from turkeys. The NAHLN EA/AM H5 and H7 2014 subtyping assays are designed to allow rapid identification of viruses reportable in poultry; these tests do not distinguish virus pathogenicity (LPAI vs HPAI) nor geographic lineage of the virus, and are typically applied after detection with the Type A-specific test [NOTE – while the subtype assays allow prioritization of wild bird samples, sequencing tools are the most reliable for determining virus subtype(s) in reservoir species where virus diversity is high]. Testing is conducted by NAHLN laboratories and non-negative samples are forwarded to NVSL where determination of the HA and NA subtype and pathotype for H5 or H7 detections in poultry are expedited using sequencing methods directly from the sample where sufficient viral ribonucleic acid (RNA) is present. When using IAV serology or antigen capture immunassays as surveillance tools, collect swabs for PCR testing following any non-negative result to determine the virus status of the flock. Serology is a useful surveillance tool in longer lived birds; however, if vaccination for H1/H3 swine lineage viruses is used antigen detection methods such as PCR are recommended to address surveillance needs.

**Import and Export Testing:** Import testing for the U.S. is conducted by virus isolation and the majority of the samples received are from pet birds such as passerines and psittacines. Export testing is performed according to the requirements of the receiving country and samples from a variety of species are tested. All import and export samples tested in 2016 (Figure 1) were negative for AI and vNDV; APMV-2 was detected in six accessions.

**Live Bird Marketing System (LBMS), Upland Game, Backyard Birds and Exhibition Birds:** The Uniform Standards for testing in the live bird marketing system were implemented as a State-Federal-Industry cooperative program in 2004 for the prevention and control of H5 and H7. Testing is conducted by approved laboratories at the state level and non-negative samples are forwarded to NVSL for confirmation. For 2016, NVSL received 1664 specimens (Figure 1) from

32 states (CA, CT, FL, GA, ID, IN, KS, KY, MA, MD, ME, MN, MO, NC, NH, NJ, NY, PA, RI, TN, TX, VA). For H5/H7 events, H5N2 LPAI of North American lineage (based upon sequence) was detected in live bird markets in NJ, NY, and PA; the event was traced to a source flock that supplied a single distributor in New York. An H2N2 virus first detected in late 2014 continues to circulate in northeastern LBMs (Table 2), and at least one market was positive for the H5N2 LPAI and H2N2 concurrently. While the H5N2 LPAI was predominantly isolated from the source Muscovy duck flock, the potential impact of a reassortment event is greater where a more poultry-adapted virus, such as this H2N2 (Figure 2), is circulating at the same time. Also, H1N1 (avian lineage) was detected from ducks in New Jersey and Pennsylvania. For antibody detections in 2016, H7N3 antibody was detected in a Massachusetts backyard flock, and H9N2 antibody in Iowa game pheasants; both premises tested negative for virus. Vaccine and wild bird lineage APMV-1 viruses of low virulence (n=66) were isolated from environmental, poultry, and domestic waterfowl samples in 12 states (AL, CT, FL, MA, MD, MI, NE, NJ, NY, PA, RI, SC). Pathogenicity and lineage were determined by the intracerebral pathogenicity index (ICPI) test and/or by analysis of the deduced amino acid profile at the fusion protein cleavage site. Pigeon paramyxovirus serotype-1 (PPMV-1: species-adapted APMV-1 variant) was identified in four states (CA, DE, MN, RI) from show, racing, and rock pigeons.

**Commercial Poultry:** Surveillance for AI in commercial poultry is described under provisions of the National H5 and H7 LPAI Control Program which was implemented in September 2006. Testing is conducted by approved laboratories at the state level and non-negative samples are forwarded to NVSL for confirmation. For 2016, NVSL received 1,670 specimens (Figure 1) from 19 states (AL, AR, CA, DE, IA, IL, IN, KY, MD, MI, MN, MO, NC, NE, NH, PA, SD, VA, WI). There were two H5/H7 events in commercial during 2016 caused by North American lineage viruses infecting turkeys (Table 1): January 2016 H7N8 LPAI (8 premises) and HPAI (1 premises) in Indiana turkeys – molecular and epidemiologic data suggest a single introduction with limited lateral spread, and mutation to HPAI in a single flock likely affected during lateral spread; April 2016 H5N1 LPAI in Missouri turkeys representing a single introduction with no further spread. Swine lineage IAV H1/H3 was isolated from in turkeys in seven states (Table 3; IL, IN, MI, MN, MO, NC, SD); H1N1pdm09 was detected in four states (IN, MI, MN, MO).

**Wild Bird Surveillance Efforts:** NAHLN laboratories participating in the wild bird surveillance testing forward only H5/H7 detections to NVSL as they are tested; non-H5/H7 IAV samples are forwarded to the NAHLN laboratory at Colorado State University for the Wildlife Services repository. Other wild bird efforts such as routine mortality event testing, other research projects, and characterization of archived H5/H7 viruses submitted by independent researchers was conducted. For 2016, 837 samples were received from all efforts. Of these, virus was recovered and/or characterized from samples in 43 states representing subtypes: H1-12 & 16 (Figures 3). Since June 2015, there have been two Eurasian H5 PCR detections (PCR positive for two different gene targets; no virus recovered, no sequence obtained) in mallards (UT, OR), and in August 2016 the Eurasian/North American reassortant H5N2 HPAI virus was identified in a single wild mallard sampled near
Fairbanks, AK during a bird banding effort. This detection suggests low level persistence of the Eurasian H5 lineage in North America and the potential for re-dissemination of the virus during the 2016 fall migration. Additionally, PPMV-1 was detected in Eurasian collared doves in California and Wyoming, and vNDV was identified as the cause of morbidity and mortality in wild cormorants in IL, MN, and WI.

Proficiency Test Panels: For FY2016 (1 Oct-30 Sept), a total of 76 laboratories from 35 states passed with a score of 90% or better. The NAHLN laboratories conducting surveillance testing for AI and/or ND are required to have one or more diagnosticians pass an annual PT to perform official rRT-PCR testing. In FY2016, AI (Type A/H5/H7) PTs were distributed for 325 diagnosticians in 58 laboratories and for 275 diagnosticians in 56 laboratories for APMV-1 (Newcastle disease) rRT-PCR.

AI Diagnostic Reagents Supplied by the NVSL: The following reagents were distributed for rRT-PCR testing and support of NPIP and LBM surveillance during FY2016 (1 Oct-30 Sept):

- **AGID Diagnostic Reagents:**
  - 9,104 units of AGID reagents (antigen and enhancement serum) were shipped to state, university, and private laboratories in 35 states sufficient for approximately 1,092,480 AGID tests
  - An additional 761 units (91,320 tests) were shipped to 11 countries

- **AIV rRT-PCR Controls:**
  - 228 vials of positive amplification control (M, H5 & H7) 30 states; 19 internationally to 4 countries
  - 457 vials of positive extraction control 38 states; 1 internationally to 1 country
  - 554 vials of negative extraction control 39 states; 1 internationally to 1 country

- **APMV-1 Diagnostic Reagents:**
  - LaSota Antigen (inactivated); 102 vials (2 ml) to 8 national and 30 vials to 4 international labs
  - APMV-1 Antiserum; 13 vials (2 ml) to 6 national and 44 vials to 5 international labs

- **APMV-1 rRT-PCR Controls**
  - 42 vials of positive amplification control to 23 states; 2 vials internationally (1 country)
  - 109 vials of positive extraction control to 26 states
Figure 1. Samples received for PCR/VI testing at NVSL by sector and calendar year.

* Increased samples received during 2015 during the Eurasian H5 HPAI outbreak

Table 1. H5/H7 events by sector and calendar year; *NOTE two events from October 2015 not previously listed on the 2015 USAHA report are included for completeness.*

<table>
<thead>
<tr>
<th>Sector</th>
<th>Year</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN (turkey)</td>
<td>2016</td>
<td>H7N8 HP/LP</td>
</tr>
<tr>
<td>MO (turkey)</td>
<td>2016</td>
<td>H5N1 LPAI</td>
</tr>
<tr>
<td>LBM-BYD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA (LBM)</td>
<td>2015</td>
<td>H7N7 LPAI</td>
</tr>
<tr>
<td>MI (BYD mixed)</td>
<td>2015</td>
<td>H5N2 LPAI</td>
</tr>
<tr>
<td>NJ, NY, PA</td>
<td>2016</td>
<td>H5N2 LPAI</td>
</tr>
</tbody>
</table>

*a Sequence only, no virus recovered*

Table 2. H2N2 detections in northeastern LBM-BYD by calendar year and state.

<table>
<thead>
<tr>
<th>LBM H2N2</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>MA</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>NJ</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>NY</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>PA</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>RI</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Figure 2. H2N2 detection in northeastern LBM-BYD by species/sample type and calendar year.

Table 3. Swine lineage H1/H3 isolations in turkeys by calendar year and subtype; H1N1pdm09 detected in IN, MI, MN, MO.

<table>
<thead>
<tr>
<th>Turkey IAV(sw)</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>H1, H3</td>
<td></td>
</tr>
<tr>
<td>IL</td>
<td>H3</td>
<td>H3</td>
</tr>
<tr>
<td>IN</td>
<td>H3</td>
<td>H1*, H3</td>
</tr>
<tr>
<td>MI</td>
<td>H1*</td>
<td></td>
</tr>
<tr>
<td>MN</td>
<td>H1</td>
<td>H1*, H3</td>
</tr>
<tr>
<td>MO</td>
<td></td>
<td>H1*</td>
</tr>
<tr>
<td>NC</td>
<td>H1</td>
<td>H3</td>
</tr>
<tr>
<td>SD</td>
<td>H1, H3*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>H1N1pdm09</td>
</tr>
</tbody>
</table>
**Figure 3.** IAV subtypes from wild bird samples tested in calendar years 2015-2016; NOTE: collection date may be earlier than date of testing/characterization; ~85% of the of H7s in 2015 represent samples collected from the same species at the same site during a 2-week period.

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**NVSL *Salmonella, Mycoplasma and Pasteurella* Diagnostics**

Brenda Morningstar-Shaw, USDA-NVSL-Diagnostic Bacteriology Laboratory

*Salmonella* serotyping

The Diagnostic Bacteriology Laboratory within the National Veterinary Services Laboratories (NVSL) routinely serotypes *Salmonella* isolates submitted by private, state, and federal laboratories as well as veterinarians, researchers and other animal health officials. This report summarizes *Salmonella* serotyping submissions to the NVSL from January 1 through December 31, 2015 originating from poultry. *Salmonella* isolates are identified as clinical (clinical signs of salmonellosis from primary or secondary infection) or non-clinical (herd and flock monitoring programs, environmental sources, food). Serotyping data from isolates submitted for research purposes are not included in the summary.

*Salmonella* serotyping at the NVSL is an ISO 17025 accredited test. Salmonellae are typed using polyvalent and single factor antisera to determine the O and H antigens. Approximately 60% of the sera used at the NVSL are produced in house as previously described (Ewing, 1986). The remaining antisera are
purchased from commercial vendors. All sera are subject to extensive quality control testing prior to use. *Salmonella* antigenic formulae are determined as previously described (Ewing, 1986) and interpreted via the White-Kauffmann-Le Minor scheme (Grimont, 2007). The subspecies designation precedes the antigenic formula for those serotypes other than subspecies I.

From January 1 to December 31, 2015, 13,880 isolates were received for *Salmonella* serotyping. Of those, 4,593 isolates were from chicken sources and 943 isolates were from turkey sources. The most common isolates from chickens and turkeys are listed in Tables 1 and 2 respectively.

The NVSL provided a *Salmonella* Group D proficiency test to assess the ability of laboratories to isolate *Salmonella* from environmental samples and determine the serogroup (specifically group D) of any *Salmonella* isolated. The test consisted of ten lyophilized cultures containing various combinations of *Salmonella* and common contaminants that simulated an environmental swab. The 2015 test included *Salmonella* serotypes Enteritidis, Berta, Anatum, Oranienburg, and Heidelberg. Contaminant bacteria included *Enterobacter cloacae, Citrobacter sedlakii, Citrobacter amalonaticus, Citrobacter freundii, Klebsiella pneumoniae, Pseudomonas aeruginosa*, and *Providencia rettgeri*. Laboratories were instructed to test the samples according to the procedures used in their laboratories. The NVSL randomly retained 13% of the test kits and tested them blindly for quality assurance (QA) purposes. The results of the proficiency test are shown in Table 3.

Additionally, the NVSL offered a *Salmonella* serotyping proficiency test to allow laboratories to assess their ability to serogroup or serotype *Salmonella*. The panel consisted of ten pure *Salmonella* isolates, including *Salmonella* serotypes Herston, Panama, Lome, Duisburg, Eko, Wippra/Molade, Dublin, Hato, Coeln, and Enteritidis. Participants were given the option to perform serogrouping, partial serotyping, or full serotyping of the isolates and were graded based on appropriate identification to the level of typing they performed. The NVSL randomly retained 15% of the test kits and tested them blindly for QA purposes. The results of the proficiency test are shown in Table 4.

### Table 1: Most common serotypes in 2015: Chicken

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enteritidis</td>
<td>164</td>
<td>Senftenberg</td>
<td>709</td>
</tr>
<tr>
<td>Kentucky</td>
<td>48</td>
<td>Kentucky</td>
<td>525</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>22</td>
<td>Enteritidis</td>
<td>349</td>
</tr>
<tr>
<td>Braenderup</td>
<td>11</td>
<td>Worthington</td>
<td>340</td>
</tr>
<tr>
<td>Heidelberg</td>
<td>10</td>
<td>Montevideo</td>
<td>340</td>
</tr>
<tr>
<td>All others</td>
<td>80</td>
<td>All others</td>
<td>2,044</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>335</strong></td>
<td><strong>Total</strong></td>
<td><strong>4,258</strong></td>
</tr>
</tbody>
</table>

### Table 2: Most common serotypes in 2015: Turkeys

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>44</td>
<td>Senftenberg</td>
<td>170</td>
</tr>
<tr>
<td>Ouakam</td>
<td>15</td>
<td>Hadar</td>
<td>165</td>
</tr>
</tbody>
</table>
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

<table>
<thead>
<tr>
<th></th>
<th>Muenchen</th>
<th>Albany</th>
<th>4,[5],12:i:-/Typhimurium</th>
<th>All others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13</td>
<td>12</td>
<td>9</td>
<td>61</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>Anatum</td>
<td>London</td>
<td>Muenster</td>
<td>All others</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>57</td>
<td>56</td>
<td>262</td>
<td>780</td>
</tr>
</tbody>
</table>

Table 3: Summary of NVSL Salmonella Group D proficiency test

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>70</td>
<td>73</td>
<td>61</td>
<td>80</td>
<td>94</td>
</tr>
<tr>
<td>Mean Score</td>
<td>97%</td>
<td>92%</td>
<td>94%</td>
<td>98%</td>
<td>98%</td>
</tr>
<tr>
<td>Score Range</td>
<td>100-85%</td>
<td>100%-29%</td>
<td>100-68%</td>
<td>100-80%</td>
<td>100-68%</td>
</tr>
<tr>
<td>Below Passing</td>
<td>0</td>
<td>7</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4: Summary of NVSL Salmonella Serotyping proficiency test

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>18</td>
<td>14</td>
<td>34</td>
<td>23</td>
<td>34</td>
<td>21</td>
</tr>
<tr>
<td>Mean Score</td>
<td>98%</td>
<td>98.50%</td>
<td>99%</td>
<td>95%</td>
<td>97%</td>
<td>88%</td>
</tr>
<tr>
<td>Score Range</td>
<td>100-90%</td>
<td>100-90%</td>
<td>100-80%</td>
<td>100-80%</td>
<td>100-80%</td>
<td>100-60%</td>
</tr>
</tbody>
</table>

Salmonella enteritidis

The number of Salmonella enteritidis (SE) isolates submitted from chickens in 2015 is shown in Table 5. The most common SE phage types are shown in Table 6.

Table 5: Number of chickens Salmonella enteritidis isolates per calendar year at the NVSL

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. chicken isolates</td>
<td>3,940</td>
<td>3,502</td>
<td>3,912</td>
<td>4,688</td>
<td>4,593</td>
</tr>
<tr>
<td>No. chicken SE isolates</td>
<td>776</td>
<td>507</td>
<td>400</td>
<td>377</td>
<td>513</td>
</tr>
<tr>
<td>SE percent of all isolates</td>
<td>19.7%</td>
<td>14.5%</td>
<td>10.2%</td>
<td>8.4%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Table 6: Most common Salmonella enteritidis phage types from chicken sources per calendar year

<table>
<thead>
<tr>
<th>Rank</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>13a</td>
<td>13</td>
<td>13</td>
<td>RDNC</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>RDNC</td>
<td>13a</td>
<td>2</td>
<td>RDNC</td>
</tr>
<tr>
<td>4</td>
<td>RDNC</td>
<td>13a</td>
<td>RDNC</td>
<td>13a</td>
<td>13a</td>
</tr>
<tr>
<td>5</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>13</td>
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</tbody>
</table>

RDNC = reacts, does not conform
**Salmonella Pullorum and Gallinarum**

The NVSL provided 2,550 ml of S. Pullorum tube antigen, 1,175 ml of S. Pullorum stained microtiter antigen, and 338 ml of antisera to testing laboratories between January 1 and December 31, 2015. The NVSL conducted 465 S. Pullorum microtiter tests in 2015. The NVSL did not identify any Salmonella Pullorum isolates in 2015.

**Pasteurella and Mycoplasma**

The NVSL received 149 isolates for somatic typing in 2015. The NVSL also supplied 124 ml of P. multocida typing sera. The amount of *Mycoplasma* reagents provided are shown in Tables 8 and 9.

Table 7: *Pasteurella multocida* somatic typing. Table shows number of isolates per fiscal year for each type.

<table>
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<tr>
<td>All other</td>
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<td>181</td>
<td>145</td>
<td>126</td>
<td>149</td>
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</table>

References


Emerging Animal Disease Preparedness and Response Plan
Lee Ann Thomas, USDA-APHIS-VS


The framework for the plan was outlined in the 2014 VS concept paper, Veterinary Services Proposed Framework for Response to Emerging Animal Diseases in the United States. The plan provides strategic direction for VS at all levels to detect and respond to emerging animal diseases. It also defines assessment, communication activities, and possible response measures for an emerging animal disease occurring in the United States. The plan will provide strategic guidance, as well as outline roles and responsibilities of Federal and SAHOs and industry partners for detecting, communicating, and responding to emerging animal diseases.

VS will apply a collaborative approach to increase awareness of, detect, characterize, investigate, and respond to emerging disease threats and provide accurate information to all interested parties. VS will use the activities described in the plan to provide a solid scientific foundation for developing strategic interventions and informing the public of all appropriate actions.

Communication and collaboration among those government agencies, industries, and stakeholders impacted by a potential or emerging disease is essential to ensure a timely and appropriate response. VS will engage the National Assembly of State Animal Health Officials (NASAHO), American Association of Veterinary Laboratory Diagnosticians (AAVLD), industry associations, and industry emerging disease groups as appropriate to share information develop response options. Formal USDA communications around specific response activities, such as investigative studies, eradication, control, or certification programs will be coordinated with APHIS Legislative and Public Affairs.

National List of Reportable Animal Diseases (NALRAD) Framework Update
Dana Cole, USDA-APHIS-VS- CEAH

The U.S. National List of Reportable Animal Diseases (NLRAD) will be a single uniform, science- and policy-based, and nationally supported standardized list of animal diseases. It will provide the basis for consistent reporting with uniform case findings and reporting criteria. This will facilitate national, interstate, and international commerce; assist in meeting international reporting obligations to the World Organisation for Animal Health (OIE) and trading partners; support the generation of export certifications; contribute to the assessment and reporting of the listed zoonotic and endemic animal diseases; and facilitate response to an emerging disease or issue in the United States.

The NLRAD will be implemented through Federal-State cooperation. Regulatory action will officially recognize the NLRAD and codify specific reporting requirements for State Animal Health Officials (SAHOs), laboratory personnel, veterinarians, producers, and others. The increased Federal authority for the
NLRAD will help animal health officials to protect the U.S. agriculture infrastructure, which is vulnerable to significant damage from listed and emerging diseases.

The development of an NLRAD has been a long-standing endeavor dating back to the 1990’s. In 2006, USAHA officially identified a need for an NLRAD and since then USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) has drafted, shared, reviewed, and sought comments on white papers, concept papers and now a framework document to move the process along towards rule-making and implementation.

The draft NLRAD Framework was completed on October 5, 2016 and distributed to interested parties through the Stakeholder Registry with a request to comment by December 5, 2016. The “U.S. National List of Reportable Animal Diseases (NLRAD) Framework,” expands on the 2014 NLRAD concept paper and provides more details on implementation of NLRAD once a final rule would be in place. The framework includes the current U.S. list of reportable animal diseases, laboratory case classification and reporting requirements, structure and procedures, a description of how the list will be updated, and additional details on communication, data management, and information release.

The NLRAD is divided into two categories: Notifiable Diseases and Conditions and Monitored Diseases. Monitored disease are reported through periodic summary reporting of occurrence. The Notifiable Diseases and Conditions section is subdivided into emergency incidents, emerging disease incidents, and regulated disease incidents. A disease or condition listed as notifiable must be brought to the attention of the Federal and State veterinary authorities within prompt, defined timeframes, in accordance with national and state regulations. NLRAD regulatory authorities will require Federal and State reporting from any individual, producer, veterinarian, laboratory personnel, wildlife or zoo personnel, researcher, public health official, or others with knowledge of occurrence or suspected occurrence of a notifiable disease.

The NLRAD list is intended to be a dynamic document that will be reviewed annually to determine if there are any diseases that need to be added to or removed from the list or change the category in which a disease has been placed. Standard Operating Procedures (SOPs) have been developed for the process to update the list. A VS internal cross-unit team will be established to consider any updates and stakeholders will be given the opportunity to submit suggested revisions. The VS Deputy Administrator will provide the final approval of the list and all changes will be codified via a Federal Register notice.

Laboratories will play a key role in the implementation of the NLRAD Framework including: definitions, reporting criteria, and details involving information sharing and communication. The actions and responsibilities identified in the NLRAD Framework are applicable to both publicly funded veterinary diagnostic laboratories and private diagnostic laboratories; all laboratories, both National Animal Health Laboratory Network (NAHLN) and non-NAHLN, performing diagnostic testing in the United States are required to recognize and abide by the NLRAD rule.

The NLRAD rule will not change how national reporting is accomplished for monitored diseases, foreign animal diseases (FADs), or regulatory program diseases. Regulations and requirements for these diseases will continue to follow
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

established guidance. For non-FADs or non-regulatory program notifiable diseases (such as high priority or emerging diseases): anyone who identifies an occurrence or suspected occurrence is required to report it to VS Officials and State Animal Health Officials.

USDA-APHIS-VS is inviting stakeholders to review and comment on the framework document. Comments should be e-mailed to VS.STAS.Feedback@aphis.usda.gov no later than December 5, 2016. The document can be accessed at https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/program-overview/ct_national_list_reportable_animal_diseases

Committee on Salmonella Report
Donna Kelly, University of Pennsylvania, New Bolton Center

The Committee on Salmonella met on Tuesday, October 18, 2016. A series of agency updates regarding salmonella and a few outbreaks were covered. One poultry highlight was Dr. Subhashinie Kariyawasam of the Department of Veterinary and Biomedical Sciences at the Pennsylvania State University who spoke on a study that examined the prevalence of Salmonella enteritidis (SE) in shell eggs from backyard poultry and other small flocks. Three to four dozen eggs were collected from each of 240 selling points (roadside stands or farmer’s markets), representing 67 counties in Pennsylvania, and tested for SE on the shell and in the egg contents. Five selling points were positive for a prevalence of 2.08%. (Commercial egg testing with the Pennsylvania Egg Quality Assurance Program has a prevalence of SE at less than 1%). One selling point tested positive on the shell. Four selling points tested positive in the internal contents. Three different phage types were found – PT8, PT13, and PT13a. Four different pulse field gel electrophoresis (PFGE) designations were determined as JEGX01.0004, JEGX01.0005, JEGX01.0021, and JEGX01.0034. These phage types and PFGE designations are commonly reported by the Centers for Disease Control and Prevention from human foodborne outbreaks. The education programs with an emphasis on quality assurance practices to prevent SE contamination of shell eggs produced by backyard and other small flocks are under development.

The Food Safety Inspection Service Update on the Prevention and Control of Foodborne Salmonella was presented by Dr. Karen Becker, Director of Applied Epidemiology Staff at USDA, Food Safety and Inspection Service (FSIS). She summarized 26 outbreaks over the past five years involving 14 recalls of ground turkey, broiled chicken livers, ground beef, hogshead cheese, chicken (including mechanically separated chicken and stuffed chicken products) and pork. The Salmonella Action Plan accomplishments included modernization of the poultry slaughter inspection to mandate that all poultry slaughter establishments in the hazard analysis and critical control points (HACCP) inspection model perform indicator organisms testing at two points in the production process, and the final Performance Standards of Sampling related activities were published on February 11, 2016 for chicken parts and comminuted poultry.
REPORT OF THE COMMITTEE

Brenda Morningstar-Shaw, Lead Microbiologist with the Salmonella Serotyping Laboratory at NVSL presented the 2015 NVSL Salmonella Report. Her abstract is included above in the Transmissible Diseases of Poultry Report.

Lauren Stevenson, Assessment Epidemiologist with the Enteric Zoonoses Activity Center, Centers for Disease Control and Prevention, presented on the largest salmonella outbreak to date from live poultry. This outbreak was linked to backyard poultry. As of September 26, 2016, there were 895 people sick in 48 states. The ages affected were from less than one year to 106 years old and 52% were female. Hospitalization rate was 27% and three deaths were reported, although salmonella was the true cause of death in only one person. Epidemiologic, trace back and laboratory findings link all 8 outbreaks to contact with live poultry (chicks and ducklings) from multiple hatcheries. People had purchased baby poultry from several different suppliers (feed stores, internet, hatchery, friends). There were seven different salmonella strains recovered.

Dr. Megin Nichols, the Enteric Zoonoses Activity Lead for the Outbreak Response and Prevention Branch of the Division of Foodborne, Waterborne and Environmental Diseases at CDC, spoke on “The Use of Non-Accredited Veterinary Diagnostic Laboratories in Salmonella Testing of Turtles Prior to Export.” Although not a poultry specific topic this case presentation was timely to the proposed resolutions. It involved eight national outbreaks of human salmonellosis related to small turtles that were being reported erroneously by a laboratory testing lots for export from 2011 to 2013 (Salmonella Pomona, Poona, and San Diego). There were also links to international isolates based on pulse field gel electrophoresis patterns and issues with the non-accredited laboratories that included improper testing methods and improper citing of regulations.
REPORT OF THE USAHA COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE

Chair: Lisa Becton, IA
Vice Chair: Maryn Ptaschinski, IA

Bobby Acord, NC; Paul Anderson, MN; Gary Anderson, KS; Celia Maria Antognoli, CO; Marianne Ash, IN; James Averill, MI; Karen Beck, NC; Karen Becker, DC; Lisa Becton, IA; Kevin Blake, ND; Philip Bradshaw, IL; Becky Brewer-Walker, AR; Nancy Brown, KS; Tom Burkgren, IA; Robert Cobb, GA; Jim Collins, MN; Joseph Corn, GA; Susan Culp, TX; Thomas DeLiberto, CO; Barbara Determan, IA; Roger Dudley, NE; Dee Ellis, TX; Tony Forshey, OH; Nancy Frank, MI; Donna Gatewood, IA; Cyril Gay, MD; Michael Gilsdorf, MD; Timothy Goldsmith, MN; Larry Granger, CO; Patrick Halbur, IA; Rod Hall, OK; Steven Halstead, MI; Beth Harris, IA; Greg Hawkins, TX; Michael Herrin, OK; Sam Hines, MI; Russell Iselt, TX; Ellen Kasari, CO; Marcus Kehrli, Jr., IA; Daniel Kovich, DC; Charlotte Krugler, SC; Elizabeth Lautner, IA; James Leafstedt, SD; Donald Lein, NY; Tsang Long Lin, IN; Bret Marsh, IN; David Marshall, NC; Chuck Massengill, MO; Paul McGraw, WI; Gay Miller, IL; Richard Mock, NC; Megin Nichols, GA; Jerome Nietfeld, KS; Sandra Norman, IN; Dustin Oedekoven, SD; Barbara Porter-Spalding, NC; Maryn Ptaschinski, IA; David Pyburn, IA; Susan Rollo, TX; James Roth, IA; Mo Salman, CO; Roxana Sanchez-Ingunza, KS; Joni Scheftel, MN; David Schmitt, IA; Richard Sibbel, IA; Harry Snelson, NC; Fred Soltero, PR; Paul Sundberg, IA; Brad Thacker, GA; Lee Ann Thomas, MD; Beth Thompson, MN; Sarah Tomlinson, CO; Susan Trock, GA; Jeff Turner, TX; Paul Ugstad, NC; Liz Wagstrom, DC; Patrick Webb, IA; Margaret Wild, CO; John Williams, MD; Nora Wineland, MO; Jennifer Wishnie, IA; Raquel Wong, HI.

The Committee met on Monday, October 17, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 1:00 to 8:10 p.m. There were 26 members and 38 guests present. Lisa Becton covered introductions and housekeeping items. There were no 2015 resolutions to review.

Presentations and Reports

Feral Swine Issues Update
Dale Nolte, USDA-APHIS-WS

This is intended to be a cooperative program to implement natural solutions in conjunction with state and local partners. Feral swine damages are thought to exceed 2.5 billion dollars annually. Field ops, designated zone (DZ) and pop monitoring, research, communication, and outreach, planning and evaluation, and regulatory action are the focus areas. This program is currently active in 41 states emphasizing the use of helicopter teams, documentation of damage and mitigation, and area eradication programs.

Six states have moved to detection status. In 2016, New York, Maryland, Idaho, and Washington and in 2017, New Jersey and Wisconsin.

Future areas of focus include:

1. Research: toxicant; economic analysis; genetic tracking and detection
2. Outreach: through Tuskegee and national outreach campaign

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3. Disease monitoring: results of serology: Classical Swine Fever (CSF) 0; brucellosis 5.4%; pseudorabies virus (PRV) 19%

4. Food Safety and Inspection Service (FSIS)- risk of disease transmission at slaughter
   a. 13% culture positive for Brucella from tissues
   b. Serology: leptospirosis prevalent, trichina and toxoplasmosis present as well as flu and Brucella
      -Brucella culture 2x positive vs serology
      -Potentially due to \( B.\) \( abortus \) as the antigen for the serologic testing

   Question about feral swine slaughter and serving product at upscale restaurants- with the human health risks profiled here- how do we mitigate this risk? Raw feral swine sourced meat may also be in dog food.

   Looking for ways to do outreach with this message

**Modeling the Transboundary Survival of Foreign Animal Disease Pathogens Via Contaminated Feed Ingredients**

Scott Dee, Pipestone Veterinary Services

Dr. Dee presented a summary of his research in the area of modeling the transboundary survival of foreign animal disease pathogens via contaminated feed ingredients.

**Porcine epidemic diarrhea virus (PEDV) projects:**

2014: PEDV can be transmitted via bioassay with contaminated feeds
2015: PEDV survival in different feed ingredients
2016: Transboundary project - PEDV survived in a subset of feed ingredients during a simulated shipment from China to the U.S. (published)

(Sal CURB® (KEMIN) or medium chain fatty acids (MCFA) (KSU) blend were equally effective mitigants).

Utilized an environmental simulator set to real world weather data and shipping timeframes. There were five ingredients where viable PEDV was recovered (virus isolation (VI) or bioassay).

**Foreign Animal Disease (FAD) surrogate project:**

The purpose was to evaluate virus survival in feed ingredients under conditions simulating importation from China to the U.S. as in the transboundary PEDV project. Ten proposed FAD agents and their surrogates will eventually be tested.

The first three which have been completed include strongly stained vessels (SVV) for foot-and-mouth disease (FMD), bovine viral diarrhea (BVD) for classical swine fever (CSF), and bovine herpes virus 1 for pseudorabies virus (PRV). The proposed surrogate pairs were chosen based on structural similarity of viruses with validated tests.

Results showed 10 of 14 feed ingredients positive for FMD (SVV) after the 37-day simulated journey; 0/14 positive for CSF (BVD), and 2/14 PRV(BHV1) positive primarily in soy products.

**Discussion:**

This is a proof of concept that feed ingredients could serve as vehicles for FAD entry; further work includes determining high risk combinations of virus and feed...
ingredient and potential mitigation strategies. The results seem to indicate that soy products appear supportive for virus survival. Also, all three stock virus controls were negative - is a protective feed matrix required for virus survival?

**USDA VS Swine Health Program Update**
John Korslund, USDA-APHIS-VS

Dr. Korslund presented an update on USDA Swine Health Programs and issues surrounding transitional swine. Additional work remains to be done in this area and more conversations with stakeholders and other state partners will be held.

**USDA Influenza Surveillance Program Update**
Ellen Kasari, USDA-APHIS-VS

Dr. Kasari presented an update on the USDA Influenza Surveillance Program. The presentation provided current information on data from the swine influenza virus (SIV) plan and also highlighted some potential changes to show up in the future due to the change in algorithm for testing. See presentation for surveillance details, available on the Committee page at usaha.org.

**USDA NLRAD and Emerging Disease Plan**
Dana Cole, USDA-APHIS-VS

Dr. Cole presented an update on the USDA National List of Reportable Animal Diseases (NLRAD) and Emerging Disease Plan. She outlined the steps that have been taken to develop the Emerging Disease plan and then provided a glimpse into how the program would work. The NLRAD will fit in with the Emerging Disease plan as it is the reporting arm of the plan. See presentation for details on each program area available on the Committee page at usaha.org.

**Swine Health Information Center Update**
Paul Sundberg, Swine Health Information Center

Dr. Sundberg presented a summary of activities and gave an update on the Swine Health Information Center. Activities include the formation of a Monitoring and Surveillance working group and a Response working group to look at research, communication, and response functions. We will need to work closely with USDA on the Emerging Disease plan as it moves forward. Other items include the Swine Disease Matrix, Seneca A virus research and a Rapid Response team development and deployment team. All information can be viewed at www.swinehealth.org.

**Industry Emerging Disease Preparedness Update**
Patrick Webb, National Pork Board

In 1998, USDA published a final report of the Swine Futures Project which “represented a unique partnership between industry and government to develop a shared vision of future industry service needs and how to best address those needs collaboratively”. The final report included recommendations to establish a system for the rapid detection of emerging animal issues, which encompasses
emerging diseases, and the development of a collaborative process to identify and respond to issues of concern. Based on these recommendations the industry has been working collaboratively to develop an industry state and federal cooperative structure to identify and address Emerging Swine Production Diseases (ESPD).

A standardized process that coordinates industry, state, and federal cooperative efforts to identify, characterize, prioritize and respond to ESPD’s of concern to the U.S. Pork Industry will provide numerous benefits. Identification, characterization, and prioritization of ESPD’s can currently be accomplished through collaboration between the Swine Health Information Center and USDA’s Risk Assessment Unit (RIU) within the Center for Epidemiology and Animal Health. According to the plan, once a disease of concern is identified the development of response recommendations will be done collaboratively by a Swine Disease Response Council. The recommendations will not carry regulatory authority, but will have been developed with input from regulators familiar with the industry.

The National Pork Board, the American Association of Swine Veterinarians and National Pork Producers Council are in the process of nominating and approving representation from each organization. The National Assembly of State Animal Health Officials (NASAHO) has nominated Dr. Bret Marsh and Dr. Dave Schmitt as their representatives. Industry will also be working with USDA to identify two representatives to serve as advisors to the Council.

Once nominations are complete the Council will be convened to start the team building process which will include an in-depth review and discussion of the ESPD plan, mock scenarios designed to exercise the plan and the development of a communication strategy to keep the Council engaged and at the ready. In the event that a disease of concern is identified the Council would provide a core function of developing response recommendations and identify the responsible party for implementation. This process would also include representation (state vet, state pork association) from the affected State and subject matter experts as needed. The recommendations would be provided to stakeholders for consideration and if accepted implemented by the responsible party.

Discussion:
What are the barriers and potential solutions for communication and sharing of data and information between state, federal and industry partners for disease incidents? The discussion centered around the identification of barriers and potential solutions to be able to identify key data in the event of an animal health challenge. Many different thoughts were shared about what issues exist with current data sharing and transfer.

Committee Business:
No old business was brought forward.

New Business:
The Transmissible Diseases of Swine Committee will incorporate the Feral Swine subcommittee into the full Committee. Agenda items will reflect the needs for update of feral swine activities as well as other pertinent swine health issues.
Influenza A Virus in Swine (IAV-S) Surveillance Resolution:
Snelson moved to approve the resolution listed above. It was properly seconded by Sundberg. Discussion followed and it was moved by Kovitch to amend the resolution by inserting the word “new” prior to mandatory. The motion to amend was seconded by Ptaschinski and voted on. Motion to amend passed. The amended motion was then voted on and passed unanimously.
Kovich moved to recommend the following. Hines seconded. The motion was voted on and was passed unanimously.

Recommendation:
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
SUBJECT MATTER: DATA SHARING
Developing the capabilities to rapidly detect, respond to and mitigate a foreign animal disease that disrupts trade and commerce while ensuring business continuity is an urgent priority for U.S. Pork Producers. The following barriers must be addressed to achieve meaningful disease response and business continuity capabilities that will drive sustainable production in the U.S. pork industry in the event foreign animal disease threatens to disrupt trade and commerce.
• The need for a nationally-coordinated bio-surveillance system that rapidly delivers real-time data for analysis to improve foreign animal disease detection.
• The need for the industry to rapidly and securely share premises, production, movement and diagnostic data with state and federal animal health authorities to facilitate the management of disease control areas resulting from regulatory actions designed to control a foreign animal disease.
• The need for the industry to securely gather, standardize, house and share data and information required by the Secure Pork Supply Plan to aid state animal health authorities in facilitating business continuity for non-infected pork premises.
Data that is needed to achieve these capabilities is located in disparate federal, state and private databases. The ability to rapidly and securely share this disparate data in real time must be improved to achieve a meaningful disease response and business continuity for pork producers in the event of a foreign animal disease outbreak that affects swine.

Recommendation:
The United States Animal Health Association encourages USDA-APHIS-VS to work with the pork industry and state animal health officials (SAHOs) on developing a data sharing policy that will allow for the secure and real time sharing of data needed to detect, respond and support business continuity in the event of a foreign animal disease outbreak that affects swine.

Resolution:
State Veterinary Diagnostic Laboratory (VDL) Data Sharing
Becton moved to approve the resolution from American Association of Veterinary Laboratory Diagnosticians (AAVLD). Hines seconded. The motion was discussed, voted on and passed unanimously.
REPORT OF THE COMMITTEE ON TUBERCULOSIS
Chair: Dustin Oedekoven, SD
Vice Chair: Beth Thompson, MN

James Averill, MI; Peter Belinsky, RI; Joyce Bowling-Heyward, MD; Michael Carter, MD; Thomas DeLiberto, CO; Jacques deMoss, MO; Brandon Doss, AR; Anita Edmondson, CA; Dee Ellis, TX; Donald Evans, KS; Nancy Frank, MI; Mallory Gaines, DC; Tam Garland, TX; Robert Gerlach, AK; Colin Gillin, OR; Michael Gilsdorf, MD; Rod Hall, OK; Steven Halstead, MI; Noel Harrington, ON; Linda Hickam, MO; Bob Hillman, ID; Dennis Hughes, NE; Susan Keller, ND; Diane Kitchen, FL; Todd Landt, IA; TR Lansford, TX; Tsang Long Lin, IN; Rick Linscott, ME; Travis Lowe, MN; Mark Luedtke, MN; Bret Marsh, IN; Paul McGraw, WI; Robert Meyer, WY; Michele Miller, FL; Eric Mohlman, NE; Peter Mundschenk, AZ; Sherrie Nash, MT; Cheryl Nelson, KY; Jeffrey Nelson, IA; Dustin Oedekoven, SD; Kenneth Olson, IL; Elizabeth Parker, ITA; Elisabeth Patton, WI; Alex Raeber, CH; M. Gatz Riddell, Jr., AL; Susan Rollo, TX; Shawn Schafer, ND; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Rebecca Smith, IL; Nick Striegel, CO; Patrick Tarlton, TX; Tyler Thacker, IA; Paul Ugstad, NC; Scott Wells, MN.

The Committee met on Tuesday, October 18, 2016, from 1:00 to 5:30 p.m. There were 53 members and 20 guests present.

Dr. Oedekoven welcomed committee members and guests, and introduced Dr. James Averill as acting Vice Chair as Dr. Beth Thompson was not able to attend this year. Dr. Oedekoven determined there was quorum for the committee to meet and vote on resolutions.

Dr. Tyler Thacker presented the report of the Scientific Advisory Subcommittee (SAS). A motion to accept the report of the SAS was made and seconded. The motion was passed. The full text of the report is included in this report.

Dr. Michael Gilsdorf presented the report of the Bi-National Committee (BNC). A motion to accept the report on the BNC was made and seconded. The motion was passed. The full text of the report is included in this report.

Dr. Mark Camacho presented the National Tuberculosis Program Update. Topics Discussed:
1. Indemnity
2. Collection of official identification at Slaughter
3. Granuloma submission rate
4. Caudal Fold Test response rate
5. Status of the proposed TB/Brucellosis Rule and the 2009 Federal Order

Dr. Scott Wells presented an update on Modeling Transmission of Bovine Tuberculosis in Uruguay Using Dynamic Cattle Movement Networks.
Dr. Noel Harrington presented the Canada National Tuberculosis Report. After almost 20 years of effort, bovine TB is approaching undetectable levels. Canada continues to have robust surveillance and aggressive response to newly identified cases.

Dr. Fernando Rivera Olvera presented the Achievements in Reducing On-farm TB Prevalence in Mexico.

Mr. Salvador Diaz Oliveros, State of Veracruz, Mexico, presented on Experiences in the Development of an Electronic System Support for Livestock Management in the Southern Region of Mexico and Its Contribution for International Recognition as TB Low Prevalence Area.

State updates were provided by:

Texas:
Discussed TB affected herds. In addition, discussed slaughter traces originating in Texas, 8 of 9 been closed.

California:
Discussed past 15 years dealing with TB and has now obtained Accredited Free status statewide.

Michigan:
Discussed Michigan’s TB Program history, four herds identified past year, and efforts to enhance wildlife risk mitigation. Further details included in this report.

Indiana:
Discussed finding of TB infected cattle herd this year and in free-ranging white tailed deer. Further details attached to this report.

Committee Business:
At the conclusion of the formal presentation, Dr. Oedekoven determined there was a quorum and gave a report on the 2015 resolutions and responses.

Three resolutions were presented to the committee; all three were approved and forwarded to the Committee on Nominations and Resolutions. Topics included:

1) Amend importation requirements for cervids from Manitoba
2) Optimization and Standardization of purified protein derivative (PPD) tuberculin for IFN-γ
3) National Cervid TB Herd Accreditation Program

Dr. Oedekoven discussed a draft proposal from the USAHA Executive Committee for streamlining committees to be more efficient and effective.
Eight presentations were made at the 2016 Tuberculosis (TB) Scientific Advisory Subcommittee meeting.

**Potential for Rapid Antibody Detection to Identify Tuberculous Cattle with Non-Reactive Tuberculin Skin Test Results**

W. Ray Waters, Bovine Tuberculosis Research Group, National Animal Disease Center, Agricultural Research Center, USDA

**Background:** Bovine tuberculosis (TB) control programs generally rely on the tuberculin skin test (TST) for ante-mortem detection of *Mycobacterium bovis*-infected cattle. **Results:** Present findings demonstrate that a rapid antibody test based on Dual-Path Platform (DPP®) technology, when applied 1-3 weeks after TST, detected 9 of 11 and 34 of 52 TST non-reactive yet *M. bovis*-infected cattle from the U.S. and Great Britain (GB), respectively. The specificity of the assay ranged from 98.9% (n = 92, U.S.) to 96.0% (n = 50, GB) with samples from TB-free herds. Multi-antigen print immunoassay (MAPIA) revealed the presence of antibodies to multiple antigens of *M. bovis* in sera from TST non-reactors diagnosed with TB. **Conclusions:** Thus, use of serologic assays in series with TST can identify a significant number of TST non-reactive tuberculous cattle for more efficient removal from TB-affected herds.

**Early Detection of Circulating Antigen and IgM-Associated Immune Complexes During Experimental *Mycobacterium bovis* infection in cattle**

Konstantin Lyashchenko, Senior Research and Development Director, Chembio Diagnostic Systems Inc.

The presence of circulating antigen in cattle experimentally infected with *Mycobacterium bovis* was demonstrated using dual-path platform (DPP) technology. The antigen-capture immunoassays employed rabbit polyclonal antibody recognizing predominantly *M. tuberculosis* complex specific epitopes and were able to detect soluble substances and whole cells of mycobacteria. The antigen found in serum appeared to be mostly bound to IgM, but not to IgG, within the immune complexes formed at early stages of *M. bovis* infection. The antigen was also detected in bile and urine, indicating possible clearance pathways. The data correlation analyses supported the role of IgM responses in antigen persistence during *M. bovis* infection. The antigen was detectable in serum months prior to the antibody seroconversion, suggesting potential for improved immunodiagnostics.

**Quantiferon®-TB IGRA: Gold Standard in Human Diagnostics and Promising Candidate for Improved Bovine TB Diagnostics**

Carsten Schroeder, Director Market Development Veterinary Applications, Qiagen

**Use of IP-10 in TB Testing of African Buffaloes**
Michele Miller, Professor, Division of Molecular Biology and Human Genetics, Stellenbosch University

African buffaloes are maintenance hosts for bovine tuberculosis (BTB). Currently approved tests for buffalo include intradermal tuberculin test and Bovigam PPD assay. However, there is suboptimal specificity of these tests in this species. Improved specificity may be achieved using M. bovis-specific peptides and ancillary biomarkers to interferon gamma (IFNg). Comparing IFNg and IP-10 production in whole blood stimulated with Bovigam PC-EC and PC-HP peptides, enhanced sensitivity was observed using IP-10 in naturally infected buffaloes. In addition, the IP-10 assay had the highest overall sensitivity, and when used in combination with the Bovigam PPD assay, 100% of M. bovis confirmed infected buffalo were detected; this was greater than the combination of Bovigam PPD and skin test. IP-10 also has advantages of being stable when stored on Protein Saver Cards for up to two weeks, and showed thermal stability when plasma was heat treated at 65°C for 20 minutes. Additional studies are being conducted on specificity of IP-10 in low and high prevalence buffalo herds.

Application of the Phage-PCR Assay in the Detection and Control of Bovine TB in the U.K.
Cath Rees, Faculty of Science, University Nottingham and PBD Biotech Ltd.

The phage amplification assay was originally developed as a method to detect human TB in sputum. Over the last ten years we have focused on application of this method to detect animal pathogens. The method and the evidence that it can be used to detect mycobacteria in clinical blood samples will be presented. The report included recent improvements to the assay and how the assay has been used to try and control bovine TB in the U.K. The data from this study has provided new insights that will inform bovine TB control measures in the U.K.

Detection of Mycobacterium DNA in experimentally infected Cattle using the Phage Assay
Tyler C. Thacker, Mycobacterial Diseases, National Animal Disease Center, ARC, USDA

The Mycobacterial Phage Assay was developed in the U.K. to detect viable mycobacteria in clinical samples. Working with Dr. Cath Rees, the developer of the assay, Animal Research Service (ARS) transferred the experimental technique to the Bovine TB Research group at the National Animal Disease Center. The two-day Phage Assay detected mycobacteria in PBMC from 3 of 6 experimentally infected calves at four months post infection. The assay detected 1 of 5 control cows, suggesting that additional optimization of the assay is needed.

Experiences with Gamma Interferon Testing for TB in Texas
Roger Parker, Texas State-Federal Laboratory, Texas Animal Health Commission

U.S. Bovigam Update 2016
Sunny Geiser-Novotny, National Center for Cattle Health, VS-APHIS-USDA
REPORT OF THE COMMITTEE

The Bovigam® was approved in 2003 as a supplemental test in the TB program and is primarily used as a substitute for the Comparative Cervical Test (CCT) in retesting caudal-fold test suspect cattle. In 2015, a sensitivity issue was discovered with the Bovigam® when testing a large, relatively high prevalence dairy. It was determined that there was low potency in certain lots of Central Science Laboratory (CSL) purified protein derivatives (PPD) packaged with Bovigam® kits. Subsequently, Veterinary Services (VS) issued Bulletin 2015.03, Bovigam® (interferon gamma) Blood Test for Bovine Tuberculosis, on July 31, 2015, providing interim approval to use the Bovigam® Rest of World (ROW) ELISA with Lelystad bovine and avian PPDs manufactured by Thermo Fisher Scientific as the stimulating antigens.

However, since changing to the Lelystad PPD, a higher than expected number of false positives have been observed, resulting in otherwise healthy animals being indemnified, removed, and necropsied with negative findings for tuberculosis. In addition, false negative and inconsistent results were noted in an inter-laboratory study while testing an affected Texas dairy before its depopulation in 2016. As a result of the issues with test performance using Lelystad PPD, several States have stopped using the Bovigam® and changed to using the comparative cervical tuberculin skin test, requiring increased use of state and federal staff resources. While the Veterinary Services’ (VS) Cattle Health Center and Thermo Fisher Scientific had discussed the possibility of increasing the cut-off value used to designate a positive result as a solution to improve specificity, the impact on sensitivity and inconsistencies identified would need to be addressed before this option could be implemented.

VS Bulletin 2015.03 expired on July 31, 2016, and VS withdrew the interim approval to use Lelystad PPD in the Bovigam® test. Beginning September 1, 2016 approved laboratories were instructed to use National Veterinary Services Laboratories (NVSL)-produced avian and bovine PPDs and the standardized laboratory protocol issued by the NVSL for testing samples using the Bovigam® ROW ELISA test, in order to improve test specificity and ensure consistency in testing procedures between the laboratories. VS will be monitoring the performance of the Bovigam using the NVSL-produced PPDs and is assisting the approved laboratories with the transition to the new protocol. VS has had conference calls and face to face meetings with Thermo Fisher Scientific to discuss future use of Lelystad PPDs in the Bovigam® test and has requested that the company make available consistent Lelystad PPD lots for U.S. approved laboratories and improve test specificity. Once the company has addressed these issues, VS will reevaluate use of Lelystad PPDs in Bovigam® for the TB program.

Replacement of CSL by Lelystad Tuberculin PPD Implications on BOVIGAM™ Testing in U.S.
Björn Schröder, Thermo Fisher Scientific

On a global level, Tuberculin purified protein derivatives PPD of different sources is used as stimulation antigens for BOVIGAM™. Until July 2015, PPD of Central Science Laboratory (CSL) origin has been used for BOVIGAM™ in U.S. The 2014 USAHA Resolution 29 recommends replacing CSL PPD with Lelystad
TUBERCULOSIS

PPD. Due to a lack of potency however CSL PPD has been discontinued in July 2015. Currently, BOVIGAM™ ROW in conjunction with Lelystad PPD has been provided to U.S. customers under Center for Veterinary Biologics (CVB) Research and Evaluation (R&E) Import Permit. The field trials indicate that the sensitivity of Lelystad PPD is better in comparison to CSL without affecting the specificity.

Due to the higher sensitivity of Lelystad PPD, more animals are now being identified as reactors. This presents a problem to the TB program in the U.S. In response, National Veterinary Services Laboratories NVSL PPD is being used with BOVIGAM™ ROW as a short-term solution. The long-term solution is to optimize Lelystad PPD for use with BOVIGAM™ to fulfill the requirements of the TB program.

Other Business:

In February 2016, the Scientific Advisory Subcommittee (SAS) of the USAHA Committee on Tuberculosis (TB) was asked to consider a proposal by the APHIS Veterinary Services (VS) Cervid Health Program to raise the dual path platform (DPP) VetTB Assay optical density (OD) cut-off value for reindeer from 200 to 500. Since the DPP VetTB Assay was approved for use in the diagnosis of Mycobacterium bovis infection in reindeer in 2013, 179 animals have been tested. Two animals have been considered positive with a cut-off of 200. Infection with M. bovis could not be demonstrated in either animal.

In setting the initial DPP cut-off values, a conservative cut-off of 200 was set for reindeer due to the lack of information on M. bovis infection in reindeer in the U.S. The decision was based on concerns that lowering the sensitivity of the test by increasing the cut-off, could potentially misdiagnose infected animals. At the same time, a cut-off of 500 was set for elk, white-tailed deer, and red deer based on statistical evaluation of previous DPP testing data. The fallow deer cut-off of 200 was set based on DPP testing data from a single M. bovis infected fallow deer herd identified in 2010. There is no new data to support a change in the cut-off points for elk, white-tailed deer, red deer or fallow deer.

The request from the Cervid Health Program was accompanied by a report entitled, “Evaluation of Current Dual Path Platform Testing Protocol for TB in Cervids” compiled by USDA, APHIS, VS, Center for Epidemiology and Animal Health (CEAH), dated December 2015. In summary, the CEAH report determined that “increasing cut-off values (for reindeer and fallow deer) results in decreased test sensitivity without much change in the test specificity. Thus, the number of undetected animals is likely to increase, even with very low disease prevalence in the population, without having much effect on the false positives.”

The specific question posed to the TB SAS was: “Is it scientifically justified to change the Cervid TB DPP serological testing protocol for reindeer at National Veterinary Services Laboratories (NVSL) by raising the OD cut-off value for test positivity from 200 to 500 on either DPP test cassette line?”

In examining the question there are several items to consider:
1. The request is to comment on whether or not there is “scientific justification” for a change in cut-off values. A scientific justification would require data on both specificity and sensitivity. As data on the sensitivity of
the DPP in reindeer does not exist, there is no appropriate manner to obtain valid scientific justification.

2. Although no information is available on DPP test sensitivity in *M. bovis*-infected reindeer, it is known that reindeer are susceptible to experimental infection with *M. bovis*\(^3\). Experimentally infected reindeer produce antibodies in response to *M. bovis* infection that are directed at the *M. bovis* specific antigens used in the DPP\(^4\).

3. To our knowledge there is no evidence that reindeer are immunologically more similar to fallow deer (with a cut-off of 200) than elk, red deer, and white-tailed deer (with a cutoff of 500).

4. The prevalence of *M. bovis* infection in reindeer in the U.S. is extremely low. In fact, *M. bovis* infected reindeer have never been detected in the U.S.

It is the opinion of the TB SAS that the question of scientific justification cannot be addressed in the absence of data on test sensitivity. The more relevant question is whether or not there is justification for the risk of raising the DPP cut-off value for reindeer. According to the CEAH report, “the consequence of raising the DPP cut-off value is an increased risk of missing infected animals.” The question of risk justification represents policy and is separate from scientific justification. Evaluating risk involves decisions outside the scope of the TB SAS. However, given the available knowledge, it would appear that the risk of missing *M. bovis* infected reindeer by increasing the DPP cut-off from 200 to 500 is very low. In a setting of very low risk, the TB SAS has no specific objection to raising the DPP cut-off for reindeer from 200 to 500, making it consistent with elk, red deer, and white-tailed deer.

It is recommended that if *M. bovis* were to be detected in reindeer in the U.S. or another country that would cooperate with the U.S., it should be a high priority to conduct an evaluation of DPP test performance in naturally infected reindeer.

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BNC Issues and Updates as of October 2016
Michael Gilsdorf, International Animal Health Solutions LLC

During 2016, the Mexican/U.S. Binational Committee (BNC) on Tuberculosis (TB), Brucellosis and Ticks met in San Diego on Tuesday January 26, 2016 at the NCBA convention and also in Tijuana, Mexico, on Wednesday, May 11, 2016 at the National Confederation of Livestock Organizations (CNOG) convention.

The following comments represent the consensus agreement reached at these meetings of the BNC. October updates are provided as well.

Agreements from the BNC: January 2016
1. The BNC is concerned about USDA Animal and Plant Health Inspection Service’s (APHIS) aggressive timeline regarding completing regionalization of the Mexican States. The BNC would like to know how USDA APHIS intends to complete Mexican regionalization within this time line.
   a. **Response:** APHIS is continuing to pursue a policy of pre-certification reviews conducted by National Service of Health Food Safety and Quality (SENASICA) followed by an APHIS regionalization review. The intent is to classify as many regions as possible by the time of publication of the pending final TB/BR rule, and all Mexican regions within the following year. APHIS is on track to meet these goals. SENASICA has conducted pre-certification reviews with APHIS participation in at least 10 of the 16 proposed regions. APHIS has conducted 9 regionalization reviews, focusing on the high-exporting status. Pre-certification reviews are planned in Coahuila and Colima in CY 2016; APHIS reviews are currently planned in the Baja Peninsula region in December 2016 and Tamaulipas in January 2017.

2. The BNC is concerned that USDA APHIS is moving forward with Mexican State regionalization without a finalized TB/BR rule. Furthermore, BNC is concerned that comments from U.S. and Mexican stakeholders will not have time to be considered while regionalization is being conducted. Although, the BNC recognizes that these are two separate issues, they are inter-related.
   a. **Response:** Consideration of public comment: APHIS is in the process of considering all of the comments received from stakeholders on regionalization under the proposed TB/BR rule. We do not consider that any of the comments will require substantive changes to the proposed approach, although some adjustments may be warranted. APHIS continues to promote transparency in the process of regionalizing Mexico for bovine TB by including a U.S. State animal health representative on each review and providing the review reports to the National Assembly of State Animal Health Officials (NASAHO).
3. When will USDA be ready to go back to Piedras Negras and Acuna to inspect the export cattle? If not, Coahuila would request that a long-term lease be negotiated for the current pens in Del Rio and Eagle Pass.
   a. **Response:** APHIS has finalized a long-term lease for the current inspection facility in Del Rio, Texas, and expects to continue to work with the lessor on mutually agreed improvements into the future. APHIS is also looking to lease space on a longer-term basis in Eagle Pass, Texas, with an expected end point in 2017. The federal lease process continues steadily, with a lease award expected in late 2016.

4. When will USDA be doing their onsite review of Coahuila to change the TB status?
   a. **Response:** Coahuila review: SENASICA scheduled a pre-certification review of the Coahuila AP zone in July 2016 that was subsequently postponed at Coahuila’s request. SENASICA has confirmed the dates for a pre-certification review the week of November 14-19, 2016.

**Agreements from The BNC: May 2016**

1. Establish a working group to analyze how to implement the use of the National System of Individual Identification of Cattle (SINIIGA) ear tags in Mexican cattle at the U.S. ports of entry.
   a. **Response:** An electronic identification meeting was held in Tijuana Mexico on September 8, 2016. A separate meeting summary is available. **Action Items:**
      1. The Mexican BNC members intend to use the electronic ear tags but want assurance from APHIS and SAGARPA that they will be used.
      2. APHIS plans to initiate a pilot project to read rodeo cattle identification because these cattle already have the radio-frequency identification (RFID) tags.
      3. Mexico industry asked APHIS to conduct a pilot project immediately using imported cattle that would follow all the criteria mentioned here at this meeting.
      4. An action plan timeline for implementing an electronic identification and certification system at the ports was requested and that it be provided to the BNC members after the Fed-Fed meeting on September 9, 2016. APHIS stated they could not provide a timeline at this time.

2. Establish a working group to plan a tick summit meeting in November (with 2 to 4 participants each from Mexico and the U.S.)
a. **Response:** The Tick Summit Meeting is scheduled on November 29-30, 2016 in Weslaco, Texas.

3. Sonora requests that USDA-APHIS recognize their brucellosis status under current regulations before the next USAHA meeting
   a. **Response:** Sonora brucellosis: APHIS conducted a regionalization review of Sonora for bovine brucellosis status in May 2016. The review team concluded that Sonora is free of *Brucella abortus* in cattle. APHIS is taking a 2-pronged approach to ensure lifting of the testing requirements for cattle exported to the United States from Sonora as quickly as possible. We plan to list Sonora as Level I for brucellosis under the pending final TB/BR rule (test exempt); in the interim, we are pursuing rulemaking to add Sonora to the list of test-exempt regions in 9 CFR 93.406(d).

4. Tamaulipas requests a response regarding the TB review conducted by SAGARPA in February 2016. They want to know if that review qualifies them to maintain their TB status without further review by USDA.

5. The BNC members request that USDA report the origin of the exported cattle lots that are detected with ticks at the border to the SENASICA and the Mexican States. The BNC members would also like to know the phase development of those ticks.
Development of Proposed Brucellosis/TB Regulations
APHIS completed new regulations and supporting standards for the brucellosis and tuberculosis (TB) programs in FY 2012. Under the proposed approach, The Code of Federal Regulations will provide the regulatory authority for the programs while the details of the programs will be described in a program standards document. These new regulations and supporting standards were under departmental review during FY 2014-15. APHIS is hopeful that Proposed Rule and Program Standards will be published in 2015. Upon publication, APHIS plans to provide an extended comment period of 90 days.

Bovine State Status
As of September 30, 2016, 49 States, two Territories (Puerto Rico and the U.S. Virgin Islands), and one zone (Michigan) were TB accredited-free. California advanced from modified accredited advanced (MAA) status as of July 2016. The MAA zone of Michigan (MI) was advanced to accredited-free status on September 10, 2014. With this advancement, Michigan has an accredited-free and a modified accredited (MA) zone. MI TB memorandum of understanding (MOU) was re-negotiated in 2016.

Captive Cervid State Status
All States and territories have modified accredited (MA) status.

TB Program Reviews
The Michigan TB program was reviewed in FY 2015.

TB-Affected Herds Identified in FY 2016
Five TB-affected cattle herds were identified during FY 2016 including four Michigan beef herds in the MA zone and one small Indiana beef herd. No Michigan herds were depopulated with Federal indemnity but one was depopulated with state funds. Two Michigan beef herds were placed under test-and-remove management plans and one herd is still pending a decision on how to manage. Two captive cervid herds in the Michigan MA zone remain under quarantine.

National TB Surveillance
Granuloma Submissions: For FY 2016, 4,682 granulomas from 163 federally inspected establishments were identified through three quarters of the Fiscal year. Overall, 2.24 granulomas were submitted per 2,000 adult cattle (culled dairy and beef cows and bulls) slaughtered, a decrease for the third consecutive year. The granuloma submission rate was 2.6 in FY 2014. TB slaughter surveillance during FY 2014 and 2015 have experienced the lowest submission rates since 2006. During FY 2006-13, the submission rate ranged from 2.9-3.5 per 2,000 culled adult cattle slaughtered. The minimum standard for slaughter surveillance is one granuloma submitted per 2,000 adult cattle slaughtered annually. Thirty-three (33) of the 40 highest volume adult cattle
slaughter establishments met or exceeded the submission standard in FY 2016, compared to 31 in FY 2015. These 40 highest volume establishments slaughter approximately 95 percent of adult cattle processed with federal inspection in the United States.

**Slaughter Cases:** During FY 2016, a total of 14 granuloma submissions had histology compatible with mycobacteriosis, out of 4,682 granuloma submissions (0.3 percent). Of these, TB was confirmed in ten (71.4 percent) cases. TB is confirmed by polymerase chain reaction (PCR) testing of formalin-fixed and direct PCR and culture of fresh tissue. Of the remaining two cases, other *Mycobacterium* species were identified for one case and one case could not be cultured because only formalin fixed tissue was submitted.

One of the ten confirmed cases occurred in an adult cow over two years of age from Canada, and nine cases occurred in feeder cattle. Of the nine fed cattle cases, five occurred in Mexican-origin cattle and four were in domestic origin steers. Six infected steers came through a Pennsylvania slaughter plant in one lot and led to the identification of a new Indiana affected beef herd. Two Texas and one Arizona steers were found but USDA was not able to find an affected herd of origin for any of those traces.

**Mexican-Origin Slaughter Cases:** A total of five TB-infected animals identified through slaughter surveillance were determined to be of Mexican-origin. The official Mexican ear tags collected at slaughter indicated origin from the State of Nuevo Leon (one case), Coahuila (one case), and Nayarit (one case). Two cases were from Mexico, though the state of origin could not be determined.

**Animal Identification Collection for Slaughter Cases:** This data was not available at the time of this report.

**Live Animal Testing, Cattle:** Tuberculin skin testing in live animals is another component of national TB surveillance in cattle and bison. During October 1, 2015 through August 31, 2016, a total of 644,399 caudal fold tuberculin skin tests (CFT) of cattle and bison were reported, with 10,242 responders (1.6 percent, 46 states and one Territory reporting, data not available for four states). During FY2015, 557,395 CFT tests of cattle and bison were reported, with 7,868 responders (1.4 percent, 50 States and 1 Territory reporting).

The gamma interferon test has been approved for use in cattle only as an official supplemental test in the TB program since 2003. Laboratories in seven States (California, Colorado, Michigan, Nevada, Pennsylvania, Texas, and Washington) and the National Veterinary Services Laboratories (NVSL) in Iowa are approved to conduct gamma interferon testing. These laboratories completed approximately 5,331 tests for cattle residing in 20 states during FY 2016 (data incomplete for some laboratories).

**Live Animal Testing, Cervids:** The CervidTB Stat-Pak® and Dual Path Platform® (DPP) tests were approved for program use in elk, red deer, white-tailed deer, fallow deer, and reindeer. Official program testing began on February 2013. During FY2016, a total of 10,750 cervid serological TB tests were completed. These samples were submitted from 8,168 white-tailed deer (76 percent), 1,897 elk (18 percent), 456 fallow deer (4 percent), 81 red deer (1 percent), and 148 reindeer (1 percent). Five animals with positive DPP test results were necropsied in FY 2016. Of these, laboratory tests
and culture for *M. bovis* have been negative for four animals and are pending for one animal.

Statistical analysis was performed on DPP test performance for tests administered during FY2013-15. The specificity of the first DPP test is 99.6 percent. The specificity after the second DPP test is 99.86 percent. Raising the DPP test cutoff would decrease sensitivity, while having very little effect on improving specificity; therefore, the DPP cutoff values will not be changed in FY 2016.

**Collaborations with Mexico**

In FY 2016, APHIS teams conducted reviews in Chihuahua, Nuevo Leon, Durango, and Sinaloa. In addition, APHIS and International Services (IS) staff assisted the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) in conducting pre-certification reviews in Baja California and Baja California Sur, Tierra Caliente Region (Guerrero, Michoacan), the Nayarit MA zone, the Huasteca Region (Veracruz, Hidalgo, San Luis Potosi, Puebla), the Centro-Occidente Region (Zacatecas, Aguascalientes, Jalisco, and San Luis Potosi), and the Guanajuato AP zone.

**TB Serum Bank**

APHIS continues to obtain well-characterized serum samples for both uninfected and infected animals. The serum bank contains 5,340 serum samples from cattle, of which 524 are from TB-infected animals, and 3,737 samples from cervids, of which 92 are from confirmed TB-infected animals. Serum bank samples continue to be available to researchers and diagnostic companies for serologic test development. States are encouraged to submit blood and tissue samples from potentially infected cattle and captive cervids, as well as blood samples from presumably uninfected cattle and cervid species from accredited-free States during FY 2015.

**IDEXX ® M. bovis Antibody Test Kit:**

The IDEXX ® *M. bovis* Antibody Test Kit was approved for official TB program use in TB-affected cattle herds in FY 2013. Guidance for the use of the test can be found in VS Guidance 6702.1 - The IDEXX Antibody (Ab) Test Serological Test for Diagnosing Bovine Tuberculosis (TB) in TB-Affected Cattle Herds. The serology test continues to be evaluated in affected herds, to determine if its use in conjunction with skin testing will reduce the risk of not detecting truly infected animals that are skin test negative. The test was used in TB affected herds in FY 2015, as part of the test and remove herd management plan.

**Selected State Updates**

**Michigan:** Four new affected herds were identified in FY 2016 described by the summary table listed below:

<table>
<thead>
<tr>
<th>State</th>
<th>County</th>
<th>Herd Type</th>
<th>Size</th>
<th>Disclosed By</th>
<th>Herd Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>Alpena</td>
<td>Beef</td>
<td>81</td>
<td>Annual test</td>
<td>State Depop</td>
</tr>
<tr>
<td>MI</td>
<td>Oscoda</td>
<td>Beef</td>
<td>180</td>
<td>Annual test</td>
<td>Test &amp; remove</td>
</tr>
</tbody>
</table>
Indiana: One new infected beef herd in Franklin County was identified in April 2016 at slaughter and has since been depopulated. In addition, one deer and one raccoon were identified as TB positive triggering a 10-mile surveillance effort that must be done within six months.

**Gamma Interferon Testing Issue**

In the course of tuberculosis testing the first Texas dairy quarantined in FY 2015, relatively lower sensitivity of the U.S. gamma interferon assay (34% and 28%) for lesions of tuberculosis was noted on the first two herd tests. As a result of extensive investigation and study over several months with collaboration of the Cattle Health Center, National Veterinary Services Laboratories (NVSL), and gamma interferon testing laboratories in Texas, Michigan, and California, a problem with lower activity of one of the lots of stimulating tuberculin in the gamma interferon assay was discovered. A notice from Veterinary Services (VS) revoked the official status of tests conducted with this particular lot after July 31, 2015. The notice described procedures to replace this testing with either the comparative cervical test or a gamma interferon assay that included a ROW (Lelystad) tuberculin for stimulation. All laboratories were verified as conducting gamma interferon assays with the ROW tuberculin by August 9, 2015.

Since changing to the Lelystad PPD high numbers of false positives have been seen at almost four times the responder rate of the previous Central Science Laboratory (CSL) purified protein derivatives (PPD). This has caused decrease in use of Bovigam® arising from high number of positive tests. In addition, VS has seen inconsistent results across different laboratories. VS is addressing the stimulation portion of Bovigam® by substituting NVSL PPD for Lelystad PPD (September 1, 2016). In addition, VS will attempt to harmonize differences in testing protocol among approved laboratories. A panel of stimulated plasma samples sent to approved labs performing the Bovigam ROW ELISA using the standardized testing protocol and VS will continued monitoring of test results.

**Michigan Tuberculosis Program Update**

James Averill, Michigan Department of Agriculture and Rural Development

**Affected Herds**

63rd Herd:
- A medium-sized beef herd in Alpena County was designated by Michigan Department of Agriculture and Rural Development (MDARD) as infected with bovine tuberculosis (TB) following routine annual surveillance testing.
- Herd was partially depopulated by MDARD funds and remainder sold through slaughter channel.
64th Herd:
- A medium-sized beef herd in Oscoda County was designated by MDARD as infected with bovine TB following routine annual surveillance testing.
- The herd is currently undergoing a test and removal program.

65th Herd
- A medium-sized beef herd in Alcona County was designated by MDARD as infected with bovine TB following a trace investigation from the 64th TB infected herd.
- The herd is currently undergoing a test and removal program.

66th Herd
- A large beef herd in Alcona County was confirmed bovine TB positive in an Alcona County herd when one of the animals was tested to be transported off the farm.
- Due to the location of the infected herd, Animal Industry Division (AID) established a special surveillance area which involved a small number of herds in the northern portion of Iosco County which is outside the modified accredited zone (MAZ).
- Determination of herd is yet unknown as a whole herd test was just conducted.

Deer surveillance:
- In 2015 has shown apparent prevalence in the free-ranging, white-tailed deer population in the core area of the MAZ was 2.7 percent in 2015, the highest it has been since 1997.

Enhanced Wildlife Risk Mitigation:
- In cooperation with Michigan State University Extension, the USDA’s Natural Resources Conservation Service and local producers, a voluntary enhanced Wildlife Risk Mitigation (WRM) program is being offered to the highest risk herds in the MAZ.
- With a team of disease control experts and local producers, herd owners work to further assess the potential vulnerabilities on their farm. The team provides education on bovine TB transmission, examines deer behavior on their farm, and suggests changes to the farmer, which will help them heighten their biosecurity.
- So far, 17 TB core area farms have had an enhanced WRM team visit them. The goal is to have two teams conduct 25 farm visits by the end of fall.

Indiana Tuberculosis Update
Bret D. Marsh, Indiana State Board of Animal Health

Background Information
- On April 28, 2016, the Pennsylvania State Veterinarian, Dr. Craig Schultz, notified the Indiana State Veterinarian, Dr. Bret Marsh, that six steers slaughtered at a Pennsylvania processing facility demonstrated lesions consistent with bovine
tuberculosis (TB) and were retained at slaughter. The group of six steers was part of a group of 11 from which nine were initially retained. Three of the nine steers were released. Tissues submitted to the National Veterinary Services Laboratories (NVSL) from the six retained animals were confirmed to be histologically compatible with tuberculosis and PCR positive for *Mycobacterium bovis*. The lot of 11 steers, including the six retained animals, had backtags with a 32 prefix indicating they had been sold through an Indiana market. Documents from the slaughter plant enabled the lot to be traced to the Indiana market and market records enabled the Indiana State Board of Animal Health (BOAH) staff to definitively identify the single herd of origin.

**Affected Herd**

The single beef herd resided on two premises in Franklin County, Indiana. These premises are approximately 3.5 miles from one another. Premises A housed breeding animals and Premises B housed feeders. BOAH placed a quarantine on both premises on April 29, 2016. The herd was comprised of 49 cattle. Caudal fold (CF) testing on 41 test eligible cattle (≥2 months of age) was performed on May 6, 2016 and read on May 9, 2016. Of the 41 tested, 27 responded (65.8%) and were classified as reactors. Based on the lesions observed in the cattle at slaughter and this high response rate, the entire herd was appraised and depopulated. All reactors and the eight calves (plus a ninth bottle calf recently transferred to another Franklin County farm) were removed, euthanized, and necropsied as of May 26, 2016. The remaining 14 non-reactors were removed and euthanized as of June 1, 2016. Necropsies of reactors and calves were performed by pathologists at the Indiana Animal Disease Diagnostic Laboratory (ADDL) at Purdue University, pathologists at the Ohio Department of Agriculture ADDL, and by VS and BOAH field personnel. Of the 27 reactors, 24 had gross lesions (88.9%). In addition, 2 of the 9 calves had gross lesions. Carcasses were disposed of using incineration, alkaline digestion, or rendering. All 49 animals from the affected herd and the bottle calf were indemnified by the USDA. A herd plan was signed by the farm owners, Dr. Bret Marsh, and Dr. Frank Wilson on August 29, 2016. This plan details the requirements for cleaning and disinfection, 90-day post cleaning and disinfection fallow period, and testing of restocked cattle.

**Laboratory Testing**

Serum, plasma, lymph node pools, and lesioned tissue (lung, liver, granulomas) samples were collected from all reactors and calves and submitted to NVSL. Lymph node pools were submitted from five of the 14 non-reactors. Of the reactors, 100% were positive on the Bovigam assay and 88.9% were positive for *M. bovis* on either direct tissue PCR or mycobacterial culture. Of the calves, 50% were positive on the Bovigam assay and 44.4% were positive for *M. bovis* on mycobacterial culture. Of the non-reactors sampled, 60% were positive for *M. bovis* on mycobacterial culture. A detailed summary of the laboratory results is presented below.
REPORT OF THE COMMITTEE

<table>
<thead>
<tr>
<th></th>
<th>CFT Reactors (n=27/27 sampled)</th>
<th>CFT Non-Reactors (n=5/14 sampled)</th>
<th>Calves (n=9/9 sampled)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M. bovis ELISA, No. (% of animals sampled)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>12 (44.4)</td>
<td>NT</td>
<td>1 (12.5)</td>
</tr>
<tr>
<td>Negative</td>
<td>15 (55.6)</td>
<td>NT</td>
<td>7 (87.5)</td>
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<td><strong>M. bovis λ Interferon Test, No. (% of animals sampled)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>27 (100)</td>
<td>NT</td>
<td>4 (50)</td>
</tr>
<tr>
<td>Negative</td>
<td>0 (0)</td>
<td>NT</td>
<td>4 (50)</td>
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<tr>
<td><strong>M. bovis direct PCR², No. (% of animals sampled)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detected</td>
<td>15 (55.6)</td>
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<tr>
<td>Not Detected</td>
<td>0 (0)</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><strong>Mycobacterial Culture², No. (% of animals sampled)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M. bovis Isolated³</td>
<td>10 (37.0)</td>
<td>3 (60)</td>
<td>4 (44.4)</td>
</tr>
<tr>
<td>M. bovis Not Isolated⁴</td>
<td>3 (11.1)</td>
<td>2 (40)</td>
<td>5 (55.6)</td>
</tr>
</tbody>
</table>

Abbreviations: No., Number; NT, Not tested

¹ A blood sample was not collected from 1 of 9 calves necropsied. Tissue samples were collected from all 9 calves.

² Either direct tissue PCR for M. bovis was performed OR mycobacterial culture. Samples from one CFT reactor had both direct PCR and mycobacterial culture performed.

³ Results presented here indicate that M. bovis was isolated from at least one sampled tissue.

⁴ Results presented here indicate that no M. bovis isolation was made from any of the sampled tissues or a non-tuberculous mycobacteria (NTM) was recovered. NTM species identified include M. engbaekii, M. nonchromogenicum, and M. monacense. In two instances, the mycobacterial culture was reported as “contaminated.” In one instance, acid fast bacteria were recovered, but not speciated.

### History of TB in Southeast Indiana as Linked to Recent Detection

After being absent from Indiana since 1984, bovine TB was identified in November 2008 in a single cow at slaughter. Soon after, TB was detected in farmed deer in 2009 in a nearby Franklin County farm consisting of red deer, elk, and fallow deer. This farm was depopulated. As a result, the Indiana Department of Natural Resources (IDNR), Board of Animal Health (BOAH), and USDA-APHIS, Wildlife Services (WS) and VS began a wildlife surveillance program. In 2010, slaughter detection of TB in two black steers traced to Indiana and Ohio premises. Since there were no recorded ID’s on the steers, the premises were not able to be definitively identified. In 2011, TB was detected in a Dearborn County cattle
TUBERCULOSIS

farm. Recent genetic sequencing results suggest the two black steers originated from this farm. Surveillance of white-tailed deer was expanded to Dearborn County. From 2008-2015, over 1,400 deer from this region were tested and all were negative for TB. In response to the current detection of TB in the Franklin County beef herd, efforts are ongoing to remove wildlife from the affected premises. To date, over 70 animals have been removed and tested from Premises A and B. On August 12, 2016, NVSL reported that *M. bovis* was isolated from a thoracic lymph node of a white-tailed deer removed from one of the affected premises. This animal was a two-year-old doe removed from Premises A. The animal had no gross lesions. On September 15, 2016, NVSL reported that *M. bovis* was isolated from thoracic and abdominal lymph nodes of a raccoon. This animal was also removed from Premises A. NVSL has performed whole genome sequencing on *M. bovis* isolates collected from recent and historic cases of TB in this region. Results indicate that all of the *M. bovis* isolates collected from Indiana animals are of the same strain and that these detection events are likely epidemiologically linked.

**Zone Testing**

Upon detection of the affected Franklin County herd, BOAH established a 3-mile testing zone surrounding both Premises A and B. Since 2006, Indiana has required the registration of all premises associated with the sale, purchase, or exhibition of livestock. BOAH’s review of their database indicated that this 3-mile zone contains 78 cattle herds of which 40 contain test-eligible cattle (cattle > 2 years of age). Upon detection of *M. bovis* in the white-tailed deer collected from premises A, this testing zone was expanded to a 10-mile radius surrounding Premises A. This zone is also extended with a 2-mile buffer on either side of the west fork of the Whitewater River to the Ohio-Indiana border. BOAH’s review of their database indicated that these zones (10-mile and river corridor) contain approximately 400 cattle herds. BOAH continues to make contact with the premises owners to identify those herds that contain test-eligible cattle. In addition, there are four farmed cervid operations within this zone, one of which is TB accredited. BOAH will test all herds with test eligible cattle and captive cervids in the 10-mile and river corridor zones within a 6-month time frame.

**Wildlife Surveillance and Management**

The IDNR has established two zones in which surveillance and management activities will be employed to detect and eliminate bovine TB in wildlife. Details of these activities can be found in the IDNR management plan titled *Bovine Tuberculosis Surveillance and Management in Franklin, Fayette, and Dearborn counties, 2016* and at: [http://www.in.gov/dnr/fishwild/9320.htm](http://www.in.gov/dnr/fishwild/9320.htm). The management and surveillance zones are depicted in the attached map (Map 2) prepared by IDNR. In the Bovine Tuberculosis Management Zone, the primary activity will focus on reducing the prevalence of the disease by reducing the population of wild white-tailed deer. Specific population reduction activities include providing hunters additional opportunities to harvest deer, issuing permits to landowners to reduce the deer population on their properties, and utilization of Wildlife Services (WS) sharpshooters to remove additional deer from the affected and surrounding properties. Active management in the Bovine Tuberculosis Management Zone will
begin immediately on the affected properties. Management activities will initially occur along the Whitewater River corridor from approximately the Fayette/Franklin county line to south of Metamora, which appears to most likely locations where affected white-tailed deer may be present. Surveillance activities will additionally be executed within the Bovine Tuberculosis Surveillance Zone. Sampling protocols have been redesigned in an attempt to detect bovine tuberculosis at lower prevalence rates. The IDNR will need to collect samples from between 350 and 1,100 deer, depending on sex and age class of the animal. While any age and sex of white-tailed deer can become infected with bovine TB, sampling bucks older than two years of age is more likely to detect the disease. A buck older than two years old equals about ten yearling bucks from a bovine TB surveillance perspective. The objective is to sample as many hunter-harvested bucks greater than two years old as possible and obtain the remaining samples with hunter-harvested does and younger bucks. To meet this objective, the following strategies will be employed:

- Mandatory check-in of deer will be required at IDNR Biological Check Stations on September 24 & 25, 2016 and from November 4 through November 27, 2016.
- Voluntary sample submission will occur October 1 through November 3, 2016 and December 3 through December 11, 2016.
- A second buck tag will be issued to anyone submitting a buck that meets the established requirements.
REPORT OF THE COMMITTEE ON WILDLIFE DISEASES

Chair: Colin Gillin, OR
Vice Chair: Peregrine Wolff, NV

Gary Anderson, KS; Paul Anderson, MN; Kay Backues, OK; Karen Beck, NC; Scott Bender, AZ; Warren Bluntzer, TX; Tom Bragg, NE; Rhonda Brakke, IA; Beth Carlson, ND; Shelly Chavis, IN; Matt Cochran, TX; Tim Condict, TX; Walter Cook, TX; Joseph Corn, GA; Susan Culp, TX; Thomas DeLiberto, CO; Barbara Determan, IA; Linda Detwiler, NJ; Bob Dittmar, TX; Mark Drew, ID; Hank Edwards, WY; Dee Ellis, TX; James Evermann, WA; Anna Claire Fagre, CO; Heather Fenton, GA; John Fischer, GA; Richard French, NH; Francis Galey, WY; Tam Garland, TX; Donna Gatewood, IA; Robert Gerlach, AK; Paul Gibbs, FL; Samantha Gibbs, FL; Colin Gillin, OR; Linda Glaser, MN; Paul Grosdidier, KS; Greg Hawkins, TX; Kristi Henderson, IL; Melinda Hergert, TX; Linda Hickam, MO; Maggie Highland, WA; Robert Hilsenroth, FL; Donald Hoenig, ME; Dennis Hughes, NE; Noah Hull, WY; David Hunter, MT; Isabel Jimenez, NY; Beth Johnson, KY; Alison Keggan, NY; Susan Keller, ND; Diane Kitchen, FL; Patrice Klein, DC; Darlene Konkle, WI; Todd Landt, IA; T.R. Lansford, TX; Chuck Lewis, IA; Tsang Long Lin, IN; Mitch Lockwood, TX; Jim Logan, WY; Linda Logan, TX; Travis Lowe, MN; Mark Luedtke, MN; Margie Lyness, GA; David Marshall, NC; Chuck Massengill, MO; James Maxwell, FL; Bob Meyer, CO; Myrna Miller, WY; Mendel Miller, SD; Michele Miller, WI; Eric Mohlman, NE; Yvonne Nadler, IL; Julie Napier, NE; Alecia Naugle, MD; Cheryl Nelson, KY; Danielle Nelson, WA; Sandra Norman, IN; Gary Olson, MN; Mitchell Palmer, IA; Steve Parker, GA; William Pittenger, MO; Kate Purple, TN; Jennifer Ramsey, MT; Jack Rhyian, CO; Justin Roach, OK; Jonathan Roberts, LA; Shawn Schafer, OH; Jack Schlater, IA; David Schmitt, IA; Dennis Schmitt, MO; Krysten Schuler, NY; Brant Schumaker, WY; Marc Schwabenlander, MN; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Daryl Simon, MN; Jonathan Sleeman, WI; Kelly Straka, MO; Patrick Tarlton, TX; Robert Temple, OH; Lee Ann Thomas, MD; Brad Thurston, IN; Susan Trock, GA; Curt Waldvogel, OH; Michele Walsh, ME; Skip West, OK; Margaret Wild, CO; Richard Willer, HI; Michelle Willette, MN; William Wilson, KS; David Winters, TX; Richard Winters, Jr., TX; Cindy Wolf, MN; Peregrine Wolff, NV; Mary Wood, WY; Marty Zaluski, MT; Glen Zebarth, MN.

The Committee met on October 16, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 12:30-5:00 p.m. There were 47 members and 25 guests present. Chairperson Colin Gillin welcomed the membership and guests and covered housekeeping items. He also asked for recommendations, resolutions and for any new business, of which, there was none forwarded. There were no resolutions from 2015 and two proposed resolutions for 2016. The resolutions were emailed to the listed membership five days prior to the committee meeting for review. One of the resolutions was pulled by the submitter prior to the meeting.

Overview

There were 13 presentations in this year’s committee focused on the interface between wildlife and livestock health. These talks were given by state, federal, and
university presenters from management and research disciplines. Topics included case descriptions of emerging diseases, disease spillover between livestock and wildlife, cutting-edge technologies, presentations of federal regulatory programs, and discussions of epidemiological trace-outs of complex disease cases and outbreaks. The following is an agenda summary of presentations given during the 2015 committee on Wildlife Diseases:

- USAHA/AAWV Student Travel Award Presentation - Grace Vahey
- HPAI National Surveillance and Wild Bird Detections – Tom Deliberto
- Disease and Risk Management of Feral Swine in North America – Dana Cole
- Screwworm Outbreak at the National Key Deer Refuge – Samantha Gibbs
- Mycoplasma Pneumonia/Nasal Tumors in Bighorn Sheep – Peregrine Wolff
- Elk Hoof Disease in Washington and Oregon - Jennifer Wilson-Wilder
- Bovine TB in Indiana Deer - Surveillance, Events, and Updates – Brett Marsh
- Update on 2015-16 Hemorrhagic Disease Activity in Wild Ruminants – Mark Ruder
- Revisiting Brucellosis in the Greater Yellowstone Area – Mark Drew and Jennifer Ramsey
- Population effects of CWD on White-tailed Deer – Dave Edmunds
- Chronic Wasting Disease in Elk in Rocky Mountain and Wind Cave National Parks: Research Updates – Margaret Wild
- Chronic Wasting Disease Events in Arkansas – Margaret Wild
- USDA-APHIS-VS CWD Program Standards and Updates – Randy Prichard/Alecia Naugle

The first presentation given was by the USAHA Student Travel Scholarship award winner, Ms. Grace Vahey, a veterinary student attending University of Georgia School of Veterinary Medicine. This travel scholarship is given to students of allied organizations through a competitive selection. The American Association of Wildlife Veterinarians was asked to canvas their membership for students interested in the attending USAHA and the current issues of wildlife disease related to the livestock and agriculture. Ms. Vahey discussed her background and research evaluating contaminate levels in fish species consumed by bottlenose dolphins and Gullah/Geechee anglers in the Charleston South Carolina Harbor estuarine area.

**Presentations and Reports**

**Highly Pathogenic Avian Influenza Surveillance in Wild Birds Across the United States**
Thomas Deliberto¹, Jonathan Sleeman², Patricia Bright³, Ronald Anglin⁴, Samantha Gibbs⁵, Darrel Styles⁶, Susan Trock⁷, Dale Garner⁸, Thomas Gidewski⁹, Mia Torchetti¹⁰

¹United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, National Wildlife Research Center
A unique A(H5Nx) clade 2.3.4.4 highly pathogenic avian influenza virus (HPAIV) was detected in North America in late 2014. Motivated by both the alarming spread of new H5 reassortant viruses in Asia and Europe as well as by the detection of HPAIV in both domestic poultry in Canada and in wild and captive birds in Washington State, initial HPAIV surveillance was conducted among wild birds in the Pacific Flyway of the United States. This effort was later expanded to include the Central and Mississippi Flyways. Positive HPAI H5 findings from wild waterfowl samples suggested that while some of these species exhibit no detectable morbidity or mortality, clinical disease was documented for other wild bird species similarly infected. Also, losses in U.S. domestic poultry were unprecedented. In July 2015, state and federal agencies initiated a national surveillance effort to provide information to guide management actions to address some of the issues associated with HPAIVs in birds. This includes risks to commercial poultry, backyard poultry, game bird farms, wild birds, wild bird rehabilitation facilities, falconry birds, and captive bird collections in zoos/aviaries. Specific objectives of the plan were to: 1) determine the distribution of influenza viruses of interest in the U.S.; 2) detect spread of influenza viruses of interest to new areas of concern; and 3) provide a flexible surveillance framework that can be modified to monitor wild waterfowl populations for avian influenza, detect reassortant avian influenza viruses, and estimate apparent prevalence of important influenza once detected in an area of concern.

Since the last confirmation of Eurasian reassortment H5N2 during the 2015 U.S. outbreak from Canada geese in Michigan June 17th, there were only two PCR-only detections (no viable virus, sequencing unsuccessful): July 2015 from a mallard during a bird banding effort in Utah, and a hunter harvested mallard from Oregon in November 2015. However, during a live-bird banding effort from August 6-14, near Fairbanks, Alaska, 188 dabbling ducks were sampled at the Creamer’s Field State Migratory Waterfowl Refuge. Influenza A was detected in 48 of the 188 samples, and a single H5 from an adult mallard was confirmed as the HPAIV reassortant clade 2.3.4.4 H5N2 (full eight gene constellation). The detection of H5N2 HPAIV in a migratory species in Alaska confirms low frequency persistence in North America and the potential for re-dissemination of the virus during the 2016 fall migration. There have been no detections in poultry since June 2015.
Risk Identification: Pathogens shared between wild swine, livestock, poultry, wildlife, and humans
Ryan Miller, Steve Sweeney, Dan Grear, Dana Cole; USDA-APHIS-VS, Center for Epidemiology and Animal Health

Cross-species diseases transmission between wildlife, domestic animals and humans are increasingly challenging for veterinary and public health systems. Consequently, diseases that may be between wildlife and livestock are of paramount importance. Recently, wild swine in North America have become of increasing concern as a potential veterinary and public health threat. However, there are no studies assessing the potential transmission of pathogens between wild swine, livestock, and humans. We used a networks approach to identify pathogens and host species most at risk for transmission of pathogens from wild swine. To assess the risk to United States agricultural and human health, we also evaluated the current status of these pathogens in North America, and investigated the potential impact on agricultural exports. We identified 34 World Organization for Animal Health (OIE) listed swine pathogens (bacterial, viral, and parasitic) that cause clinical disease in livestock, poultry, farmed wildlife species, and humans. Of these 34 pathogens, an average 73% of bacterial, 39% of viral, and 63% of parasitic pathogens caused clinical disease in other species. Non-porcine livestock in the family Bovidae (cattle, sheep, goats) shared the most pathogens with swine (82%). Only 45% of currently reportable domestic swine diseases had published surveillance studies of wild swine in North America. Investigation of economic impacts in countries experiencing an OIE-listed disease outbreak found a median export decline of 18% in the 12 months immediately following a reported outbreak. The co-occurrence of wild swine and farms increased at an annual mean rate of 1.2% with as much as 57% of all farms and 77% of all agricultural animals residing in counties with wild swine. The increasing co-occurrence of wild swine with livestock and humans, as well as the large number of pathogens shared, present a growing risk for cross-species transmission in North America.

New World Screwworm infestation on the National Key Deer Refuge
Samantha Gibbs, National Wildlife Refuge System, U.S. Fish and Wildlife Service

Smallest subspecies of the North American white-tailed deer, Key deer inhabit 20-25 islands in the lower Florida Keys, ranging from No Name and Big Pine Key westward to the Sugarloaf Keys. The largest males typically stand only about one meter at the shoulder and weigh a maximum of around 85 lbs. Females are smaller, weighing on average 65 pounds. Poaching and habitat loss reduced the number of Key deer to only a few dozen animals by the 1950’s. The establishment of the National Key Deer Refuge and subsequent listing of the deer as endangered in 1967 allowed for protection and a dramatic recovery of the species. Total population now estimated at approximately 1,000 animals.

New World Screwworm, (Cochliomyia hominivorax), Female screwworm flies lay their eggs in or at the edges of open wounds, Screwworm larvae eat the living tissue of warm-blooded animals.
Twenty-nine Key deer were found dead or euthanized due to severe myiasis beginning July 4, 2016. A veterinarian located in Marathon, FL (approximately 25 miles east of Big Pine Key) confirmed reports that at least three domestic animals with severe myiasis had been examined since July 22, 2016. Larvae collected from deer were submitted September 29, 2016 simultaneously to the University of Florida (UF) and the National Veterinary Services Laboratory (NVSL) in Ames, Iowa for identification. UF and NVSL both keyed the larvae out to Cochliomyia hominivorax (New World Screwworm) on September 30, 2016. The Florida Department of Agriculture and Consumer Services, Division of Animal Industry (FDACS-DAI) immediately initiated a Foreign Animal Disease Investigation in coordination with the U.S. Department of Agriculture (USDA). An animal check station was set up in Key Largo. October 6, 2016, a dog was confirmed positive for screwworm (first examined September 19). October 12, 2016 a pet pig was confirmed positive for screwworm. Since then, there have been presumptive positives in two more dogs, a domestic pig, and 86 Key deer.

Continuing morbidity and mortality in Key deer: determining the triggers for action, thermal imaging, and increased frequency of ground counts. Other actions: options for treatment and prevention, both prevents and treats new world screwworm, long lasting effectiveness with one dose, wide margin of safety, doesn’t impact invertebrates on the refuge (endangered Bartram’s Hairstreak butterfly), doesn’t impact other animals on the refuge (Key Largo woodrat, Lower Keys marsh rabbit and silver rice rat all federally listed species), doesn’t require capturing, re-capturing, or holding the animal for any length of time, and available in the U.S.

Update of Pneumonia in Bighorn Sheep
Peregrine Wolff, Nevada Department of Wildlife

Dr. Wolff reviewed bighorn sheep health during 2016 including topics concerning lack of cross strain immunity to Mycoplasma ovipneumoniae (M. ovi) in bighorn sheep, nasal sinus tumors and the Western Association of Fish and Wildlife Agencies (WAFWA), Wild Sheep Working Group (WSWG) West Wide Disease Management Venture.

Strain Specific Immunity to Mycoplasma ovipneumoniae

Following an all age pneumonia die-off where M. ovi was identified as a causative agent, surviving ewes appear to possess a level of immunity to the infecting strain of M. ovipneumoniae. However, this immunity does not appear to be conveyed to their lambs and annual lamb mortality is often high. Spillover of a novel strain of M. ovi sometime in the future, has been documented to lead to morbidity and mortality in adults similar to the original disease event.

This lack of cross protective immunity between strains emphasizes the need for continued effective separation between wild sheep and domestic sheep and goats as well as other wild sheep herds infected with M. ovi. There is preliminary work also being conducted through Washington State University on the feasibility of developing, an M. ovi free domestic sheep or goat.
Reference

Bighorn Sheep Sinus Tumors, An Update
In 2009, bighorn sheep sinus tumors were discovered within a herd of seven Rocky Mountain bighorn ewes in Colorado that were culled due to a history of at least ten years of failed lamb recruitment. Since discovery, at least 38 cases of sinus tumors have been identified in at least ten free ranging bighorn herds in Colorado. Additional cases have been identified in Rocky Mountain bighorns from Wyoming, Nevada, and Nebraska, as well as one herd of desert bighorn sheep in California, and one herd of California bighorn sheep in Nevada. The disease has been shown to be infectious experimentally and likely has moved across the landscape through natural and artificial movements of bighorn sheep. While sinus tumors alone do not appear to affect adult survival or lamb recruitment, sinus tumors in combination with other typical respiratory pathogens have been consistently identified in Colorado bighorn herds that are struggling with dismal lamb recruitment. Theoretically, sinus tumors may affect the susceptibility of adult bighorns to pneumonia through interference with normal clearance mechanisms of the upper respiratory tract. For more information on this emerging syndrome contact Dr. Karen Fox (karen.fox@state.co.us).

Reference

Western Association of Wildlife Agencies, Wild Sheep Working Group West Wide Disease Management Venture
Respiratory disease-associated all-age die-offs and perennial lamb recruitment failure are the most critical threats to wild sheep in 19 of 23 Western Association of Fish and Wildlife Agency (WAFWA) jurisdictions. Despite decades of research and financial effort, there are no consistently effective methods to manage or recover affected wild sheep herds.

Traditional approaches to bighorn respiratory disease have focused mainly on the role that pathogens and other factors play in the respiratory disease complex. However, we also need to understand how management actions affect disease processes. This Venture proposes to assist jurisdictions to evaluate, validate and implement adaptive management actions that may prevent infection, clear pathogens and improve herd performance. Such actions are vital for ensuring long-term viability of wild sheep populations on historic landscapes. In response to this challenge, the collaborative “West-Wide Adaptive Wild Sheep Disease Management Venture” (DMV) was created by the WAFWA Wild Sheep Working Group and Wildlife Health Committee (WHC) to achieve this purpose.
WILDLIFE DISEASES

GOAL: Develop, implement and evaluate novel epidemiology-based management approaches to control wild sheep respiratory disease.

OBJECTIVES:
1. Identify, develop, and evaluate disease management actions through standardized data collection and assessments of cost/benefit, logistics, and practicality of each action.
2. Improve understanding of the variation in herd response following exposure to important respiratory pathogens and identify factors that contribute to variation in herd responses.

CHARGES:
1. Identify attributes that potentially impact herd performance in healthy and unhealthy herds (e.g., WAFWA WHC, 2014 Bighorn Sheep Health Monitoring Recommendations).
2. Develop criteria for experimental management actions and monitoring protocols, to include non-outbreak (healthy) herds and timing of actions in relation to outbreaks (during or after die-offs).
3. Provide criteria to jurisdictions so that herds can be identified for participation.
4. Encourage, coordinate, and assist jurisdictions with standardization and/or funding for enhanced monitoring of herds and management experiments, including the cost/benefit of each identified management action.
5. Foster and sustain active support and participation among WAFWA leadership, wild sheep managers and wildlife health professionals.
6. Acquire long-term funding support.

Elk Hoof Disease in Washington and Oregon
Jennifer Wilson-Welder, Research Microbiologist, Bacterial Diseases of Livestock Research Unit, National Animal Disease Center, Agriculture Research Service, USDA

In early 2000s, limping free-ranging elk (Cervus elaphus) with abnormal hooves were reported in south-western Washington State. Numbers of cases steadily increased in the Cowlitz River Basin reaching epidemic proportions in 2008. Several targeted collections were conducted by Washington Department of Fish and Wildlife (WDFW) in 2009, 2013 and 2014, targeting animals in a variety of age classes. The results of these collections revealed no systemic cause of hoof abnormalities; viscera, virus isolation, mineral levels and parasitology were in all cases unremarkable, similar between affected and unaffected animals and failed to identify an underlying cause of hoof disease. Animals as young as nine months of age had evidence of hoof abnormalities. Disease was limited to the hoof structure or surrounding skin (Han and Mansfield, 2014). Histopathology of the hoof lesions revealed changes to the keratinocytes (hyperkeratosis), lamellar perivasculitis, areas of necrotic ulceration and neutrophilic inflammatory infiltrates. Most importantly, silver stained sections showed multiple morphologies of bacteria invading deep into the tissues, predominated by spirochetes. Samples were sent to several laboratories, and multiple confirmations were made that the lesions
contained spirochetes belonging to the family Treponema, and were genetically similar to those found in digital dermatitis, a hoof disease of domestic livestock (Clegg et al., 2014).

Digital dermatitis (DD)-like diseases has been described in several domestic species, including dairy and beef cattle, sheep and goats (Wilson-Welder et al., 2015). The clinical presentation in bovine digital dermatitis (BDD) is that of a circular to oval distinct region of ulcerative or granular tissue, usually occurring in or near the interdigital cleft, adjacent to the heel-blub or coronary band. Multiple studies have confirmed that DD is a multifactorial, polymicrobial and poly treponemal disease. Contagious Ovine Digital Dermatitis (CODD) presents clinically as ulcerations along the coronary band, underrunning the hoof horn, presence of profuse granular tissue and results often in the loss of the hoof capsule (Angell et al., 2015). In many ways, the elk hoof disease grossly presents more like CODD. Regardless of the gross presentation, the underlying histopathology and associated bacterial consortium, especially the treponemes, is nearly identical. Genetic analysis of Treponema isolated from elk lesions were highly similar to those isolated from cattle and sheep on different continents (Clegg et al., 2016). Thus the elk hoof disease has been given the name Treponeme Associated Hoof Disease (TAHD).

TAHD is also being described in Oregon. Most of the cases seem to have been concentrated on the ‘wet’ side of the Cascade Range, however sporadic cases have also been described extending southward along the coastal valleys and in the north eastern corner of the state. These cases on the ‘dry’ side of the Cascades seem to affect fewer numbers of individual animals within a herd. While diagnostic tests confirm the involvement of DD-associated treponemes, it is unclear at this point if this represents a new stage of TAHD evolution.

To address long term effects of TAHD on the southwestern Washington elk population, WDFW initiated a five year Survival Study. Female elk in the Mount Saint Helens region were fitted with radio collars to monitor survival and calf production. In addition, other heath metrics were collected at time of capture including swabs of the feet to confirm presence of TAHD and blood for immunological assays. In the first year (February 2015), a total of 75 animals were captured, 76% had visible hoof abnormalities consistent with TAHD. Swabs were sent to a USDA-research laboratory for culture and PCR testing, 17 of 30 samples sent were culture positive, 41% were PCR positive, and the PCR was positive for Treponema associated with DD (T. phagedenis, T. medium and T. pedis) (Evans et al., 2008). In the second year (December 2015), 45 elk cows were captured, including 29 from the previous capture in February. Sixty six percent had visible hoof lesions in the field consistent with TAHD, 46% were culture positive and 75% were PCR positive for DD-associated treponemes. Elk with disease had significantly higher serum antibody titers to mixed Treponema antigens than animals outside the endemic area, or animals not showing disease in the endemic area. Most of the captured animals had lesions similar to grades 3 or 4 following a similar scoring system published for CODD (partial or complete ulceration of coronary band or sole, sloughing of the hoof horn) and many had more than one foot with some stage of disease (Angell et al., 2015).
With the results of just the first few captures undergoing analysis, some preliminary conclusions are being considered. The disease can progress rapidly. Several recaptured animals went from grades 0 (healthy) to 4 (loss of hoof capsule) in eight months. Rarely does the disease regress as little to no resolution was seen. The research teams are working on better non-lethal diagnostic tools. Culture and PCR were confirming many of the visually obvious cases, but not detecting all. Due to natural antibody present in the elk and cross-reactivity to environmental bacteria, the serology to other organisms involved in hoof diseases such as Fusobacterium, are hard to differentiate. The USDA-research laboratory has recently developed an experimental model for DD that will help elucidate bacterial pathogenesis and mechanisms of disease pathology that will contribute to improvements in diagnostics. Work will continue in diagnostics and case definition of TAHD, which at this time, relies heavily on histopathology for confirmation of cases. Both Washington and Oregon Departments of Fish and Wildlife will continue increased surveillance for TAHD in elk herds. There are currently planned public and hunter education campaigns, participation of citizen science reporting surveys and efforts to restrict movement of affected feet in endemic areas.

References


Bovine Tuberculosis Surveillance and Management in Indiana
Bret D. Marsh, Indiana State Board of Animal Health
(Content of this report prepared primarily by The Indiana Department of Natural Resources, Specifically Dr. Joe Caudell.)

History of Bovine Tuberculosis (TB) in Indiana
Bovine tuberculosis was eradicated from Indiana in 1984. Bovine tuberculosis was identified in Indiana in a single cow in November 2008 and farmed deer in 2009 in a nearby Franklin County farm consisting of red deer, elk, and fallow deer. As a result, Indiana Department of Natural Resources (IDNR), the Indiana State Board of Animal Health (BOAH), and USDA-APHIS, Wildlife Services (WS) and Veterinary Services (VS) began a surveillance program to determine if bovine tuberculosis had spilled over into wild white-tailed deer. In 2011, bovine tuberculosis was detected in a Dearborn County cattle farm. Later that year, surveillance of white-tailed deer was expanded to this area. From 2008-2015, more than 1,400 deer from this area were tested and all wild white-tailed deer were negative for bovine tuberculosis.

In April 2016, bovine tuberculosis was detected by BOAH and USDA on a cattle farm consisting of two premises in Franklin County. As part of the response to that event, wildlife was removed and tested from the affected areas. In August 2016, a wild white-tailed deer removed from the affected premise tested positive for bovine tuberculosis. Results from the other wildlife taken from the farm are pending.

The USDA-APHIS National Veterinary Services Laboratory (NVSL) has been conducting research on bovine tuberculosis strains from throughout the United States. The results from Indiana indicate that all of the deer species and cattle affected by bovine tuberculosis have been affected by the same strain. The data indicate that all of the bovine tuberculosis found in Indiana is closely related and that these events are likely connected. Current data suggest that bovine tuberculosis has possibly been circulating at extremely low levels in the deer herd since at least late 2008 when the first case was detected. Based on these findings, IDNR will establish a Bovine Tuberculosis Management Zone in south Fayette and Franklin counties, and a Bovine Tuberculosis Surveillance Zone in northern Dearborn County.

**Indiana Bovine Tuberculosis Management Zone**

For 2016, the area south of State Road 44 in Fayette County and all of Franklin County has been designated a Bovine Tuberculosis Management Zone and the primary activity in this area will focus on reducing the prevalence of the disease and reducing the population of wild white-tailed deer to reduce the spread of the disease. Surveillance for the disease in the Bovine Tuberculosis Management Zone is considered a secondary objective.
MANAGEMENT ACTIVITIES WILL CONSIST OF:

• The removing of additional deer from the bovine-tuberculosis-affected property and/or the surrounding properties will occur as soon as possible. If hunters have access to surrounding properties, IDNR will partner with them to collect targeted samples.

• Additional opportunities to harvest deer will be provided to allow hunters to assist in the reduction of the deer population.
  o A second buck tag will be issued to anyone submitting a buck that meets the established requirements (see below).
  o Landowner permits will be available to landowners desiring to reduce the deer population on their property for the purposes of disease management.

• Surveillance
  o Hunters will check in their deer online within 12 hours of harvest and obtain their registration number.
  o Voluntary surveillance for hunters in Franklin and south Fayette counties who are concerned about bovine tuberculosis in their harvested deer can either use the two to three established drop-off and/or staffed locations, or they can contact a biologist using the toll-free number to arrange a time and location for heads to be sampled.
  o A collectable Deer Cooperator Patch will be issued to all cooperating youth and adult hunters who submit deer for bovine tuberculosis surveillance.

• A ban on feeding deer and other mammalian wildlife in the Bovine Tuberculosis Management Zone will be implemented.

• The IDNR will work to establish a baseline population size/density for the area using spotlight counts and/or other methods.

• Active white-tailed deer population reduction will begin in January and continue until early April using a combination of landowner permits and sharpshooting with the goal of reducing the number of infected individuals in the area and the density of deer to reduce the spread of the disease among wild white-tailed deer.

Indiana Bovine Tuberculosis Surveillance Zone

For 2016, sampling protocols were redesigned in an attempt to detect bovine tuberculosis at lower prevalence rates by conducting bovine tuberculosis surveillance in Dearborn County north of State Road 48 during the 2016 deer hunting season. The IDNR will need to collect samples from between 350 and 1,100 deer, depending on sex and age class of the animal. While any age and sex of white-tailed deer can become infected with bovine tuberculosis, surveillance from other states has demonstrated that sampling bucks older than two years of age is more likely to detect the disease. Therefore, obtaining samples from older-age bucks will result in fewer total deer that need to be tested (approximately 350). If most samples come from does or bucks younger than two years old, then more deer will need to be sampled. In general, a buck older than two years old equals about ten yearling bucks from a bovine tuberculosis surveillance perspective.
Therefore, our objective is to sample as many hunter-harvested bucks that are older than two years as possible and obtain the remaining samples with hunter-harvested does and younger bucks.

**TO MEET THIS OBJECTIVE, THE FOLLOWING STRATEGIES WILL BE EMPLOYED:**

- The Surveillance Area is Dearborn County north of State Road 48 and will consist of a period of mandatory and voluntary check-in at Biological Check Stations.
  - Mandatory check-in of deer will be required at IDNR Biological Check Stations on September 24-25, 2016, and from November 4-27, 2016. During the mandatory check-in period, hunters must check in their deer online and obtain their registration number within 12 hours of harvest and then bring the deer to a Biological Check Station within 12 hours of harvest.
  - Voluntary sample submission will occur October 1 through November 3, 2016, and December 3-11, 2016. Hunters who harvest deer in Dearborn County will check in their deer online and obtain their registration number within 12 hours of harvest. During the check-in process, hunters will be instructed to contact the IDNR using a toll-free number to facilitate participation in the bovine tuberculosis surveillance effort.
    - A sample collection team based in Dearborn County will be on call to meet with hunters to sample their deer or hunters can visit Biological Check Stations.
    - The samples needed are found in the head and neck of the deer, so these areas should be preserved if deer are processed in the field.
    - Hunters who wish to have their deer mounted or processed can provide the name of the taxidermists or processor so that arrangements can be made to collect the samples from that location.
- A second buck tag will be issued to anyone submitting a buck that meets the established requirements (see below).
- A collectable Deer Cooperator Patch will be issued to all cooperating youth and adult hunters who submit deer for bovine tuberculosis surveillance.

**Check Stations**

**DEARBORN COUNTY: DEER HARVESTED NORTH OF STATE ROAD 48**

Mandatory: September 24-25, November 5-27
Voluntary: October 1 - November 4, December 3-11
- 3-D Mart at BP Gas Station, 27968 State Road 1, West Harrison
- Gravel lot behind FCN Bank, 226 North Meridian Street, Sunman, Ripley County
- Orscheln Farm and Home, 181 South Tanners Creek Drive, Lawrenceburg

**FAYETTE COUNTY: DEER HARVESTED SOUTH OF STATE ROAD 44**

Voluntary: September 24-25, November 12-13
- Mustins Taxidermy, 1600 West County Road 350-S, Connersville
Additional Buck Tag for Hunters

During 2016, hunters who harvest a buck two years old or older from the bovine tuberculosis surveillance and management areas and allow a sample to be collected (either by IDNR staff, taxidermist, or at a processor) will qualify for an additional free buck tag that can be used to harvest a second older-aged buck from the bovine tuberculosis surveillance or management area. A buck older than two years old can typically be estimated in the field by the spread of the antlers and the number of antler points. The age will be confirmed by tooth wear replacement by a biologist. To judge a deer in the field, hunters can look for:

- An antler spread that is equal to or greater than the width of the ears when the ears are in the alert or outstretched position.

Deer that are presented to a biologist that meet this criterion will qualify for an additional buck tag. Deer that do not meet these criteria, but are judged to be older than two years old by tooth wear by a biologist will also qualify for an additional buck tag.

The second buck that is harvested must meet the same criteria as the first buck and must also be presented for sampling before hunters can obtain their registration number. Hunters will be allowed to keep antlers and the deer from both the first and second buck.

Additional buck tags will be available at Biological Check Stations or by arrangement with biologists by calling the toll-free number listed on the CheckINGame System.

Time Frame

Hunter-harvested samples will be collected starting during youth weekend and continue through early December. Active management in the Bovine Tuberculosis Management Zone will begin immediately on the affected properties.

Agency Sharpshooting for Surveillance

If an adequate number of samples to meet the surveillance goal are not collected through hunter-harvested deer, personnel from IDNR and USDA-APHIS, Wildlife Services (WS) will be used to remove deer from the bTB Surveillance Area (northern Dearborn County) in early 2017. There are typically enough deer harvested by hunters in the surveillance area to meet the surveillance objective; however, we estimate that the vast majority of the deer older than two years old will need to be sampled. It is critical that hunters participate in the surveillance to eliminate the need for sharpshooting. It is also important that hunters encourage each other to participate in the surveillance. IDNR considers sharpshooting for surveillance purposes an undesirable option; however, it may be necessary if successful hunter participation in the surveillance effort is low.

Update on 2015-16 Hemorrhagic Disease Activity in Wild Ruminants
Mark G. Ruder, Clara Kienzle, Rebecca L. Poulson, and David E. Stallknecht, SCWDS, University of Georgia

Annually, the Southeastern Cooperative Wildlife Disease Study (SCWDS) receives tissue samples from throughout the United States from wild ruminants suspected to have orbiviral hemorrhagic disease. Virus isolation and identification is performed and findings from the 2015 and 2016 transmission seasons are reported here. During 2015, 56 viruses were isolated from 172 tissue samples, representing six species of wild ruminant (159 white-tailed deer, 6 mule deer, 3 elk, 2 Key deer, 1 moose, and 1 bison) from 19 states. Isolations of epizootic hemorrhagic disease virus (EHDV-1) (3), EHDV-2 (42), EHDV-6 (3), and bluetongue virus (BTV-17) (8) were made from white-tailed deer (see Table). As of October 1, 2016, there have been 36 viruses isolated from 99 tissue samples, representing 21 states and 6 species (84 white-tailed deer, 6 mule deer, 4 pronghorn, 3 bighorn sheep, 1 elk, and 1 nilgai). Isolations of EHDV-1 (1), EHDV-2 (21), EHDV-6 (3), BTV-2 (1), BTV-3 (9), BTV serotype pending (1) were made from white-tailed deer or mule deer (see Table).

### 2015 SCWDS Hemorrhagic Disease Diagnostics

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<thead>
<tr>
<th>STATE</th>
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<tbody>
<tr>
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<td>EHDV-1</td>
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<tr>
<td></td>
<td></td>
<td>EHDV-6</td>
</tr>
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### 2016 SCWDS Hemorrhagic Disease Diagnostics

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<tr>
<td>Louisiana</td>
<td>white-tailed deer</td>
<td>BTV-2</td>
</tr>
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</table>

461
The 2016 BTV-3 outbreak in West Virginia and Virginia is noteworthy because this serotype of BTV is not historically endemic to the U.S. Furthermore, this outbreak represents the northeastern most detection of BTV-3 in the U.S. and there is concern over the northern expansion of bluetongue and EHD viruses into northern states. During early- to mid-August 2016, the Virginia Department of Game and Inland Fisheries (VDGIF) and the West Virginia Division of Natural Resources (WVDNR) received numerous reports of sick and dead white-tailed deer in bordering counties of the northern part of each state. Prompt field investigation and diagnostic sample submission by agency personnel lead to the isolation of BTV at SCWDS, which was confirmed as BTV-3 by NVSL. Reporting of sick and dead deer by the public continued through mid- to late-September. Based on these reports and field investigation by WVDNR and VDGIF, the outbreak was intense in the deer population but appears to have been fairly localized to a mountainous region in extreme eastern Hardy County, West Virginia, western Shenandoah County, Virginia, and northern Rockingham County, Virginia. However, follow-up investigation will aim to better evaluate the geographic extent of the outbreak. In total, BTV-3 was detected in tissues sampled from 9 of 14 deer from the region. BTV-3 was first confirmed in Florida in 1999 by the National Veterinary Services Laboratory (NVSL). However, since that time, BTV-3 has been detected in domestic and wild ruminants over a broad geographic region, including Florida (1999-2003, 2013), Mississippi (2006, 2009), Arkansas (2008), Oklahoma (2008), South Dakota (2012), and Texas (2015). A large portion of these BTV-3 detections have been made from white-tailed deer, highlighting the importance of monitoring wild ruminants for orbivirus activity. In many regions of the U.S., this species can serve as an important sentinel for EHDV and BTV activity.

An additional noteworthy observation from 2016 is the isolation of EHDV-6 from a mule deer in New Mexico. This represents the western most detection of EHDV-6 by SCWDS and indicates that this virus continues to circulate over a very broad geographic region in the United States.

**Revisiting Brucellosis in the GYA – Montana**
Jennifer Ramsey, Montana Fish, Wildlife, and Parks

Background information regarding brucellosis in Montana as well as an overview of the objectives and results Montana’s Targeted Surveillance Program

<table>
<thead>
<tr>
<th>State</th>
<th>Species</th>
<th>Virus</th>
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<tr>
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<td>Virginia</td>
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</tr>
<tr>
<td>West Virginia</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>EHDV-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EHDV-2</td>
</tr>
</tbody>
</table>
for elk was presented. Included was reporting by Montana Fish, Wildlife, and Parks’ for planned future efforts for brucellosis surveillance and research.

Mark Drew, Idaho Fish and Game Department  

Brucellosis in elk is a well-established disease in the Greater Yellowstone area. Surveillance efforts in elk have been used to define disease distribution and prevalence. In addition, these data have been used to inform the establishment of a Designated Surveillance Area (DSA) for cattle in the three states (MT, ID and WY). Typically, samples from adult female elk that are captured or harvested by hunters are tested using a variety of antibody tests to determine serologic status of a given population or area (hunting district, game management unit, zone). The three states have different approaches to the disease in elk and different disease prevalence, some of which may be associated with elk population levels, movements, density, or winter range characteristics. Interactions between cattle and elk in winter, primarily January to June, are the high-risk period for exposing cattle to the disease. Management efforts to minimize the exposure of cattle during this period differ between states and include fencing of cattle and haystacks, vaccination of elk, hazing or depredation hunts for elk, and habitat improvement to keep elk winter ranges separate from cattle wintering areas.

Population Effects of Chronic Wasting Disease on White-tailed Deer  
David Edmunds, Natural Resource Ecology Laboratory, Colorado State University/U.S. Geological Survey  
Matthew Kauffman, Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming (UW)  
Brant Schumaker, Department of Veterinary Sciences, UW  
Frederick Lindzey, Wyoming Cooperative Fish and Wildlife Research Unit, UW  
Walter Cook, Department of Veterinary Pathobiology, Texas A&M University  
Terry J. Kreeger, Wyoming Game and Fish Department  
Ronald Grogan, Department of Veterinary Sciences, UW  
Todd Cornish, Department of Veterinary Sciences, UW  

Chronic wasting disease (CWD) is an invariably fatal transmissible spongiform encephalopathy, or prion disease, of white-tailed deer, mule deer, elk, moose, and reindeer. Current distribution of CWD in free-ranging North American cervids includes 21 U.S. states and two Canadian provinces; recently CWD also was discovered in free-ranging reindeer and moose in Norway. Despite a 100% fatality rate, areas of high prevalence (~45% in some deer populations), and an ever-expanding geographic distribution, little is known about potential population-level effects of CWD in deer. To investigate these effects, we tested the null hypothesis that CWD found at high prevalence would not negatively impact white-tailed deer population sustainability. The specific objectives of the study were to monitor CWD-positive and CWD-negative white-tailed deer in a high-prevalence CWD area in southeast Wyoming longitudinally via radio-telemetry and global positioning system (GPS) collars. We captured deer as fawns on winter range to CWD-test by tonsil biopsy, mark with radio-collars, and pregnancy test all females. We recaptured all deer
annually to retest for CWD and pregnancy status. We tracked deer throughout the year by radio telemetry and GPS collars and annual vital rates were determined for four cohorts of deer from 2003-2010. For the two populations (CWD-negative and CWD-positive), we determined the following: a) demographic and disease indices, b) annual survival, and c) finite rate of population growth ($\lambda$).

The CWD prevalence was higher in females (42%) than males (28.8%) and hunter harvest and clinical CWD were the most frequent causes of mortality, with CWD-positive deer over-represented in harvest and total mortalities. Survival was significantly lower for CWD-positive deer and separately by sex; CWD-positive deer were 4.5 times more likely to die annually than CWD-negative deer while bucks were 1.7 times more likely to die than does. Population $\lambda$ was 0.896 (0.859-0.980), which indicated a 10.4% annual decline.

This is the first conclusive evidence that CWD found at high prevalence leads directly to population declines in free-ranging deer populations. This population highlights the potential long-term negative outcome of endemic CWD to population sustainability and stresses the importance of preventing CWD from becoming endemic in a population, rather than attempting to manage if after the fact. Therefore, the best management strategy remains minimizing movement of CWD to new areas.

**Chronic Wasting Disease in Elk: Research Updates from National Parks**

Margaret A. Wild, Ryan J. Monello, Jenny G. Powers, and Nathan L. Galloway; National Park Service

Chronic wasting disease (CWD), a fatal, contagious prion disease of cervids, can cause long-term population declines in deer (Odocoileus spp.); however, little data exist on the effects of CWD on free-ranging elk (Cervus elaphus nelsoni). Where CWD exists in elk, prevalence is frequently estimated to be <1% leading some to surmise that its population impact is minimal. In some geographically isolated areas of Colorado, Wyoming, and South Dakota however CWD prevalence in elk surpasses that in deer. To investigate the population impacts of CWD, we studied an elk herd residing in and around Rocky Mountain National Park, Colorado, where CWD was first detected in 1981. Using immunohistochemical staining of rectal biopsies, we estimated CWD prevalence to be 12.9% (CL 8.0 - 19.1) in 2008-2009, although additional analyses using the highly sensitive serial protein misfolding cyclic amplification (sPMCA) assay predict prion infection to be higher (18.9%, CI 15.5 – 32.7%). We used survival rates of susceptible and infected elk to develop a projection matrix for a discrete time, female only model that estimated the intrinsic population growth rate ($\lambda$) of this elk herd to be 1.00 (BCI 0.93 - 1.05). Results of the projection matrix predict that even in the absence of hunting or other sources of mortality, CWD alone could induce population declines once prevalence exceeds 13% (BCI = 0, 35); however, this estimate was contingent on calf:cow ratios and harvest. To refine these estimates, we initiated a longer term survival study on this population in 2011. Using rectal biopsies, we estimate CWD prevalence at 8.5% (CL 4.6-13.3%). Preliminary results suggest survival rates remain low and CWD continues to be a leading cause of mortality. Clearly the population impacts of CWD on elk should not be dismissed without
further investigation. At Wind Cave National Park, South Dakota, CWD contributed to decreased population growth rates in elk. Upcoming research will investigate the effect of reducing density on CWD prevalence and vital rates in the park.

Chronic Wasting Disease in Arkansas
Cory Gray, Arkansas game and Fish Commission
Margaret A. Wild, National Park Service

Chronic wasting disease (CWD), a neurodegenerative disease of cervids, was detected in Arkansas for the first time in February 2016 in a 2.5-year female elk legally harvested in October 2015 near Pruitt in Newton County. During that same period, a CWD-positive 2.5-year female white-tailed deer was found dead in Ponca in Newton County. To date, a total of 109 cervids have been confirmed positive for CWD in Arkansas; 5 elk and 104 white-tailed deer.

During March 14-24, 2016, biologists from the Arkansas Game and Fish Commission (AGFC) and other agencies randomly collected 266 white-tailed deer from a 125,000-acre CWD Focal Area in Newton County, Arkansas. CWD was detected in 62 (23%) of these animals. CWD prevalence rate in female and male deer was 20% and 32%, respectively. Concurrent with the collection of the obex and retropharyngeal lymph nodes used for CWD testing, a 1-inch2 section of ear tissue was obtained from each deer and frozen for future genetic analysis.

To explore spatial distribution, additional sampling of road-killed (i.e., deer struck and killed by vehicles) and target animals (i.e., cervids exhibiting any illness or unusual activity) was implemented, statewide, in March 2016. Interestingly, a 2.5-year male, road-killed in Pope County, was found to be CWD-positive. This individual deer was identified 45 miles south of the CWD Focal Area in Newton County near the Arkansas River.

The AGFC implemented a series of regulations during the summer of 2016 with two goals in mind: 1) Minimize disease introduction into new areas, and 2) minimize disease amplification in already established areas. These regulations went into effect for the 2016 hunting season.

AGFC staff and partners are currently coordinating surveillance activities for the 2016 elk and deer seasons. Surveillance goal is to increase knowledge of disease distribution, monitor prevalence inside the focal areas, and collect higher-probability samples (i.e., road kills, target animals, and mature bucks) statewide to serve as a disease detection strategy.

USDA-APHIS-VS CWD Program Standards and Updates
Alecia Naugle, Randy Pritchard, USDA-APHIS-VS, Cervid Health Team
Fiscal Year (FY) 2016
Voluntary Chronic Wasting Disease (CWD) Herd Certification Program

The APHIS National CWD Herd Certification Program (HCP) was implemented in 2014. It is a voluntary Federal-State-industry cooperative program administered by APHIS and implemented by participating States. The program provides uniform national herd certification standards that minimize the risk of spreading CWD in farmed cervid populations. Participating States and herd owners must comply with requirements for animal identification, fencing, recordkeeping,
inspections/inventories, as well as animal mortality testing and response to any CWD-exposed, suspect, and positive herds. APHIS monitors the Approved State HCPs to ensure consistency with Federal standards through annual reporting by the States.

With each year of successful surveillance, herds participating in the HCP will advance in status until reaching five years with no evidence of CWD, at which time herds are certified as being low risk for CWD. Only captive cervids from enrolled herds certified as low risk for CWD may move interstate. Currently, 29 States participate in the voluntary CWD Herd Certification Program and have Approved HCPs. FY 2016 marks the fourth year that Approved States have submitted their CWD HCP annual reports to APHIS. In FY2016 there were 2,704 enrolled cervidae herds: 2,129 deer, 447 elk and 128 mixed species herds. Of those, there were 2,331 certified cervidae herds: 1789 deer, 421 elk and 121 mixed species herds.

**VS PCEP Evaluation**

Veterinary Services (VS) conducted an internal evaluation of its Cervid Health Program in 2016 at the request of VS leaders. The evaluation used VS’ Program Continuous Evaluation Process (PCEP), a standardized process designed to help VS leaders improve programs and services by examining (1) the program goals with respect to alignment with VS goals, stakeholder needs, program status and allocated resources; (2) the program strategies with respect to suitability for achieving program goals effectively and efficiently; and (3) the program value to stakeholders. A total of 49 stakeholders, including 40 stakeholders external to VS, were asked to provide input to the PCEP evaluation. Seven VS veterinary medical officers and one Wildlife Services veterinary medical officer met from May through June 2016 to complete the evaluation and to provide recommendations for the program. Recommendations and stakeholder input regarding the CWD Herd Certification Program (HCP) from the review were provided to the CWD Program Standards Working Group.

**CWD in Farmed and Wild Cervids**

Summary of CWD detections. As of September 30, 2016, CWD has been confirmed in wild deer and elk in 22 U.S. States, and in farmed cervids in 16 States. In total, 24 States have identified CWD in wild and/or farmed cervids. CWD has been reported in 77 farmed cervid herds in the United States.

Confirmation of the disease in free-ranging elk and white-tailed deer in Arkansas in 2016 marked the first reports of CWD in the wild cervid population in this State.

FY2016 CWD Detections in Farmed Cervids: Seven new positive captive cervid herds were identified in FY2016 (5 white-tailed deer and 2 elk). None of the seven positive herds were certified herds in the Herd Certification Program.

**Texas: Two new herds**

In February 2016, National Veterinary Services Laboratories (NVSL) confirmed CWD in a 3½-year-old, natural addition whitetail buck that was hunter-harvested from a release site on a ranch in Medina and Uvalde counties. The deer originated from a breeding facility on the ranch. Based on the possible exposures, both the breeder pen and the release site were considered positive premises. The buck was genotype GG at codon 96 and tested positive on both lymph node and obex. Two
more positive deer have been identified out of 349 animals in the herd that have been tested since February using post-mortem and/or ante-mortem samples. The breeding facility and the associated hunting facility tested at least 130 white-tailed deer for CWD as part of routine post-mortem surveillance within the five years prior to the first positive case. The positive herd was within 50 miles of another known positive farmed cervid herd at the time of diagnosis. The herd currently has approximately 780 whitetail deer under State quarantine.

In April 2016, NVSL confirmed CWD in a 3½-year-old, natural addition white-tailed doe in Medina County. The doe was genotype GG at codon 96 and tested positive on both lymph node and obex. Subsequently, an additional 13 positive deer were identified by post-mortem and ante-mortem testing, including five 96GG, six 96GS, and two 96SS genotypes. The herd tested a total of 181 deer for CWD as part of routine post-mortem surveillance in the five years prior to the positive diagnosis. This positive herd is within ten miles of the positive herd identified in Medina/Uvalde Counties in February 2016.

Approximately 1,000 white-tailed deer currently reside on the premises that remains under State quarantine. Federal indemnity was used to remove and test select animals to inform the epidemiological investigation and evaluate the performance of ante-mortem tests.

**Wisconsin: Three new herds**

NVSL confirmed CWD in a 3-year-old, natural addition buck on a white-tailed deer breeding/hunting facility in Three Lakes, Wisconsin in November 2015. The facility is located in Oneida County. The buck was positive on both obex and lymph node, but was not tested for genotype. One additional positive hunter-harvested 5-year-old buck was positive on both lymph node and obex (untested genotype). No CWD positive cervids have been found in wild or farmed cervids within 50 miles of the positive premises. The herd tested at least 129 deer for CWD as part of routine post-mortem surveillance were reported within the five years prior to the positive diagnosis. The herd consists of approximately 450 white-tailed deer and is under State quarantine. Federal indemnity was not provided for this herd.

In January 2016, NVSL confirmed CWD in a 2½-year-old, natural addition white-tailed buck in Iowa County, Wisconsin. The farm had been under quarantine since 2002 because it is located within five miles of CWD-detection in wildlife. Only a few deer are kept on the farm for exhibition. The buck was positive on both obex and lymph node, with an untested genotype. The herd was enrolled in an HCP program in 2002, but was not compliant at the time of diagnosis. Twelve valid CWD test results had been reported in the five years prior to the positive animal diagnosis. The herd’s owner currently has an inventory of less than 10 CWD-susceptible species. Federal indemnity was not provided for this herd.

NVSL confirmed CWD in a white-tailed deer in Oconto County, Wisconsin in September 2016. The deer was a female, one-year-old natural addition that was found dead. The lymph node was CWD-positive but prion was not detected in the obex sample tested. The facility includes a separate breeding farm at the same location, with approximately 850 deer in the breeding farm and an estimated 1,500 deer in the hunting preserve. This preserve is not on a Herd Certification Program. There have been 1,078 deer tested from this preserve since 2010. A quarantine
was issued. It will require 100% testing of all deer that die or are killed and are 12 months of age, in both operations. There are no plans to depopulate this farm at this time.

**Iowa: One new herd**

NVSL confirmed CWD in an elk from a hunting preserve in Pottawattamie County, Iowa, in January 2016. An adjacent breeding facility owned by the same producer was depopulated for CWD in 2012. The breeding facility received exposed deer from another positive herd in Iowa. The hunting preserve tested seven animals for CWD in 2012 (no other testing known). The hunt facility currently consists of white-tailed deer and elk and the plan is to hunt out the remaining animals. Federal indemnity was not provided for this herd.

**Colorado: One new herd**

In June 2016, NVSL confirmed CWD in an elk from a facility in Eagle County, Colorado. The 9-year-old cow elk was born on another premises in Colorado, but had been at this Eagle County facility for the past 8 years. This facility consisted of a small herd used for personal meat production. Communication with state animal health officials indicated that only one other elk resided on the premises at the time of CWD detection. That animal was euthanized and tested “not detected” for CWD. The herd owner has no plans to raise elk in the future.

**Retrospective Epidemiology of CWD in Farmed and Wild Cervids:** VS initiated a retrospective CWD epidemiology assessment in partnership with State animal health and wildlife agencies in 2015, but the evaluation was postponed due to VS’ highly pathogenic avian influenza response. As part of the Herd Certification Program annual reporting process, VS asked States to complete an epidemiology summary for all previously identified CWD-infected herds. Nine States responded to the request for data and completed positive herd summaries for a total of 25 herds.

VS also cooperated with the Association of Fish and Wildlife Agencies and the Southeastern Cooperative Wildlife Disease Study to request similar data on CWD surveillance and epidemiology in wild cervid populations. Fourteen States responded to the request for data. VS is summarizing the information we received.

**Review of CWD Program Standards**

VS convened a working group composed of State, Federal, and industry representatives in the summer of 2016 to review the CWD Program Standards. This working group met for a 3-day face-to-face meeting and several follow-up conference calls to identify sections of the CWD Program Standards that need revision and to provide options for how VS could revise those sections. VS also asked a group of CWD scientific experts to provide their opinions on several key scientific questions. The working group discussed the following topics: goals and outcomes for the CWD Program; purpose/use of the Program Standards; susceptible species; definitions of terms; ante-mortem testing; epidemiologic investigations; reporting; indemnity; surveillance in certified herd; fencing requirements; biosecurity requirements; and carcass disposal. A summary of the working group’s discussions and VS’ recommended changes to the CWD Program Standards will be distributed for comment at the 2016 USAHA meeting.
Guidance Document for Interstate Movement of Wild Caught Cervids

VS issued a guidance document, VSG 8000.1 Surveillance and Testing Requirements for Interstate Transport of Wild Caught Cervids in September 2016. This document clarifies the process for approval, establishes a recommended minimum standard for testing and a uniform process of disease risk assessment to help prevent the spread of cervid diseases such as CWD, bovine tuberculosis (TB), and brucellosis when wild cervids are captured for interstate movement and release. Prior to its finalization, we shared a draft with State Animal Health Officials and Wildlife Officials in States that have conducted these movements in the recent past for review and comment.

Live Animal Testing For CWD

VS cooperated with animal health officials in Wisconsin, representatives from VERGE, and the herd owner to perform ante-mortem collection of medial retropharyngeal lymph node (MRPLN) biopsies during a depopulation of a white-tailed deer herd in November 2015 as a proof-of-concept pilot project. Additionally, VS' National Veterinary Services Laboratories (NVSL) evaluated historical post-mortem MRPLN samples and used this data to develop laboratory protocols to test and interpret ante-mortem MRPLN samples. VS will collaborate with States and industry to develop a policy concerning the use of ante-mortem MRPLN biopsies using the protocols developed by NVSL.

In addition, VS continues to support research to develop and validate other live animal tests for CWD. A pilot project is in process in Ohio to evaluate the use of whole-herd rectal biopsy as an ante-mortem test in CWD-exposed white-tailed deer herds. The first whole-herd test was performed on 231 exposed white-tailed deer in six herds from February through March. The second whole-herd testing was completed in September and final results are pending. Genotyping was used to determine the timing of the second whole-herd test. To date, all biopsy results have been “not detected.”

Cervid Tuberculosis

The CervidTB Stat-Pak and Dual Path Platform (DPP) VetTB Assay serologic tests were approved for use in captive and free-ranging North American elk, white-tailed deer, red deer, fallow deer, and reindeer effective February 4, 2013. In July 2014, the DPP test became both a primary and secondary test for TB in cervids. Animals that have two consecutive positive tests at least 30 days apart are classified as TB reactors, and APHIS provides indemnity to euthanize these animals for further diagnostic testing.

In FY 2016, 10,750 cervids were tested serologically for bovine TB. A total of 42,612 cervids have been tested since the introduction of the serological tests in 2013. In FY2016, primary DPP serological testing identified 18 TB suspects; ten of these animals had negative tests when retested at least 30 days after the primary test and three animals have yet to be retested. Five were identified as TB reactors when they tested positive to the secondary DPP test. All five reactors were necropsied. Four mycobacterial culture results were negative and one culture result is pending.

In February 2016, the Scientific Advisory Subcommittee (SAS) of the USAHA Committee on Tuberculosis (TB) considered a proposal from VS to raise the DPP
optical density (OD) cut-off value for reindeer from 200 to 500. Since the DPP was approved for use in the diagnosis of Mycobacterium bovis infection in reindeer in 2013, 179 animals were tested. Two animals were positive based on a cut-off of 200. Infection with *M. bovis* was not demonstrated in either animal. The TB SAS did not object to raising the DPP cut-off for reindeer from 200 to 500 in a low prevalence population. However, they recommended that if *M. bovis* were detected in reindeer, VS should evaluate DPP test performance in naturally infected reindeer. In March 2016, VS raised the OD cut-off value for reindeer from 200 to 500 making it consistent with the cut-off for elk, red deer and white-tailed deer.

**National Animal Health Monitoring System Cervid Industry Study**

Beginning early September 2014, VS, in cooperation with the National Agricultural Statistics Service (NASS), conducted the first national study of the U.S. farmed cervid industry. The study surveyed 3,000 producers from all States that have farmed cervids. The survey response rate was 42.5%, which is exceptional for a mail survey. The study provides baseline industry statistics, a description of current production practices and challenges, producer-reported disease occurrences, and an overview of health management and biosecurity practices. A report from the study is now available in electronic and printed formats at: http://www.aphis.usda.gov/nahms

**Cervid Health Program Budget**

The Cervid Health Program includes the CWD herd certification program and the cervid TB program. It is funded through the Equine, Cervid, and Small Ruminant Line Item. In FY2016, the Cervid Health Program was appropriated $3.0 million by Congress for cervid health activities. This funding was generally allocated as follows: $800,000 for indemnity for CWD and cervid TB; $200,000 for USDA Wildlife Services research and $150,000 for pilot projects to evaluate live animal diagnostic tests for CWD, and the remaining funding primarily supported Cervid Health Team and VS field activities.

**Committee Business:**

The Committee discussed one member resolution to amend VS Guidance Document 8000.1 “Surveillance and Testing Requirements for Interstate Transport of Wild Caught Cervids” and the CFR § 81.3, (b) Animals captured for interstate movement and release, to ensure any wild cervid of a CWD susceptible species captured and transported interstate for release shall follow the same protocol set forth in CFR 55 and 81 for farmed cervidae. After 50 minutes of spirited debate but no agreement or resolve among committee members concerning more specific or appropriate language, a motion was made by the submitter to table the resolution and revisit it in the Subcommittee on Farmed Cervidae and Committee on Captive Wildlife and Alternative Livestock.

No further resolutions were forwarded so the Committee was adjourned at 5:50 p.m.

Alternatives to Antibiotics: Immune restoratives for Disease Prevention -- Marcus E. Kehrli, Jr.

Automated Quantification and Description of the Evolutionary Patterns of Influenza Viruses in U.S.A. Swine -- Tavis K. Anderson, Rasna R. Walia, Catherine A. Macken, Richard H. Scheuermann, Amy L. Vincent

Molecular Determinants of Swine H3 Influenza A Viruses: Sequence Based Predictors of Antigenic Properties for Vaccine Strain -- Eugenio Abente, Nicola Lewis, Mark Mogler, Daniela Rajao, Jefferson Santos, Phillip C. Gauger, Daniel Perez, Amy Vincent
ALTERNATIVES TO ANTIBIOTICS: IMMUNE RESTORATIVES FOR DISEASE PREVENTION

Marcus E. Kehrli, Jr.
National Animal Disease Center, USDA-ARS

With a $40.5 billion Gross Domestic Value for milk produced in the U.S. in 2013, the dairy industry was the third largest sector of the 2013 U.S. animal agriculture economic engine. The value of milk produced in 2013 represented 24% of the total value of animal agriculture production; this figure nearly doubled from over a decade ago. Mastitis is mammary gland inflammation caused by wide range of bacterial, fungal, algal and yeast pathogens. Clinical mastitis is the most common cause of morbidity in adult dairy cows and is the most common cause for antibiotic usage in lactating dairy cattle. The National Mastitis Council estimated the annual cost of this disease in 1978 and when adjusted for inflation, the figure today exceeds $5 billion. Calving is a stressful time for cows and the weeks immediately after calving are the period in which they are most likely to develop disease. In fact, nearly 25% of all clinical coliform mastitis occurs in the first two weeks after calving. Research has shown that numerous physiological changes during the transition from pregnancy to lactation result in an immunosuppression and high disease susceptibility. The cow’s immune system reaches a functional nadir in the week or two after calving, resulting the mammary gland, along with the gastrointestinal, respiratory, and reproductive tract all being at risk of increased disease incidence as a result. Circulating neutrophils represent the major recruitable host defense against acute tissue infection, such as mastitis and their critical role in controlling mastitis has been repeatedly demonstrated by researchers since the late 1800’s. Nearly 30 years ago, USDA scientists began investigating new ways to help support transition cows through this critical period of immunosuppression around calving by using biotherapeutics that target neutrophil production and function. One immune modulator or biotherapeutic that consistently helped enhance neutrophil numbers and function was granulocyte colony stimulatory factor (G-CSF) a cytokine that triggers the bone marrow to produce leukocytes – neutrophils in particular, which in turn, fight infectious disease. Human G-CSF has been successfully used for many years as an adjunct therapy for cancer patients undergoing chemotherapy. In a series of studies, G-CSF has been evaluated for its effects on bovine immunity and as a prophylactic against mastitis. Researchers found a consistent dose-dependent effect on increasing neutrophil production by the bone marrow and observed no adverse effects. Importantly, a series of controlled experimental challenge studies with Staphylococcus aureus, Klebsiella pneumonia and Escherichia coli each showed a significant reduction in clinical incidence of mastitis and reduced
severity in the remaining cows that still developed mastitis. The first commercially-available form of G-CSF was approved in March of 2016 by the U.S. Food and Drug Administration for the reduction in the incidence of clinical mastitis in the first 30 days of lactation in periparturient dairy cows and periparturient replacement dairy heifers. The injectable product is a pegylated form of bovine G-CSF that helps support the natural function of a dairy cow’s immune system during the critical time around calving, when she is most vulnerable to mastitis. This is an example of cooperation between the public and private sector to leverage the benefits of basic research into a commercially viable product. Public-sector scientists characterized periparturient immune suppression and first proposed the use of a biotherapeutic in transition cows. The private sector focused on transforming that basic research concept into a safe, effective and convenient-to-use product for dairy producers, and applied their decades of experience in manufacturing to produce commercial-scale quantities of biotherapeutic proteins. Reducing the incidence of the primary disease that results in therapeutic antibiotic use will in turn reduce the use of antibiotics.
AUTOMATED QUANTIFICATION AND DESCRIPTION OF THE EVOLUTIONARY PATTERNS OF INFLUENZA VIRUSES IN U.S.A. SWINE

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Influenza A viruses (IAV) cause one of the most important respiratory diseases in swine. Further, due to the susceptibility of swine to transient infection with IAV from different species, including humans, novel reassorted viruses may emerge that have implications for public health. Consequently, understanding the genetic diversity of circulating viruses in swine can identify novel viral lineages, and provide criteria for informing and improving intervention strategies. To achieve this, a national surveillance system was initiated in 2009 by the USDA and implemented through the National Animal Health Laboratory Network. Samples submitted for diagnostic investigation of respiratory disease are screened by RT-PCR and, if positive for IAV, the viruses are isolated, subtyped, and the HA and NA genes sequenced. These data have revealed a continual co-circulation of multiple genetic clades of three IAV subtypes in swine: H1N1, H3N2, and H1N2. With subsequent phylogenetic analyses, the subtypes can be further categorized to one of 13 HA clades reflecting their evolutionary history: the majority of the sequences falls within three genetic clades – the H1gamma/classical N1, H3 IVA/2002-N2, and H1d1/2002-N2. However, these major genotypes have not replaced the minor genotypes, as these continue to persist at low levels, emerging sporadically. Additionally, our data demonstrate that genetic diversity is not spatially uniform: each U.S. region (North, South, East, and West) contains a unique genetic population of IAV suggesting that regional intervention solutions should be considered. To facilitate comparisons of these IAVs infecting swine within and between regions, we developed and implemented an annotation tool and globally harmonized nomenclature for H1 swine IAV that can assign biologically informative categories to new “unknown” HA sequence data. This tool uses a bifurcating scaffold phylogenetic tree inferred from representatives of each well-supported, named clade, selected to capture the evolutionary relationships among clades. The algorithm places a query sequence on the scaffold phylogeny with a goal to maximize the likelihood of the subsequent phylogeny: following placement, a series of rules assigns a clade annotation to the query. This process is 99.4% accurate and provides a method for researchers, diagnosticians and health officials to assign clade designations, and identify unknown H1 HA IAV sequences.
F. OTHER REPORTS

Taken together, our work reveals that the genetic diversity of swine IAV is complex at regional and especially at global levels. In the United States, there are at least 13 genetic clades that have emerged and persisted following spillover events from non-swine hosts and subsequent ecological and evolutionary processes. The temporal and spatial distribution of the genetics of contemporary swine IAV can be used to inform studies on antigenic evolution and diversity. With the implementation of appropriate vaccination platforms, these data provide fundamental information for the rational design of vaccines and inform risk management policies for agricultural and public health.
MOLECULAR DETERMINANTS OF SWINE H3 INFLUENZA A VIRUSES: SEQUENCE BASED PREDICTORS OF ANTIGENIC PROPERTIES FOR VACCINE STRAIN

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Influenza A virus (IAV) is an important pathogen in swine, and the main intervention strategy is vaccination to induce neutralizing antibodies against the hemagglutinin (HA). The gold standard for characterizing antigenic properties of IAV is to perform hemagglutinin inhibition (HI) assays, a technique that examines antibodies capable of blocking the interaction between the virion and its receptor, sialic acids. Antigenic cartography, a computational approach to visualize cross HI data on a map, was used to better understand the antigenic diversity of H3 IAV circulating in swine in the United States. Three major antigenic clusters (cyan, red, and green) were identified among H3N2 viruses circulating in pigs in the U.S. and were associated with amino acid changes in 6 key sites in the HA1 domain of the HA protein (145, 155, 156, 158, 159, and 189; referred to as the antigenic motif). Introducing amino acid substitutions in an isogenic backbone and quantifying the antigenic effect tested the significance of these six positions, and validated the important role these positions have in defining the antigenic phenotype. Additionally, new antigens were tested and the antigenic phenotype could be accurately predicted based on the antigenic motif the virus encoded. Vaccine challenge studies in pigs were employed to examine protection against challenge with an antigenically distinct virus. We also compared the efficacy of different vaccine platforms including adjuvanted whole inactivated virus (WIV), live-attenuated influenza virus (LAIV), and an HA-subunit vaccine delivered with an alphavirus vector against challenge strains that were antigenically distinct. WIV provided the least effective cross-protection against antigenically distinct viruses, and there was also evidence of vaccine-associated enhanced respiratory disease. The alphavirus-vectored vaccines were capable of cross-protection, although it did not produce sterilizing immunity and there was a trend for lower protection in certain vaccine-challenge mismatches. LAIV, currently not licensed for use in pigs, also provided efficient cross-protection, and furthermore, it generated sterilizing immunity. Due to the antigenically diverse population of swine H3 viruses currently circulating, development of improved vaccine strategies is warranted. Areas of future research should include: rational selection of antigenically distinct viruses for multivalent WIV formulations, WIV prime-
F. OTHER REPORTS

boost strategies that provide broader cross-protection, and subunit vaccines that incorporate additional viral proteins.
III. Organizational Matters

A. Bylaws of USAHA
B. USAHA Administrative Policies
C. Previous Meetings
D. USAHA Award Recipients
III. 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 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
III. ORGANIZATIONAL MATTERS

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 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

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
III. ORGANIZATIONAL MATTERS

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, 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 such 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
III.A. USAHA BYLAWS

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 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.

6.2. 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
III. ORGANIZATIONAL MATTERS

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 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.
III.A. USAHA BYLAWS

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.
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 meeting proceedings; (3) The proposed amendment(s) shall then be presented to the membership at the next annual meeting.

b. Amendments to bylaws shall be presented section-by-section at a meeting of the members and shall be approved only upon an affirmative vote of two-thirds of the voting members, provided a quorum is present.

c. In the event the amendment(s) proposed are not approved by the Board of Directors as set forth in (1), then the proposed amendment(s) may be presented by a petition signed by at least thirty members which shall result in their proceeding through steps (2) and (3) above as if the Board of Directors had initially approved the proposed amendment(s).

10.2. Fiscal Year. The Executive Committee shall from time to time establish the Association’s fiscal year.

10.3. Parliamentary Procedure. Robert’s Rules of Order Newly Revised shall govern the proceedings of the Association, the Board of Directors and all committees in all cases not otherwise provided for in applicable federal or state statute or rule, the articles of incorporation or bylaws of the Association or its policies or procedures.

10.4. Confidential Information. Confidential information of the Association shall be maintained in confidence and not used for any other than Association purposes nor disclosed to others, except as permitted by law, these bylaws or written consent of the Association, by Association members, directors, officers, employees and agents.
III. ORGANIZATIONAL MATTERS

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.

10.8. Dissolution. In the event of dissolution, the Association shall distribute its assets as required by the laws and statutes of the State of Delaware; and distribute its remaining net assets in a manner permitted an entity to maintain its status as exempt from taxation under Section 501 (c) (5) of the Internal Revenue Code of 1986, as amended, or any successor provision.
### III. B. USAHA ADMINISTRATIVE POLICIES

#### ESTABLISHMENT AND OPERATION OF STANDING COMMITTEES

**2012**

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.
8. Committee rosters for the current year should be finalized no later than 30 days prior to the start of the Annual Meeting.

#### PARTICIPATION IN USAHA OF FEDERAL AGENCIES AND FEDERAL EMPLOYEES

**2009**

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. Individual membership and participation of numerous animal health, food safety, and research professionals from a variety of federal agencies is critical to the committees’ success.

A major function of USAHA is development of policies and procedures of national disease control and eradication programs. This means that many committee findings and resolutions constitute recommendations to the
III. ORGANIZATIONAL MATTERS

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 chairs where they would be making recommendations to their employer.

A number of committees have used federal employees as assistant chairs to good advantage. Also, committees which do not deal with federal agency policy may be chaired by federally-employed USAHA members where appropriate.

The Executive Committee is responsible for the daily activities of the Association, and represents the Association on a year-round basis. To avoid conflict of interest, federal employees should not serve in elected officer positions of the Association. Individuals that serve as an officer that become employed by the federal government should resign their officer position, and a replacement should be sought in accordance with the bylaws.

FINANCIAL AND INVESTMENT POLICY

2008

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.
III. B. USAHA ADMINISTRATIVE POLICIES

- 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.

Reserve Fund Balance (2010)

USAHA targets a financial reserves balance equal to two years of operating expenses. The Treasurer and Executive Director are responsible for monitoring this status, and reporting accordingly to the Executive Committee.

Should the reserve balance drop below the target amount, the following criteria should take place:

85-99% of Target Balance

The Executive Committee shall make appropriate budget adjustments to increase funds to target amount within one year, or an appropriate timeframe according to current economic conditions.

50% - 84% of Target Balance

The Executive Committee shall make appropriate financial cuts and budget adjustments to increase funds to target amount within three years, or a more appropriate timeframe according to current economic conditions.
Less than 50%

The Executive Committee shall undertake a major financial overhaul of the organization and develop a plan to: 1) operate in a sustainable manner and 2) rebuild the reserve funds to the target area. Adjustments should be made immediately upon Executive Committee approval of the new plan, with modifications subject to Board of Directors at the next annual meeting.

Should the above mitigations prove unsuccessful, the Executive Committee should evaluate all options for the organization to reduce expenses to a sustainable manner. This can include merging management with other organizations, merging the organization collectively with another, or ceasing operations altogether, in which case the organization will be dissolved according to the bylaws and applicable laws.

YEAR-ROUND ACTIVITIES
2008

USAHA is a year-round organization, and is often asked to comment on specific issues related to its mission. USAHA should first refer to its resolutions to address a given issue.

USAHA staff will act upon all resolutions as directed by the membership and Board of Directors, involving necessary correspondence. For issues that arise, that pertain to resolutions, can have direct action taken as deemed necessary. No additional voting is necessary, though the input of the executive committee is encouraged.

Should an issue be presented that no resolution has been approved, the Executive Director/Secretary will coordinate with President and First Vice President (Chair of Government Relations) to determine if USAHA should address the specific issue, with consensus from the Executive Committee.

SPECIAL FUNDS POLICY
2009

USAHA will manage special funds for Committees and closely related organizations to house finances and bookkeeping services. Special funds will be held separate of the general USAHA fund, and USAHA will record transactions accordingly. USAHA will enter into a written agreement for each account with the primary representative of the group or Committee and a designated treasurer for that account. The designated account treasurer holds authority for all transactions. Special fund oversight is held by the USAHA Treasurer with support of the Secretary/Executive Director.

JOB POSTINGS FOR NEWS ALERTS AND WEB SITE
2010

USAHA has available opportunities for distributing position announcements through its daily News Alert Summaries, currently on a weekly basis. The following policy sets forth guidelines for use of this service.
USAHA Job Postings are available to any member of the association at no fee. The association will post positions to its web site in addition to the distribution among members.

Non-member groups may also submit positions, however, are subject to review and approval for distribution. The following criteria will be considered:

1) Animal health or animal agriculture related
2) Fields of veterinary medicine, research, diagnostics, regulatory, technical services, non-profit, and/or other related supporting disciplines
3) Align with the mission of USAHA

USAHA reserves the right to refuse posting of any position.

OFFICIAL AGENCY, ALLIED ORGANIZATION MEMBER SUBSTITUTIONS
2011

Official Agency and Allied Organization Members have a designated representative to serve on the board of directors and receive the member benefits for that organization. Occasionally, the designated representative is unable to attend all or some of the annual meeting. In these instances, the representative can designate a substitution to fulfill their obligations on behalf of their agency/organization. This includes:

- Board of Directors Meetings
- Membership Meetings
- Committee Meetings (of which the original representative is an appointed member)

While the USAHA Bylaws state that proxy voting is not allowed, the substitution is treated differently as a transfer of the representative duties.

STUDENT MEMBERSHIP POLICY
2012

Students must be a full-time student in an accredited college or university, in a field of study outlined in the bylaws, part 3.1, E in order to be eligible as a student member and to receive student meeting registration rates.

POLICIES REGARDING USAHA ANNUAL MEETING

ANNUAL MEETING SPEAKER REGISTRATION/COMPLIMENTARY REGISTRATION
Revised 2011

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 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 will consider providing for travel expenses for general session and committee speakers on a limited basis. Requests must be submitted to the Executive Committee in advance, with consideration being given to a proposed speaker’s expertise, timeliness of subject matter, likelihood of attending the meeting otherwise, and budgetary capabilities.

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.

ANNUAL MEETING HOST STATE BENEFITS POLICY

As the State hosting the Annual Meeting is often requested to provide support to the organization in terms of staff, supplies and time commitments, USAHA will provide reciprocal in-kind benefits to the hosting State to help offset those costs. USAHA will provide one complimentary registration for every three (3) paid registrations for host state employees. The state animal health official is responsible for communicating the complimentary registration designees to USAHA by the pre-registration deadline. Exceptions to this guideline are subject to review and approval by the Executive Committee.
III. B. USAHA ADMINISTRATIVE POLICIES

DIRECTOR, OFFICER AND STAFF RELATED POLICIES

REIMBURSEMENT AND EXPENSES
2008

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.

CONFLICT OF INTEREST POLICY
2008

Due to increased scrutiny of non-profit organizations, by the IRS and requirements for increased transparency, USAHA should have in place a conflict of interest policy for its Board of Directors, Officers and Employees. Policy:

Any member or employee involved in a business transaction of the United States Animal Health Association in which a conflict of interest may be present, shall notify the Executive Committee promptly. Said individual shall refrain from voting on such transactions, and exclude themselves from deliberations. The individual will refrain from any personal influence on the transaction. A transaction that involves a conflict of interest should be reviewed against relative competitive bids or proposals. Decisions to pursue a transaction with a potential conflict of interest should first uphold the best interests of USAHA, and include terms that are reasonable to USAHA within the given marketplace.

Approvals will be made by the Executive Committee. A written disclosure summarizing any possible conflict of interest shall be kept on file at the USAHA office. Discussion and resolution shall be indicated in the minutes of the USAHA Executive Committee session.

Conflict of interest should be disclosed if: a transaction of USAHA involves any close relative of a Director or Employee as the direct vendor/provider, or the Director/Employee stands material gain through a transaction. A Director or Employee holds financial interest if holdings are of 5% or greater of the potential vendor, or holds position of influence with an organization that seeks to do business with USAHA.

A close relative is defined as any parent, spouse, sibling, child, grandchild, or spouse of the aforementioned. Also to be included would be
any individual residing in the same household that would resemble a parental or marital relationship.

WHISTLEBLOWER POLICY
2008

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
2008

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.

USAHA PROFESSIONAL DEVELOPMENT SUPPORT
2011

USAHA sees the importance of continuing education for its employees. USAHA may support the opportunities sought by its employees to enhance his/her skill sets. The following is an outline of benefit for employees.

USAHA may provide support as follows:

General
Support for professional development must be pre-approved by the employee’s supervisor prior to commitment in order to receive benefits. Any opportunity should be directly beneficial to current job functions or can be justified as direct future benefit to the Association.

Flexible Scheduling
USAHA may work with employee to accommodate scheduling of work hours to allow for professional development. This can include:

- University/College courses during normal work hours
- Conferences/seminars for professional development
- Other events with pre-approval of supervisor

Employees should strive to maintain a full work week (40 hours) by making up any lost time at hours mutually agreed upon by employee and supervisor.

Academic Courses
USAHA may support tuition for courses directly beneficial to the employee’s job duties, up to $1000 per fiscal year. Tuition will be reimbursed
III. B. USAHA ADMINISTRATIVE POLICIES

upon completion of the course by the employee, with a minimum of a C grade or relative “passing” status when grading is not applicable. Courses will be considered regardless of degree/non-degree track.

(*Reimbursements are a taxable benefit.)

Conference/Seminar Registration

USAHA may support registration costs for conferences, seminars or other related courses (self-directed, web-based, etc.) Such programs should enhance the employee’s ability to do current job functions, or expand skill sets to take on additional duties. USAHA may support up to three conferences per year to a maximum of $1000, unless employee is taking academic courses.

Travel

Travel, lodging and meals are reimbursable at federal per diem rates for development opportunities outside of local meetings, such as the St. Joseph or Kansas City areas.
III. C. Previous Meetings of the United States Animal Health Association
### III.C. PREVIOUS MEETINGS

<table>
<thead>
<tr>
<th>No.</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, WI</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>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. Campbell, Chicago, IL</td>
</tr>
</tbody>
</table>
## III. ORGANIZATIONAL MATTERS

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</th>
</tr>
</thead>
<tbody>
<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. Campbell, 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. Fenneyhough, 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>
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<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>
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<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>
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<td>38</td>
<td>Dec. 5-7, 1934</td>
<td>Chicago, IL</td>
<td>Dr. T. E. Robinson, Providence, RI</td>
<td>Dr. O.E. Dyson, Kansas City, MO</td>
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<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>
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<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>
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<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>
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<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>
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<td>43</td>
<td>Dec. 6-8, 1939</td>
<td>Chicago, IL</td>
<td>Dr. J. L. Axby, Indianapolis, IN</td>
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<td>44</td>
<td>Dec. 4-6, 1940</td>
<td>Chicago, IL</td>
<td>Dr. H. D. Port, Cheyenne, WY</td>
<td>Dr. Mark Welsh, College Park, MD</td>
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<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>
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<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>
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### III.C. PREVIOUS MEETINGS

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<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>
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<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>
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<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>
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<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>
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<td>51</td>
<td>Dec. 3-5, 1947</td>
<td>Chicago, IL</td>
<td>*Dr. Will J. Miller, Topeka, KS</td>
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<td>52</td>
<td>Oct. 13-15, 1948</td>
<td>Denver, CO</td>
<td>*Dr. Jean V. Knapp, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<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>
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<td>54</td>
<td>Nov. 1-3, 1950</td>
<td>Phoenix, AZ</td>
<td>*Dr. C. P. Bishop, Harrisburg, PA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<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>
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<td>56</td>
<td>Oct. 29-31, 1952</td>
<td>Louisville, KY</td>
<td>*Dr. Ralph L. West, St. Paul, MN</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<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>
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<td>58</td>
<td>Nov. 10-12, 1954</td>
<td>Omaha, NE</td>
<td>*Dr. T. C. Green, Charleston, WV</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<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>
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<td>60</td>
<td>Nov. 28-30, 1956</td>
<td>Chicago, IL</td>
<td>*Dr. A. L. Brueckner, Baltimore, MD</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<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>
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<td>62</td>
<td>Nov. 4-6, 1958</td>
<td>Miami Beach, FL</td>
<td>*Dr. John G. Milligan, Montgomery, AL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>63</td>
<td>Nov. 15-18, 1959</td>
<td>San Francisco, CA</td>
<td>*Mr. F. G. Buzzell, Augusta, ME</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>64</td>
<td>Oct. 17-21, 1960</td>
<td>Charleston, WV</td>
<td>*Dr. J. R. Hay, Chicago, IL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>65</td>
<td>Oct. 30-Nov. 3, 1961</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. P. Schneider, Boise, ID</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<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>
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<td>67</td>
<td>Oct. 15-18, 1963</td>
<td>Albuquerque, NM</td>
<td>*Dr. T. J. Grennan, Jr. Providence, RI</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>No.</td>
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<td>69</td>
<td>Oct. 25-29,</td>
<td>Lansing, MI</td>
<td>*Dr. J. W. Safford, Helena, MT</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>1965</td>
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<td>70</td>
<td>Oct. 10-14,</td>
<td>Buffalo, NY</td>
<td>*Dr. C. L. Campbell, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>1966</td>
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<td>71</td>
<td>Oct. 16-20,</td>
<td>Phoenix, AZ</td>
<td>*Dr. Grant S. Kaley, Albany, NY</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>1967</td>
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<td>72</td>
<td>Oct. 6-11,</td>
<td>New Orleans, LA</td>
<td>*Dr. John F. Quinn, Lansing, MI</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>73</td>
<td>Oct. 12-19,</td>
<td>Milwaukee, WI</td>
<td>*Dr. John L. Oharra, Reno, NV</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>74</td>
<td>Oct. 18-23,</td>
<td>Philadelphia, PA</td>
<td>*Dr. Frank B. Wheeler, Baton Rouge, LA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>1970</td>
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<td>Oct. 24-29,</td>
<td>Oklahoma City, OK</td>
<td>*Dr. M.D. Mitchell, Pierre, SD</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>76</td>
<td>Nov. 5-10,</td>
<td>Miami Beach, FL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>77</td>
<td>Oct. 14-19,</td>
<td>St. Louis, MO</td>
<td>*Dr. W. C. Tobin, Denver, CO</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>Oct. 13-18,</td>
<td>Roanoke, VA</td>
<td>*Mr. O. H. Timm, Dixon, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>1974</td>
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<td>79</td>
<td>Nov. 2-7,</td>
<td>Portland, OR</td>
<td>*Dr. J. E. Andrews, Atlanta, GA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>80</td>
<td>Nov. 7-12,</td>
<td>Miami Beach, FL</td>
<td>*Dr. H. E. Goldstein, Columbus, OH</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>81</td>
<td>Oct. 16-21,</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. E. Janawicz, Montpelier, VT</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>82</td>
<td>Oct. 21-Nov.</td>
<td>Buffalo, NY</td>
<td>**Dr. L. E. Bartell, Sacramento, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>3, 1978</td>
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<td>83</td>
<td>Oct. 28-Nov.</td>
<td>San Diego, CA</td>
<td>*Dr. T. F. Zweigart, Raleigh, NC</td>
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<td>Nov. 2-7,</td>
<td>Louisville, KY</td>
<td>*Mr. B. W. Hawkins, Ontario, OR</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
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<td>1980</td>
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<td>Oct. 11-16,</td>
<td>St. Louis, MO</td>
<td>*Dr. L. W. Hinchman, Indianapolis, IN</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
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<td>86</td>
<td>Nov. 7-12,</td>
<td>Nashville, TN</td>
<td>Dr. G. B. Rea, Salem, OR</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
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<td>1982</td>
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<td>87</td>
<td>Oct. 15-21,</td>
<td>Las Vegas, NV</td>
<td>Dr. J. R. Ragan, Nashville, TN</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
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<td></td>
<td>1983</td>
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<td>88</td>
<td>Oct. 21-26,</td>
<td>Fort Worth, TX</td>
<td>*Mr. J. O. Pearce, Jr. Okeechobee, FL</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
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<td>Oct. 27-Nov.</td>
<td>Milwaukee, WI</td>
<td>*Dr. David U. Walker, Montpelier, VT</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
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<td>Oct. 14-19,</td>
<td>Louisville, KY</td>
<td>*Dr. N. W. Kruse, Lincoln, NE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>1986</td>
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<td>91</td>
<td>Oct. 25-30,</td>
<td>Salt Lake City, UT</td>
<td>*Dr. J. F. Hudelson, Denver, Co</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>92</td>
<td>Oct. 16-21, 1988</td>
<td>Little Rock, AR</td>
<td>*Dr. J. A. Cobb, Atlanta, GA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>93</td>
<td>Oct. 28-Nov. 3, 1989</td>
<td>Las Vegas, NV</td>
<td>Mr. P. E. Bradshaw, Griggsville, IL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>94</td>
<td>Oct. 6-12, 1990</td>
<td>Denver, CO</td>
<td>Dr. M. A. Van Buskirk, Harrisburg, PA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<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>
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<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>
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<td>97</td>
<td>Oct. 23-29, 1993</td>
<td>Las Vegas, NV</td>
<td>Dr. T. J. Hagerty, St. Paul, MN</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>98</td>
<td>Oct. 29-Nov. 4, 1994</td>
<td>Grand Rapids, MI</td>
<td>*Mr. J. B. Finley, Jr., Encinal, TX</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<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>
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<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>
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<td>101</td>
<td>Oct. 17-24, 1997</td>
<td>Louisville, KY</td>
<td>Dr. Larry L. Williams, Lincoln NE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<td>102</td>
<td>Oct. 3-9, 1998</td>
<td>Minneapolis, MN</td>
<td>Dr. Jones W. Bryan, Columbia, SC</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<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>
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<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>
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<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>
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<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>
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<td>107</td>
<td>Oct. 9-16, 2003</td>
<td>San Diego, CA</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>108</td>
<td>Oct. 21-27, 2004</td>
<td>Greensboro, NC</td>
<td>Dr. Donald Lein, Ithaca, NY</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>109</td>
<td>Nov. 3-9, 2005</td>
<td>Hershey, PA</td>
<td>Dr. Richard D. Willer, Phoenix, AZ</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>110</td>
<td>Oct. 12-18, 2006</td>
<td>Minneapolis, MN</td>
<td>Dr. Bret D. Marsh, Indianapolis, IN</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<td>111</td>
<td>Oct. 18-24, 2007</td>
<td>Reno, NV</td>
<td>Dr. Lee M. Myers, Atlanta, GA</td>
<td>§Dr. J Lee Alley, Montgomery, AL</td>
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<tr>
<td>112</td>
<td>Oct. 23-29, 2008</td>
<td>Greensboro, NC</td>
<td>Mr. James W. Leafstedt, Alcester, SD</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>113</td>
<td>Oct. 8-14, 2009</td>
<td>San Diego, CA</td>
<td>Dr. Donald E. Hoenig, Belfast, ME</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>114</td>
<td>Nov. 11-17, 2010</td>
<td>Minneapolis, MN</td>
<td>Dr. Richard E. Breitmeyer, Sacramento, CA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
</tbody>
</table>
### III. ORGANIZATIONAL MATTERS

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary/Executive</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>Sept. 29- Oct.5, 2011</td>
<td>Buffalo, NY</td>
<td>Dr. Steven L. Halstead, East Lansing, MI</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>116</td>
<td>Oct. 18-24, 2012</td>
<td>Greensboro, NC</td>
<td>Dr. David T. Marshall, Raleigh, NC</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>117</td>
<td>Oct. 17-23, 2013</td>
<td>San Diego, CA</td>
<td>Dr. David L. Meeker, Alexandria, VA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>118</td>
<td>Oct. 16-22, 2014</td>
<td>Kansas City, MO</td>
<td>Dr. Stephen K. Crawford, Concord, NH</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>119</td>
<td>Oct. 22-28, 2015</td>
<td>Providence, RI</td>
<td>Dr. Bruce L. King, Axtell, UT</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>120</td>
<td>Oct. 13-19, 2016</td>
<td>Greensboro, NC</td>
<td>Dr. David D. Schmitt, Ankeny, IA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
</tbody>
</table>

**Key**

* Deceased

‡ Last meeting of the Interstate Association of Livestock Sanitary Boards

** Resigned Dec. 12, 1977

§ USAHA hired an Executive Director, in lieu of the Secretary, effective 2006-2007

† Reprinted in 54th Annual Proceedings †† Reprinted in 66th Annual Proceedings
III. D. USAHA Award Winners
III. ORGANIZATIONAL MATTERS

USAHA MEDAL OF DISTINCTION RECIPIENTS

110th Annual Meeting, Minneapolis, Minnesota – 2006
   Dr. Clarence L. Campbell, Tallahassee, Florida
   Dr. Richard H. McCapes, Davis, California

111th Annual Meeting, Reno, Nevada – 2007
   Dr. J. Lee Alley, Montgomery, Alabama
   Mrs. Linda B. Ragland, Richmond, Virginia

   Dr. John C. Shook, Mechanicsburg, Pennsylvania

113th Annual Meeting, San Diego, California – 2009
   Dr. Bret E. Marsh, Indianapolis, Indiana

114th Annual Meeting, Minneapolis, Minnesota – 2010
   Mr. Neal F. Black, Eagan, Minnesota
   Dr. Thomas J. Hagerty, St. Michael, Minnesota

   Dr. Bob E. Hillman, Boise, Idaho

   Dr. John E. Ragan, Bowie, Maryland

117th Annual Meeting, San Diego, California – 2013
   Dr. Don H. Lein, Ithaca, New York

118th Annual Meeting, Kansas City, Missouri – 2014
   Mr. William Hawks, Washington, District of Columbia

119th Annual Meeting, Providence, Rhode Island – 2015
   Dr. Richard Breitmeyer, Davis, California

120th Annual Meeting, Greensboro, North Carolina – 2016
   Mr. Jim Leafstedt, Alcester, South Dakota
III.D. USAHA AWARD WINNERS

USAHA FEDERAL PARTNERSHIP AWARD RECIPIENTS

Dr. Jack Shere, Raleigh, North Carolina  
Dr. William Smith, Sutton, Massachusetts

Dr. Donald Otto, Knoxville, Iowa

117th Annual Meeting, San Diego, California – 2013  
Dr. Donald Evans, Topeka, Kansas

118th Annual Meeting, Kansas City, Missouri – 2014  
Dr. Sarah Tomlinson, Fort Collins, Colorado

119th Annual Meeting, Providence, Rhode Island – 2015  
Dr. Kevin Petersburg, Des Moines, Iowa

120th Annual Meeting, Greensboro, North Carolina – 2016  
Dr. Angela Pelzel-McCluskey, Fort Collins, Colorado
IV. GLOSSARY OF COMMONLY USED ACRONYMS
### IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D</td>
<td>Decontamination, depopulation, and disposal</td>
</tr>
<tr>
<td>AAC</td>
<td>Animal Agriculture Coalition</td>
</tr>
<tr>
<td>AADAP</td>
<td>Aquatic Animal Drug Approval Partnership</td>
</tr>
<tr>
<td>AAEP</td>
<td>American Association of Equine Practitioners</td>
</tr>
<tr>
<td>AAFCO</td>
<td>Association of American Feed Control Officials</td>
</tr>
<tr>
<td>AAHSC</td>
<td>Aquatic Animal Health Standards Commission</td>
</tr>
<tr>
<td>AAIIV</td>
<td>American Association of Industrial Veterinarians</td>
</tr>
<tr>
<td>AALAS</td>
<td>Association of Laboratory Animal Science</td>
</tr>
<tr>
<td>AAMD</td>
<td>Acquisition and Asset Management Division</td>
</tr>
<tr>
<td>AAMDC</td>
<td>American Association of Mycobacterial Diseases</td>
</tr>
<tr>
<td>AAZV</td>
<td>American Association of Zoo Veterinarians</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>AAVMC</td>
<td>Association of American Veterinary Medical Colleges</td>
</tr>
<tr>
<td>ABADRL</td>
<td>Arthropod-Borne Animal Disease Research Laboratory</td>
</tr>
<tr>
<td>ABF</td>
<td>Antibiotic-free</td>
</tr>
<tr>
<td>ABS</td>
<td>Adult bovine serum</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>Automated Cargo Environment</td>
</tr>
<tr>
<td>ACE</td>
<td>Automated Commercial Environment</td>
</tr>
<tr>
<td>ACIA</td>
<td>Antigen Capture ELISA</td>
</tr>
<tr>
<td>ACIA</td>
<td>Antigen capture immunoassay</td>
</tr>
<tr>
<td>ACVIM</td>
<td>American College of Veterinary Internal Medicine</td>
</tr>
<tr>
<td>ADDs</td>
<td>Assistant District Directors</td>
</tr>
<tr>
<td>ADG</td>
<td>Average daily gain</td>
</tr>
<tr>
<td>ADOL</td>
<td>Avian Disease and Oncology Laboratory</td>
</tr>
<tr>
<td>ADRU</td>
<td>Animal Disease Research Unit</td>
</tr>
<tr>
<td>ADT</td>
<td>Animal Disease Traceability</td>
</tr>
<tr>
<td>ADUFA</td>
<td>Animal Drug User Fee Act</td>
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</tbody>
</table>
### IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>Approved Establishment</td>
</tr>
<tr>
<td>AEC</td>
<td>Area Emergency Coordinator</td>
</tr>
<tr>
<td>AEC</td>
<td>Anion-exchange chromatography</td>
</tr>
<tr>
<td>AERs</td>
<td>Adverse event reports</td>
</tr>
<tr>
<td>AF</td>
<td>Accredited free</td>
</tr>
<tr>
<td>AFBF</td>
<td>American Farm Bureau Federation</td>
</tr>
<tr>
<td>AFBIS</td>
<td>American Farm Bureau Insurance Services</td>
</tr>
<tr>
<td>AFIA</td>
<td>American Feed Industry Association</td>
</tr>
<tr>
<td>AFRI</td>
<td>Agriculture and Food Research Initiative</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>AGD</td>
<td>Agricultural Defense</td>
</tr>
<tr>
<td>AGID</td>
<td>Agar gel immunodiffusion</td>
</tr>
<tr>
<td>AGPs</td>
<td>Antibiotics growth promoters</td>
</tr>
<tr>
<td>AHC</td>
<td>American Horse Council</td>
</tr>
<tr>
<td>AHEM</td>
<td>Animal Health Emergency Management</td>
</tr>
<tr>
<td>AHI</td>
<td>Animal Health Institute</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>AHRSII</td>
<td>Animal Health Regulatory Science Innovation Initiative</td>
</tr>
<tr>
<td>AHS</td>
<td>African horse sickness</td>
</tr>
<tr>
<td>AHSM</td>
<td>Animal Health Surveillance and Management</td>
</tr>
<tr>
<td>AHTs</td>
<td>Animal Health Technicians</td>
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<tr>
<td>AI</td>
<td>Avian influenza</td>
</tr>
<tr>
<td>AIC</td>
<td>Animal Import Centers</td>
</tr>
<tr>
<td>AICAP</td>
<td>Avian Influenza Coordinated Agricultural Program</td>
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<tr>
<td>AI-CMC</td>
<td>Avian Influenza Crisis Management Center</td>
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<tr>
<td>AICs</td>
<td>Animal import centers</td>
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<tr>
<td>AID</td>
<td>Animal Industry Division</td>
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<td>AIMS</td>
<td>Animal Identification Management System</td>
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<td>AIN</td>
<td>Animal Identification Number</td>
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<tr>
<td>AIPL</td>
<td>Animal Improvement Programs Laboratory</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>AIV</td>
<td>Avian influenza virus</td>
</tr>
<tr>
<td>AKAV</td>
<td>Akabane virus</td>
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<tr>
<td>AMD</td>
<td>Age-related macular degeneration</td>
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<tr>
<td>AMVEEA</td>
<td>South American cooperative of veterinarians and avian specialists</td>
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<tr>
<td>AMPs</td>
<td>Antimicrobial peptides</td>
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<tr>
<td>aMPV</td>
<td>Avian metapneumovirus</td>
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<tr>
<td>AMR</td>
<td>Antimicrobial resistance</td>
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<tr>
<td>AMS</td>
<td>Agricultural Marketing Service</td>
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<td>AMVC</td>
<td>Audubon-Manning Veterinary Clinic</td>
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<td>ANSI</td>
<td>American National Standards Institute</td>
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<td>ANV</td>
<td>Avian Nephritis Virus</td>
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<tr>
<td>AOCS</td>
<td>American Oil Chemists’ Society</td>
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<td>AOS</td>
<td>Active Observational Surveillance</td>
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<td>APHIS</td>
<td>Animal and Plant Health Inspection Service</td>
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<td>APIC</td>
<td>Association for Professionals in Infection Control and Epidemiology</td>
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<td>APTA</td>
<td>Authorized Poultry Testing Agent</td>
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<td>AQHA</td>
<td>American Quarter Horse Association</td>
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<td>AQSIQ</td>
<td>Administration of Quality Supervision, Inspection and Quarantine</td>
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<td>ARC</td>
<td>Agricultural Research Center</td>
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<td>ARMS</td>
<td>Antiparasitic Resistance Management Strategy</td>
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<td>ARS</td>
<td>Agricultural Research Service</td>
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<td>ASF</td>
<td>African Swine Fever</td>
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<td>ASI</td>
<td>American Sheep Industry</td>
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<td>AST</td>
<td>Agriculture Screening Tools</td>
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<td>AST</td>
<td>Aspartate aminotransferase</td>
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<td>ATCC</td>
<td>American Type Culture Collection</td>
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<td>AU-IBAR</td>
<td>African Union InterAfrican Bureau on Animal Resources</td>
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<td>AV</td>
<td>Adult Vaccinates</td>
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<td>AVBP</td>
<td>Association of Veterinarians in Broiler Production</td>
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<tr>
<td>AVEP</td>
<td>Association of Veterinarians in Egg Production</td>
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<tr>
<td>AVIC</td>
<td>Area veterinarian in charge</td>
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<td>AVMA</td>
<td>American Veterinary Medical Association</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
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<td>---------</td>
<td>------------</td>
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<tr>
<td>AVMC</td>
<td>Aquatic Vet Med Committee</td>
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<td>AWA</td>
<td>Animal Welfare Act</td>
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<tr>
<td>AWI</td>
<td>Animal Welfare Institute</td>
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<td>AWW</td>
<td>Adjusted weaning weight</td>
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<td>AZA</td>
<td>Association of Zoos and Aquariums</td>
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<tr>
<td>BAC</td>
<td>Bacterial artificial chromosome</td>
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<td>BAIS</td>
<td>Branch of Aquatic Invasive Species</td>
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<tr>
<td>BAPA</td>
<td>Buffered Acidified Plate Antigen</td>
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<tr>
<td>BCF</td>
<td>Bacterial culture of the feces</td>
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<td>BCG</td>
<td>Bacille Calmette-Guerin</td>
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<tr>
<td>BCV</td>
<td>Bovine Coronavirus</td>
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<td>BCWD</td>
<td>Bacterial cold-water disease</td>
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<td>BDD</td>
<td>Bovine digital dermatitis</td>
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<td>BDESB</td>
<td>Birth Defects Epidemiology and Surveillance Branch</td>
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<td>BDM</td>
<td>Bio-development module</td>
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<tr>
<td>BEAP</td>
<td>Brucellosis Emergency Action Plan</td>
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<td>BEFV</td>
<td>Bovine ephemeral fever virus</td>
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<tr>
<td>BFB</td>
<td>Biosecurity for Birds</td>
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<td>BHS</td>
<td>Bighorn Sheep</td>
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<td>BM</td>
<td>Borrelia miyamotoi</td>
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<td>BMAPs</td>
<td>Brucellosis Management Action Plans</td>
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<td>BMP</td>
<td>Brucellosis Management Plan</td>
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<td>BMPs</td>
<td>Best management practices</td>
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<td>BMST</td>
<td>Brucellosis Milk Surveillance Testing</td>
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<td>BNC</td>
<td>Bi-National Committee</td>
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<td>BOAH</td>
<td>Board of Animal Health</td>
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<td>BoCV</td>
<td>Bovine coronavirus</td>
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<td>BoHV-1</td>
<td>Bovine herpesvirus-1</td>
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<td>BP</td>
<td>Border Patrol</td>
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<tr>
<td>BPI</td>
<td>Business Process Improvement</td>
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<tr>
<td>BPS</td>
<td>Bovine Papular Stomatitis</td>
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<tr>
<td>BQA</td>
<td>Beef Quality Assurance</td>
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<td>BQFS</td>
<td>Bison Quarantine Feasibility Study</td>
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<td>BRD</td>
<td>Bovine Respiratory Disease</td>
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<td>Acronym</td>
<td>Description</td>
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<td>-------</td>
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<tr>
<td>BRSV</td>
<td>Bovine respiratory syncytial virus</td>
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<td>BRT</td>
<td>Brucellosis ring test</td>
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<td>BSA</td>
<td>Bovine serum albumin</td>
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<tr>
<td>BSC</td>
<td>Biological Standard Commission</td>
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<td>BSE</td>
<td>Bovine spongiform encephalopathy</td>
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<td>BSL</td>
<td>Breed Specific Legislation</td>
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<tr>
<td>BSL</td>
<td>Bio-safety level</td>
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<tr>
<td>BSVE</td>
<td>Biosurveillance Ecosystem</td>
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<tr>
<td>bTB</td>
<td>Bovine tuberculosis</td>
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<tr>
<td>BTD</td>
<td>Black-tailed deer</td>
</tr>
<tr>
<td>BTRA</td>
<td>Biological Threat Risk Assessment</td>
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<tr>
<td>BTV</td>
<td>Bluetongue virus</td>
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<tr>
<td>BVDV</td>
<td>Bovine viral diarrhea virus</td>
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<tr>
<td>BY</td>
<td>Biological year</td>
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<tr>
<td>CABS</td>
<td>Consortium for the Advancement of Brucellosis Science</td>
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<tr>
<td>CAC</td>
<td>Codex Alimentarius Commissions</td>
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<td>CAFO</td>
<td>Concentrated Animal Feed Operation</td>
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<tr>
<td>CAHFS</td>
<td>California Animal Health and Food Safety</td>
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<tr>
<td>CAHFS</td>
<td>Collaboration for Animal Health, Food Safety and Epidemiology</td>
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<tr>
<td>CAHPS</td>
<td>Commercial <em>Aquaculture</em> Health Program Standards</td>
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<tr>
<td>CAMAVET</td>
<td>Committee of the Americas for the Harmonization of the Registration and Control of Veterinary Medicines</td>
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<tr>
<td>CAP</td>
<td>Conservation Assessment Program</td>
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<tr>
<td>CARB</td>
<td>Combating Antibiotic Resistance Bacteria</td>
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<tr>
<td>CARPOL</td>
<td>Certificates, Accreditations, Registrations, Permits, and Other Licenses</td>
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<tr>
<td>CART</td>
<td>County Animal Response Team</td>
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<tr>
<td>CAST</td>
<td>Council for Agricultural Science and Technology</td>
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<tr>
<td>CASTV</td>
<td>Chicken Astrovirus</td>
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<td>CatEx</td>
<td>Categorical Exclusion</td>
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<tr>
<td>CATT</td>
<td>Card agglutination test</td>
</tr>
<tr>
<td>CB</td>
<td>Chemical and Biological</td>
</tr>
<tr>
<td>CBDD</td>
<td>Chemical and Biological Defense Division</td>
</tr>
<tr>
<td>CBP</td>
<td>Customs and Border Protection</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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</tr>
<tr>
<td>CBPP</td>
<td>Contagious bovine pleuropneumonia</td>
</tr>
<tr>
<td>CBRNE</td>
<td>Chemical, biological, radiological, nuclear and explosive weapons</td>
</tr>
<tr>
<td>CCAS</td>
<td>Cooperative Compliance Agreements</td>
</tr>
<tr>
<td>CCC</td>
<td>Consumer Complaint Coordinators</td>
</tr>
<tr>
<td>CCT</td>
<td>Comparative cervical tuberculin</td>
</tr>
<tr>
<td>CD</td>
<td>Clostridial Dermatitis</td>
</tr>
<tr>
<td>CDA</td>
<td>Colorado Department of Agriculture</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CDD</td>
<td>Center for Disease Detection</td>
</tr>
<tr>
<td>CDLVWD</td>
<td>Committee on Diagnostic Laboratory and Veterinary Workforce Development</td>
</tr>
<tr>
<td>CDPH</td>
<td>California Department of Public Health</td>
</tr>
<tr>
<td>CDPHE</td>
<td>Colorado Department of Public Health and Environment</td>
</tr>
<tr>
<td>CDR</td>
<td>Complementarity determining regions</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>Compact disc, read-only-memory</td>
</tr>
<tr>
<td>CEAH</td>
<td>Centers for Epidemiology and Animal Health</td>
</tr>
<tr>
<td>CEEZAD</td>
<td>Center of Excellence for Emerging and Zoonotic Animal Diseases</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>
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<tr>
<td>CEO</td>
<td>Chick embryo origin</td>
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<tr>
<td>CF</td>
<td>Complement fixation</td>
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<td>CFR</td>
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<td>CI/KR</td>
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<td>CK</td>
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<td>CMC</td>
<td>Crisis Management Center</td>
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<td>CMC-AH</td>
<td>Crisis Management Centre for Animal Health</td>
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<td>CNOG</td>
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<td>CNS</td>
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<td>CNV</td>
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<td>CoA</td>
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<tr>
<td>COB</td>
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<td>CODD</td>
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<td>COMEXA</td>
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<td>Cycle threshold</td>
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### IV. GLOSSARY OF ACRONYMS

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<td>Domestic dog/coyote</td>
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<td>Drug Enforcement Administration</td>
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<td>Department for Environment, Food, and Rural Affairs (UK)</td>
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<td>Direct-fed microbial</td>
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<td>Department of Health and Human Services</td>
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<td>Dairy Records Management Systems</td>
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<td>Department of Homeland Security</td>
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<td>DIVA</td>
<td>Differentiating Infected from Vaccinated Animals</td>
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<td>DJC</td>
<td>Designated Johne’s Coordinator</td>
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<td>Deoxyribonucleic acid</td>
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<td>Department of Natural Resources</td>
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<td>Department of Defense</td>
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<tr>
<td>DOI</td>
<td>Department of the Interior</td>
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<td>DPI</td>
<td>Day post-inoculation</td>
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<td>Dual Path Platform</td>
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<td>dRIT</td>
<td>Immunohistochemical test</td>
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<td>dRIT</td>
<td>Direct rapid immunohistochemistry test</td>
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<td>DRMS</td>
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<td>DS</td>
<td>Diplomatic security</td>
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<td>Designated surveillance area</td>
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<td>Department of State Health Services</td>
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<td>DTD</td>
<td>Dangerous transmissible diseases</td>
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### IV. GLOSSARY OF ACRONYMS

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<td>DVM</td>
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<td>E2E</td>
<td>Engage to Excel</td>
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<td>EAP</td>
<td>Export Animal Products</td>
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<td>Environmental Assessments</td>
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<td>EAV</td>
<td>Equine arteritis virus</td>
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<td>EAZWV</td>
<td>European Association of Zoo and Wildlife Veterinarians</td>
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<td>EBSA</td>
<td>Enhancing biosecurity best practices</td>
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<tr>
<td>EC</td>
<td>Executive Committee (USAHA)</td>
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<td>Embryonated chicken eggs</td>
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<td>ECSR</td>
<td>Equine, Cervid and Small Ruminant</td>
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<td>ECT</td>
<td>Elephant Care Task Force</td>
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<td>ECVI</td>
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<td>Equine Disease Communication Center</td>
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<td>EDEN</td>
<td>Extension Disaster Education Network</td>
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<td>EDFZ</td>
<td>Equine Disease-Free Zone</td>
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<td>Emerging disease incidents</td>
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<td>EDWG</td>
<td>Exercises and Drills Working Group</td>
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<tr>
<td>EEE</td>
<td>Eastern equine encephalitis</td>
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<td>European Food Safety Authority</td>
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<td>EG</td>
<td>Ethylene glycol</td>
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<td>EHD(V)</td>
<td>Epizootic hemorrhagic disease (virus)</td>
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<td>Equine herpesvirus myeloencephalopathy</td>
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<td>EHV</td>
<td>Equine herpesvirus</td>
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<td>EIA</td>
<td>Equine infectious anemia</td>
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<td>EIAO</td>
<td>Enforcement Investigation and Analysis Officers</td>
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<td>EID</td>
<td>Electronic identification</td>
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<td>Environmental impact statement</td>
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<td>ELDU</td>
<td>Extra-label drug use</td>
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<td>ELISA</td>
<td>Enzyme Linked Immunosorbent Assay</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>EM</td>
<td>Election microspray</td>
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<td>EM&amp;D</td>
<td>Emergency Management and Diagnostics</td>
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<td>EMEA</td>
<td>European Medicines Evaluation Agency</td>
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<td>EMPRES</td>
<td>Emergency Prevention System</td>
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<td>EMRS</td>
<td>Emergency Management Response System</td>
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<td>Exotic Newcastle disease</td>
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<td>EOP</td>
<td>Emergency Operations Plan</td>
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<td>EP</td>
<td>Equine piroplasmosis</td>
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<td>EPA</td>
<td>Environmental Protection Agency</td>
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<td>EpiUnit</td>
<td>Epidemiologic Unit</td>
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<td>Equine Protozoal Myelitis</td>
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<td>ERSS</td>
<td>Emergency Response Support System</td>
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<td>Emergency Support Function</td>
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<td>ESPD</td>
<td>Emerging Swine Production Diseases</td>
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<td>Environmental Systems Research Institute</td>
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<td>European Union</td>
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<tr>
<td>FA</td>
<td>Food animal</td>
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<td>FA</td>
<td>Fluorescent antibody</td>
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<td>FAC</td>
<td>Fish and Aquatic Conservation</td>
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<td>FAD</td>
<td>Foreign animal disease(s)</td>
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<td>FAD PReP</td>
<td>Disease Preparedness and Response Plan</td>
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<td>FADI</td>
<td>Food and Agriculture Defense Initiative</td>
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<td>FADRU</td>
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<td>Food and Agriculture Organization (United Nations)</td>
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<td>Food Animal Residue Avoidance Database</td>
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<td>FARC</td>
<td>Fisheries and Aquatic Resource Conservation</td>
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<td>Federal and State Transport</td>
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### IV.GLOSSARY OF ACRONYMS

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<td>FAVN</td>
<td>Fluorescent antibody virus neutralization</td>
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<td>Food Agriculture and Veterinary Response Exercise</td>
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<td>FAZD</td>
<td>Foreign Animal and Zoonotic Disease</td>
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<td>Fetal bovine serum</td>
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<td>FBS</td>
<td>Farm business survey</td>
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<td>Food, Drug and Cosmetic Act</td>
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<td>Food and Drug Administration</td>
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<td>Foreign or Emerging Animal Disease</td>
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<td>FECRT</td>
<td>Fecal egg-count reduction test</td>
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<td>Colombian Federation of Cattle Raisers</td>
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<td>Federal Food Drug and Cosmetic Act</td>
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<td>Feather follicle epithelium</td>
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<td>FFPE</td>
<td>Formalin-fixed, paraffin-embedded</td>
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<td>Fish Health Section</td>
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<td>Fractional inhibitory concentration</td>
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<td>Firefly luciferase</td>
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<td>Fanconi Syndrome</td>
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<td>Food Safety Assessments</td>
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<td>Government Accountability Office</td>
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<td>Good aquaculture practice</td>
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<td>Gas chromatography–mass spectrometry</td>
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<td>Gross domestic product</td>
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<td>Global Animal Health and Food Safety</td>
</tr>
<tr>
<td>GIN</td>
<td>Gastrointestinal nematode</td>
</tr>
<tr>
<td>GISAID</td>
<td>Global Initiative on Sharing All Influenza Data</td>
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<tr>
<td>GLEWS</td>
<td>The Global Early Warning System</td>
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<tr>
<td>GLP</td>
<td>Good laboratory practice</td>
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<tr>
<td>GMA</td>
<td>Grocery Manufacturers Association</td>
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<td>GMP</td>
<td>Good manufacturing practice</td>
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<td>GPS</td>
<td>Global Positioning Systems</td>
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<td>GST</td>
<td>Glutathione S-transferase</td>
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## IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>GTNP</td>
<td>Grand Teton National Park</td>
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<tr>
<td>GVL</td>
<td>GlobalVetLink</td>
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<td>GWAS</td>
<td>Genome wide association study</td>
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<td>GYA</td>
<td>Greater Yellowstone Area</td>
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<td>GYE</td>
<td>Greater Yellowstone Ecosystem</td>
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<td>GYIBC</td>
<td>Greater Yellowstone Area Interagency Brucellosis Committee</td>
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<td>HA</td>
<td>Hemagglutinin</td>
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<tr>
<td>HACCP</td>
<td>Hazard analysis and critical control points</td>
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<td>HAZMAT</td>
<td>Hazardous Materials</td>
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<td>HCP</td>
<td>Herd certification program</td>
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<td>HD</td>
<td>Hemorrhagic disease</td>
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<tr>
<td>HEYM</td>
<td>Herrold's egg yolk medium</td>
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<tr>
<td>HHP</td>
<td>High health, high performance</td>
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<td>HHP</td>
<td>High Performance Horse</td>
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<td>HHS</td>
<td>Department of Health and Human Services</td>
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<td>HI</td>
<td>Hemagglutination inhibition</td>
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<td>HL7</td>
<td>Health Level Seven</td>
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<td>HLS</td>
<td>Hair-loss syndrome</td>
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<td>HMP</td>
<td>Herd monitored plan</td>
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<td>HPAI</td>
<td>Highly pathogenic avian influenza</td>
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<tr>
<td>HPLC</td>
<td>High pressure liquid chromatography</td>
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<td>HRD</td>
<td>Human Remains Detection</td>
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<td>HSIN</td>
<td>Homeland Security Information System</td>
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<td>HSPD</td>
<td>Homeland Security Presidential Directive</td>
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<td>HSR</td>
<td>Health Service Region</td>
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<td>HSUS</td>
<td>Humane Society of the United States</td>
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<td>HTGS</td>
<td>High throughput genomic sequences</td>
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<td>HVT</td>
<td>Herpesvirus of turkeys</td>
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<tr>
<td>IAI</td>
<td>Integrated agricultural intelligence</td>
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<td>IAP</td>
<td>Incident Action Plan</td>
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<td>IAV</td>
<td>Influenza A virus</td>
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<td>IAVBC</td>
<td>International Aquatic Veterinary Biosecurity Consortium</td>
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<td>IAV-S</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>IBD</td>
<td>Infectious bursal disease</td>
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<tr>
<td>IBH</td>
<td>Inclusion body hepatitis</td>
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<tr>
<td>IBMP</td>
<td>Interagency Bison Management Plan</td>
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<td>IBR</td>
<td>Infectious bovine rhinotracheitis</td>
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<tr>
<td>IC</td>
<td>Inspection and Compliance</td>
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<td>ICA</td>
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<tr>
<td>ICCM</td>
<td>Institute of Computational Comparative Medicine</td>
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<td>ICE</td>
<td>Immigration and Customs Enforcement</td>
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<td>ICLN</td>
<td>Integrated Consortium of Laboratory Networks</td>
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<td>ICP</td>
<td>Incident Command Post</td>
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<td>ICS</td>
<td>Incident Command System</td>
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<td>ICVI</td>
<td>Interstate certificate of veterinary inspection</td>
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<td>IDC</td>
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<td>IDF&amp;G</td>
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<td>IDHC</td>
<td>Infectious diseases of horses committee</td>
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<td>IDNR</td>
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<td>IES</td>
<td>Investigative Enforcement Services</td>
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<td>IES</td>
<td>Investigative and Enforcement Services'</td>
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<td>IFA</td>
<td>Immunofluorescence assay</td>
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<td>IFAH</td>
<td>International Federation for Animal Health</td>
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<td>IFAT</td>
<td>Indirect fluorescent antibody</td>
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<td>IFHA</td>
<td>International Federation of Horseracing Authorities</td>
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<td>IFN</td>
<td>Interferon</td>
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<tr>
<td>IHC</td>
<td>Immunohistochemistry</td>
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<td>IHN</td>
<td>Infectious hematopoietic necrosis</td>
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<tr>
<td>IIAD</td>
<td>Institute of Infectious Animal Diseases</td>
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<tr>
<td>IICA</td>
<td>Inter-American Institute for Cooperation on Agriculture</td>
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<td>IICAB</td>
<td>Institute for International Cooperation in Animal Biologics</td>
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<tr>
<td>iiPCR</td>
<td>Insulated isothermal PCR</td>
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<td>IIT</td>
<td>Incident Investigation Team</td>
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<tr>
<td>ILRI</td>
<td>International Livestock Research Institute</td>
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<td>ILT</td>
<td>Infectious laryngotracheitis</td>
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<tr>
<td>ILTV</td>
<td>Infectious laryngotracheitis virus</td>
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<td>Acronym</td>
<td>Definition</td>
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<td>---------</td>
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<tr>
<td>IMHA</td>
<td>Immune-mediated hemolytic anemia</td>
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<td>IMT</td>
<td>Incident Management Team</td>
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<td>IMT</td>
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<td>Immuno-peroxidase Virus Neutralization test</td>
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<td>IS</td>
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<td>ISAV</td>
<td>Infectious Salmon Anemia Virus</td>
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<td>Idaho State Department of Agriculture</td>
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<td>ISDH</td>
<td>Indiana State Department of Health</td>
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<td>ISIA</td>
<td>International Serum Industry Association</td>
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<td>ISO</td>
<td>International Organization for Standardization</td>
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<td>ISR</td>
<td>Intergenic sequence ribotyping</td>
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<td>Information Technology</td>
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<td>ITDS</td>
<td>International Trade Data System</td>
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<td>ITRCB</td>
<td>International Technical Regulatory Capacity Building</td>
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<td>IVD</td>
<td>Idiopathic vesicular disease</td>
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<td>IVI</td>
<td>Institute of Virology and Immunology</td>
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<td>IVT</td>
<td>In-vitro transcribed</td>
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<tr>
<td>JAC</td>
<td>Joint Advisory Committee</td>
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<td>JD</td>
<td>Johne's disease</td>
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<tr>
<td>JDIP</td>
<td>Johne's Disease Integrated Program</td>
</tr>
<tr>
<td>JEI</td>
<td>Johne's Education Initiative</td>
</tr>
<tr>
<td>JIC</td>
<td>Joint Information Center</td>
</tr>
<tr>
<td>JIT</td>
<td>Just-In-Time</td>
</tr>
<tr>
<td>JPPD</td>
<td>Johnin purified protein derivative</td>
</tr>
<tr>
<td>JPT</td>
<td>Jerky pet treat</td>
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<tr>
<td>JSA</td>
<td>Joint Subcommittee on Aquaculture</td>
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<tr>
<td>JVDI</td>
<td>Journal of Veterinary Diagnostic Investigation</td>
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<tr>
<td>KAP</td>
<td>Knowledge, attitudes, and practice</td>
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<tr>
<td>KBUSLIRL</td>
<td>Knipling-Bushland United States Livestock Insects Research Laboratory</td>
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<tr>
<td>KSVDL</td>
<td>Kansas State Veterinary Diagnostic Laboratory</td>
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<tr>
<td>KWL</td>
<td>Kauffman-White-LeMinor</td>
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<tr>
<td>LADIVES</td>
<td>Regional Vesicular Laboratory</td>
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</table>
### IV. GLOSSARY OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>LA-MRSA</td>
<td>Livestock-associated methicillin-resistant <em>S. aureus</em></td>
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<tr>
<td>LAV</td>
<td>Live attenuated vaccines</td>
</tr>
<tr>
<td>LBMS</td>
<td>Live Bird Marketing System</td>
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<tr>
<td>LC/MS</td>
<td>Liquid Chromatography/Mass Spectroscopy</td>
</tr>
<tr>
<td>LCEM</td>
<td>Laboratory Capacity Estimation Model</td>
</tr>
<tr>
<td>LCMSMS</td>
<td>Liquid chromatography-tandem mass spectrometry</td>
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<tr>
<td>LCMV</td>
<td>Lymphocytic Choriomeningitis virus</td>
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<tr>
<td>LDPE</td>
<td>Low-density polyethylene</td>
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<td>LERP</td>
<td>Livestock Emergency Response Plan</td>
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<td>LHD</td>
<td>Local Health Departments</td>
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<td>LIDs</td>
<td>Location Identifications</td>
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<td>LIMS</td>
<td>Laboratory Information Management System</td>
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<tr>
<td>LIRN</td>
<td>Laboratory Investigation and Response Network</td>
</tr>
<tr>
<td>LIS</td>
<td>Laboratory Information System</td>
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<tr>
<td>LLMDA</td>
<td>Lawrence Livermore Microbial Detection Array</td>
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<tr>
<td>LMH</td>
<td>Leghorn male hepatoma</td>
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<tr>
<td>LMS</td>
<td>Laboratory Messaging Service</td>
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<tr>
<td>LOD</td>
<td>Limit of detection</td>
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<tr>
<td>LOH</td>
<td>Loss of heterozygosity</td>
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<tr>
<td>LOINC</td>
<td>Logical Observation Identifiers Names and Codes</td>
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<td>LPAI</td>
<td>Low pathogenic avian influenza</td>
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<tr>
<td>LPDV</td>
<td>Lymphoproliferative disease virus</td>
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<tr>
<td>LPNAI</td>
<td>Low pathogenic notifiable avian influenza</td>
</tr>
<tr>
<td>LRF</td>
<td>Laser range finder</td>
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<td>LSRTIS</td>
<td>Licensing Serial Release and Testing System</td>
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<td>LTR</td>
<td>Long terminal repeat</td>
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<td>MA</td>
<td>Modified Accredited</td>
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<tr>
<td>MAA</td>
<td>Modified Accredited Advanced</td>
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<td>MAbs</td>
<td>Monoclonal Antibodies</td>
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<td>MAC</td>
<td>Multi-agency coordination committee</td>
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<td>MAH</td>
<td>Market Authorization Holders</td>
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<tr>
<td>MAK</td>
<td>Modified Atmosphere Killing</td>
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<tr>
<td>MALDI</td>
<td>Matrix-assisted laser desorption ionization</td>
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<td>MAP</td>
<td>Mycobacterium Avium Paratuberculosis</td>
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### IV. GLOSSARY OF ACRONYMS

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<td>MAPIA</td>
<td>Multi-antigen print immunoassay</td>
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<td>MAT</td>
<td>Microscopic agglutination test</td>
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<tr>
<td>MAZ</td>
<td>Modified Accredited Zone</td>
</tr>
<tr>
<td>MBM</td>
<td>Meat-and-bone meal</td>
</tr>
<tr>
<td>MBP</td>
<td>Maltose binding protein</td>
</tr>
<tr>
<td>MCFA</td>
<td>Medium chain fatty acids</td>
</tr>
<tr>
<td>MCI</td>
<td>Market cattle identification</td>
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<tr>
<td>McM</td>
<td>McMillan strain</td>
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<td>MCT</td>
<td>Mid-cervical tuberculin</td>
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<tr>
<td>MD</td>
<td>Mule deer</td>
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<tr>
<td>MD</td>
<td>Marek’s disease</td>
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<tr>
<td>MDA</td>
<td>Mycobacterial diseases of animals</td>
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<td>MDA-CAP</td>
<td>Mycobacterial diseases of animals coordinated agricultural project</td>
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<td>MDARD</td>
<td>Michigan Department of Agriculture and Rural Development</td>
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<tr>
<td>MDOL</td>
<td>Montana Department of Livestock</td>
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<tr>
<td>MDR</td>
<td>Multi-drug resistant</td>
</tr>
<tr>
<td>MDV</td>
<td>Marek’s disease virus</td>
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<tr>
<td>MERS</td>
<td>Middle East respiratory syndrome</td>
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<td>MFWP</td>
<td>Montana Fish, Wildlife and Parks</td>
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<tr>
<td>MG</td>
<td>Mycoplasma gallisepticum (&lt;em&gt;M. gallisepticum&lt;/em&gt;)</td>
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<td>MHC</td>
<td>Histocompatibility complex</td>
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<td>MIC</td>
<td>Minimum inhibitory concentration</td>
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<td>Mobile Information Management</td>
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<td>MLCh</td>
<td>Matrix, Decision Loop and Checklist</td>
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<td>Modified Live Viral</td>
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<td>MM</td>
<td>Mycoplasma meleagridis</td>
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<td>MNDNR</td>
<td>Minnesota Department of Natural Resources</td>
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<td>MOA</td>
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<td>MOU</td>
<td>Memorandum of Understanding</td>
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<td>MQ</td>
<td>Macrophages</td>
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<td>MRC</td>
<td>Medical Reserve Corps</td>
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<td>MRPLN</td>
<td>Medial retropharyngeal lymph node</td>
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<td>MRSA</td>
<td>Methicillin-resistant Staphylococcus aureus</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<td>MS</td>
<td>Mycoplasma synoviae</td>
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<td>MS</td>
<td>Mass spectra</td>
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<td>MSIs</td>
<td>Minority serving institutions</td>
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<td>MSP</td>
<td>Multi-State Partnership</td>
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<td>Microbial Source Tracking</td>
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<td>MSU-DCPAH</td>
<td>Michigan State University Diagnostic Center for Population and Animal Health</td>
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<td>Mycobacterium tuberculosis</td>
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<td>MTWG</td>
<td>Methods Technical Working Group</td>
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<td>MUMS</td>
<td>Minor Use/Minor Species</td>
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<td>Neuraminidase</td>
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<td>NAA</td>
<td>National Aquaculture Association</td>
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<td>NAADSM</td>
<td>North American Animal Disease Spread Model</td>
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<td>NAAHP</td>
<td>National Aquatic Animal Health Plan</td>
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<td>NABC</td>
<td>National Aquatic Biosecurity Center</td>
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<td>New Animal Drug Application</td>
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<td>National Animal Disease Center</td>
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<td>NAFMDVB</td>
<td>North American Foot and Mouth Disease Vaccine Bank</td>
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<td>North American Gamebird Association</td>
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<td>NAHEMS</td>
<td>National Animal Health Emergency Management System</td>
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<td>NAHERC</td>
<td>National Animal Health Emergency Response Corps</td>
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<td>NAHITB</td>
<td>National Animal Health Information Technology Board</td>
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<td>NAHLN</td>
<td>National Animal Health Laboratory Network</td>
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<td>NAHMS</td>
<td>National Animal Health Monitoring System</td>
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<td>NAHRS</td>
<td>National Animal Health Reporting System</td>
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<td>NAHSS</td>
<td>National Animal Health Surveillance System</td>
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<td>NAI</td>
<td>No Action Indicated</td>
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<td>NAIS</td>
<td>National Animal Identification System</td>
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<td>NAL(r)</td>
<td>Nalidixic acid-resistant</td>
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<td>NARMS</td>
<td>National Antimicrobial Resistance Monitoring System</td>
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<td>NASAAEP</td>
<td>National Alliance of State Animal and Agricultural Emergency Programs</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<td>NASPHV</td>
<td>National Association of State Public Health Veterinarians</td>
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<td>National Agricultural Statistics Service</td>
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<td>NAVMEC</td>
<td>North American Veterinary Medical Education Consortium</td>
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<td>NBAF</td>
<td>National Bio and Agro-Defense Facility</td>
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<td>National Centers for Animal Health</td>
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<td>NCAHD</td>
<td>National Center for the Analysis of Healthcare Data</td>
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<td>National Center for Animal Health Emergency Management</td>
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<td>NCBA</td>
<td>National Cattlemen's Beef Association</td>
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<td>NCC</td>
<td>National Chicken Council</td>
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<td>NCFAD</td>
<td>National Centre for Foreign Animal Disease</td>
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<td>NCFDD</td>
<td>National Center for Food Protection and Defense</td>
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<td>NCIE</td>
<td>National Center for Import and Export</td>
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<td>Noncytopathic</td>
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<td>NCS</td>
<td>Newborn calf serum</td>
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<td>NCUSAHA</td>
<td>North Central USAHA (District)</td>
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<td>National Defense Authorization Act</td>
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<td>National Disaster Medical System</td>
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<td>NDV</td>
<td>Newcastle disease virus</td>
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<td>NPIS</td>
<td>New Poultry Inspection System</td>
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<td>NPLA</td>
<td>Neutralizing peroxidase-linked assay</td>
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<td>NPPC</td>
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<td>NPS</td>
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<td>NRF</td>
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<td>NUES</td>
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<td>National Wildlife Research Center</td>
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<td>NWS</td>
<td>New World screwworm</td>
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<td>OAI</td>
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<td>OCV</td>
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<tr>
<td>OCVI</td>
<td>Online Certificate of Veterinary Inspections System</td>
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<td>OD</td>
<td>Optical Density</td>
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<td>ODAFF</td>
<td>Oklahoma Department of Agriculture, Food and Forestry</td>
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<td>Office of Health Affairs (DHS)</td>
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<td>OHCC</td>
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<td>OIE</td>
<td>World Animal Health Organization</td>
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<td>OIG</td>
<td>Office of the Inspector General</td>
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<tr>
<td>OM</td>
<td>Osteomyelitis</td>
</tr>
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<td>OMB</td>
<td>Office of Management and Budget</td>
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<tr>
<td>OOS</td>
<td>Out of state</td>
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<td>OPPV</td>
<td>Ovine progressive pneumonia virus</td>
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<td>ORF</td>
<td>Open reading frame</td>
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<td>ORST</td>
<td>Outbreak Response and Surveillance Team</td>
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<td>ORT</td>
<td><em>Ornithobacterium rhinotracheale</em></td>
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<td>ORV</td>
<td>Oral rabies vaccination</td>
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<td>OSA</td>
<td>Official State Agency</td>
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<tr>
<td>OSTP</td>
<td>Office of Science and Technology Policy</td>
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<td>OTC</td>
<td>Over-the-counter</td>
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IV. GLOSSARY OF ACRONYMS

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<td>Orbivirus Working Group</td>
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<td>OWC</td>
<td>Old World Camelids</td>
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<tr>
<td>PA</td>
<td>Plains Area</td>
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<tr>
<td>PAC</td>
<td>Positive amplification</td>
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<tr>
<td>PACCARB</td>
<td>Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria</td>
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<td>Pennsylvania Department of Health</td>
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<td>PADRAP</td>
<td>Production Animal Disease Risk Assessment Program</td>
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<td>PAHO</td>
<td>Pan American Health Organization</td>
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<tr>
<td>PAMTA</td>
<td>Preservation of Antibiotics for Medical Treatment Act</td>
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<tr>
<td>PANAFTOSA</td>
<td>Pan American Foot-and-Mouth Disease Center</td>
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<tr>
<td>PAR</td>
<td>Pipestone Applied Research</td>
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<tr>
<td>PARA</td>
<td>Preventing Antibiotics Resistance Act</td>
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<tr>
<td>PAST</td>
<td>Prevent All Soring Tactics</td>
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<tr>
<td>PBMCs</td>
<td>Peripheral blood mononuclear cells</td>
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<tr>
<td>PBS</td>
<td>Phosphate buffered saline</td>
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<tr>
<td>PBV</td>
<td>Picobirnavirus</td>
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<tr>
<td>PC</td>
<td>Pre-conditioning</td>
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<tr>
<td>PCAST</td>
<td>President’s Council of Advisors on Science and Technology</td>
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<tr>
<td>PCEP</td>
<td>Program Continuous Evaluation Process</td>
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<tr>
<td>PCR</td>
<td>Polymerase chain reaction</td>
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<tr>
<td>PCV 2</td>
<td>Porcine Circovirus 2</td>
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<tr>
<td>PDCoV</td>
<td>Porcine deltacoronavirus</td>
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<td>PDS</td>
<td>Professional Development Staff</td>
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<td>PEC</td>
<td>Positive extraction</td>
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<tr>
<td>PEDv</td>
<td>Porcine Epidemic Diarrhea virus</td>
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<td>PEL</td>
<td>Policy, Evaluation, and Licensing</td>
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<td>PEMS</td>
<td>Poult Enteritis Mortality Syndrome</td>
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<td>PEP</td>
<td>Post-exposure prophylaxis</td>
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<td>PETA</td>
<td>People for the Ethical Treatment of Animals</td>
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<td>PETS</td>
<td>Pets Evacuation and Transportation Standards Act</td>
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<td>PFE</td>
<td>Polarized Fractal Efficiency</td>
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## IV. GLOSSARY OF ACRONYMS

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<thead>
<tr>
<th>Acronym</th>
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<td>PFGE</td>
<td>Pulsed-field gel electrophoresis</td>
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<td>PFI</td>
<td>Pet Food Institute</td>
</tr>
<tr>
<td>PG</td>
<td>Propylene glycol</td>
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<td>PGHs</td>
<td>Peptidoglycan hydrolases</td>
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<tr>
<td>PhD</td>
<td>Doctor of Philosophy</td>
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<td>PHLIS</td>
<td>Public Health Laboratory Information Systems</td>
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<td>PI</td>
<td>Post inoculation</td>
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<tr>
<td>PI</td>
<td>Persistently infected</td>
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<tr>
<td>PI3-BRSV</td>
<td>Parainfluenza-3-Bovine Respiratory Syncytial Virus</td>
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<tr>
<td>PI3V</td>
<td>Parainfluenza-3 virus</td>
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<tr>
<td>PIADC</td>
<td>Plum Island Animal Disease Center</td>
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<td>PIIWG</td>
<td>Pork Industry Identification Working Group</td>
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<td>PIJAC</td>
<td>Pet Industry Joint Advisory Council</td>
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<td>PIN</td>
<td>Premise identification number</td>
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<td>PIOS</td>
<td>Public Information Officers</td>
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<td>PKEMRA</td>
<td>Post Katrina Management Reform Act</td>
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<td>PL</td>
<td>Pathobiology Laboratory</td>
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<td>PMCA</td>
<td>Protein Misfolding Cyclic Amplification</td>
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<td>PMIP</td>
<td>Pre-movement isolation period</td>
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<td>PMO</td>
<td>Pasteurized Milk Ordinance</td>
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<td>PMWS</td>
<td>Post-weaning multisystemic wasting syndrome</td>
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<td>PNF</td>
<td>Payette National Forest</td>
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<td>PPD</td>
<td>Purified protein derivative</td>
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<td>PPE</td>
<td>Personal protective equipment</td>
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<td>PPPMD</td>
<td>Pesticide and Plant Pest Management Division</td>
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<td>PPQ</td>
<td>Plant Protection &amp; Quarantine</td>
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<td>PPR</td>
<td>Peste des petits ruminants</td>
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<td>PQA</td>
<td>Pork Quality Assurance</td>
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<td>PQZ</td>
<td>Permanent Quarantine Zone</td>
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<td>PRCA</td>
<td>Professional Rodeo Cowboys Association</td>
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<td>PRDA</td>
<td>Puerto Rican Department of Agriculture</td>
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<td>PReP</td>
<td>Preparedness and Response Plan</td>
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<td>PREVENT</td>
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<td>PRNP</td>
<td>Prion protein</td>
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### IV. GLOSSARY OF ACRONYMS

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<tr>
<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>PRRS(V)</td>
<td>Porcine reproductive and respiratory syndrome (virus)</td>
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<td>PRV</td>
<td>Pseudorabies virus</td>
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<td>PSAs</td>
<td>Public Security Advisors</td>
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<td>PSS</td>
<td>Program Support Services</td>
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<td>PTs</td>
<td>Proficiency testing schemes</td>
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<td>PVS</td>
<td>Performance of Veterinary Services</td>
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<tr>
<td>QA</td>
<td>Quality assurance</td>
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<td>QCS</td>
<td>Quality Certification Services</td>
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<td>QFT</td>
<td>Quantiferon Gold In-Tube</td>
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<td>QMS</td>
<td>Quality Management System</td>
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<td>QT</td>
<td>Quality Assurance</td>
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<td>RA/HMP</td>
<td>Risk Assessments/Herd Management Plans</td>
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<td>RAMALT</td>
<td>Recto-anal mucosal-associated lymphoid tissues</td>
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<td>RAP</td>
<td>Rapid Automated Presumptive</td>
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<td>RAPIDD</td>
<td>The Research and Policy for Infectious Disease Dynamics</td>
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<td>RE</td>
<td>Reticuloendotheliosis</td>
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<td>REEMO</td>
<td>Electronic Registration Mobilization</td>
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<td>RES</td>
<td>Regionalization Evaluation Services</td>
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<td>REV</td>
<td>Reticuloendotheliosis virus</td>
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<td>RFA</td>
<td>Request for applications</td>
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<td>RFID</td>
<td>Radio frequency identification</td>
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<td>RFP</td>
<td>Request for proposal</td>
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<td>Renewable Fuel Standards</td>
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<td>RIU</td>
<td>Risk Assessment Unit</td>
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<td>RML</td>
<td>Rocky Mountain Laboratory</td>
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<td>RNA</td>
<td>Ribonucleic acid</td>
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<td>ROW</td>
<td>Rest of world</td>
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<tr>
<td>RPF</td>
<td>Request for Proposals</td>
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<td>RPV</td>
<td>Rinderpest virus</td>
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<td>RRT</td>
<td>Rapid Response Team</td>
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<td>RRT-PCR</td>
<td>Reverse transcriptase, polymerase chain reaction</td>
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<td>RSS</td>
<td>Runting-stunting syndrome</td>
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<td>Abbreviation</td>
<td>Description</td>
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<td>RSSS</td>
<td>Regulatory Scrapie Slaughter Surveillance</td>
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<tr>
<td>RT-PCR</td>
<td>Real-time polymerase chain reaction</td>
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<tr>
<td>RT-QuIC</td>
<td>Real-time quaking-induced conversion</td>
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<td>RVC</td>
<td>Reserve Veterinary Corps</td>
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<td>RVCMS</td>
<td>Rinderpest virus containing materials</td>
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<td>RVFV</td>
<td>Rift Valley fever virus</td>
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<td>RVNA</td>
<td>Rabies virus neutralizing antibody</td>
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<td>RVSS</td>
<td>Reagents and Vaccine Services</td>
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<td>SA</td>
<td>Select Agent</td>
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<td>SAADRA</td>
<td>Southern Agriculture and Animal Disaster Response Alliance</td>
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<td>Secretary of Agriculture, Ranching, Rural Development, Fisheries and Food Supply (Mexico)</td>
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<td>Southern Animal Health Association (District)</td>
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<td>State animal health official</td>
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<td>SALMS</td>
<td>State Animal Laboratory Messaging Service</td>
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<td>SARCHI</td>
<td>South African Research Initiative</td>
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<td>Severe Acute Respiratory Syndrome</td>
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<td>SARTs</td>
<td>State Animal Response Team</td>
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<td>SAS</td>
<td>Scientific Advisory Subcommittee</td>
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<tr>
<td>SB</td>
<td>Swine brucellosis</td>
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<tr>
<td>SBIR</td>
<td>Small business innovation research</td>
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<td>SBS</td>
<td>Secure Broiler Supply Plan</td>
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<td>SBV</td>
<td>Schmallenberg virus</td>
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<td>SCAD</td>
<td>Scientific Commission for Animal Diseases</td>
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<td>SCC</td>
<td>Somatic cell count</td>
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<td>SCS</td>
<td>South Central skunk</td>
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<td>SCS</td>
<td>Surveillance Collaboration System</td>
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<td>Single cervical tuberculin test</td>
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<td>SCWDS</td>
<td>Southeastern Cooperative Wildlife Disease Study</td>
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<td>SD</td>
<td>Salmonella Dublin</td>
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<td>SDO</td>
<td>Standards Development Organizations</td>
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<td>SDS</td>
<td>Sodium dodecyl sulphate</td>
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<td>SDZ</td>
<td>Sulfadiazine</td>
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<td>SE</td>
<td>Salmonella enteritidis</td>
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### IV. GLOSSARY OF ACRONYMS

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<tr>
<td>SEAFWA</td>
<td>Southeastern Association of Fish and Wildlife Agencies</td>
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<td>Swine enteric coronavirus diseases</td>
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<tr>
<td>SECoV</td>
<td>Swine Enteric Coronavirus</td>
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<td>SECWDS</td>
<td>Southeastern Cooperative Wildlife Disease Study</td>
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<td>SENASICA</td>
<td>National Services of Animal and Plant Health, Quality and Food Safety (Mexico)</td>
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<td>SEOP</td>
<td>State Emergency Operations Plan</td>
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<td>SEPRL</td>
<td>Southeastern Poultry Research Laboratory (ARS)</td>
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<td>Secure Egg Supply</td>
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<td>SFCP</td>
<td>Scrapie Flock Certification Program</td>
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<td>Secure Food Supply</td>
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<td>SH</td>
<td><em>Salmonella heidelberg</em></td>
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<td>SHI</td>
<td>Synergistic Hemolysin Inhibition</td>
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<td>Swine Health Information Center</td>
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<td>Swine Health Monitoring Project</td>
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<td>Slaughter Horse Transport Program</td>
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<td>SICAMORA</td>
<td>Compliance documentation for exporting cattle from Mexico to the U.S.</td>
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<td>National System of Individual Cattle Identification</td>
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<td>Sterile Insect Technique</td>
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<td>Swine Influenza Virus</td>
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<td>SMS</td>
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<td>SNGD</td>
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<td>SNPs</td>
<td>Single nucleotide polymorphisms</td>
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<td>SODA</td>
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<td>SOP</td>
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<td>SPHV</td>
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<td>SPRS</td>
<td>Surveillance, Preparedness and Response Services</td>
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<td>SPS</td>
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<td>Acronym</td>
<td>Description</td>
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<td>SPS</td>
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<td>SPV</td>
<td>Sylvatic plague vaccine</td>
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<td>STEC</td>
<td>Shiga toxin–producing <em>Escherichia coli</em></td>
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<td>SVD</td>
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<td>SWAP</td>
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<tr>
<td>SWOT</td>
<td>Strengths, weaknesses, opportunities, and threats</td>
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<td>T&amp;E</td>
<td>Training and Exercise</td>
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<td>TAD</td>
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<td>TADs</td>
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<td>TAHD</td>
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<td>TCE</td>
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<td>Tissue culture origin</td>
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<td>TCoV</td>
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<td>TEP</td>
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<td>Description</td>
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<td>TOC</td>
<td>Turkey osteomyelitis complex</td>
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<td>TR-DFTR</td>
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<td>TRICH</td>
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<td>UEP</td>
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<td>UHF</td>
<td>Ultra-high frequency</td>
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<td>UM&amp;R</td>
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<td>USAID</td>
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<td>VAC</td>
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<td>VBJDCP</td>
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<td>Veterinary International Committee on Harmonisation (International)</td>
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