PROCEEDINGS

ONE HUNDRED AND TWENTY FOURTH ANNUAL MEETING

OF THE

UNITED STATES ANIMAL HEALTH ASSOCIATION

VIRTUAL MEETING
OCTOBER 5-21, 2020
The 2020 Annual Meeting was forced to be held virtually due to the COVID-19 Pandemic.

The Meeting was originally scheduled at the Gaylord Opryland Hotel in Nashville, Tennessee.

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.

USAHA MEMBERSHIP
State Official Agency Members (50)

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

Federal Official Agency Members (11)
USDA, APHIS, Veterinary Services USDI, National Park Service
USDA, Agriculture Research Service USDI, USGS, National Wildlife Health Center
USDA, National Institute of Food and Agriculture USDOE, Lawrence Livermore National Laboratory
USDA, APHIS, Wildlife Services U.S. Forest Service
USDHHS, Centers for Disease Control and Prevention
U.S. Dept. of Homeland Security
USDI, U.S. Fish and Wildlife Service

Territory and Sovereign Agency Members (1)
North Mariana Island

International Animal Health Agencies (3)
Australia
Canada
Mexico
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
Association of Fish & Wildlife Agencies
Battelle Memorial Institute
Exotic Wildlife Association
Livestock Exporters Association, USA
Livestock Marketing Association
National Aquaculture Association
National Association of State Public Health Veterinarians
National Bison Association
National Cattlemen’s Beef Association
National Chicken Council
National Dairy Herd Information Association, Inc.
National Institute for Animal Agriculture
National Milk Producers Federation
National Pork Board
National Pork Producers Council
National Renderers Association
National Turkey Federation
North American Deer Farmers Association
North American Elk Breeders Association
Professional Rodeo Cowboys Association
U.S. Poultry & Egg Association
USA Poultry and Egg Export Council

District Delegates
Northeast: B. Thompson; D. McElhaney
North Central: P. Brennan; J. Eggers
South: L. O. Lollis; E. Jensen
West: T. Hanosh; H.M. Richards

Individual Members: 630
Life Members: 139
Student Members: 45
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I. 2020 Officers and Directors

A. Officers

2019-2020 Executive Committee

Front row (from left): Kristin Haas, VT, Immediate Past President; President; Marty Zaluski, MT, President, Charlie Hatcher, TN, President-Elect. Back row (from left): Manoel Tamassia, NJ, Third Vice President; Dustin Oedekoven, SD, First Vice President; Annette Jones, CA, Treasurer; Steve Rommereim, SD, Second Vice President.
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<th>STATES</th>
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<tr>
<td>Frazier, Tony</td>
<td>Alabama Dept of Agric</td>
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<td>Gerlach, Robert</td>
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## I.B. USAHA BOARD OF DIRECTORS

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<tr>
<td>Smith, David</td>
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<td>Logan, Jim</td>
<td>Wyoming Livestock Board</td>
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### Representative

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<td>Schipp, Mark</td>
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**Representative**

**ALLIED INDUSTRY**

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<th>Cindy Wolf</th>
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<td>Cain, Kevin</td>
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## I.B. USAHA BOARD OF DIRECTORS

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<tr>
<td>Froebel, Lindy</td>
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### Representative

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<td>Jensen, Eric</td>
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<td>Lollis, Laurent O'Gene</td>
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### PAST PRESIDENTS, EC

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<tr>
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<tbody>
<tr>
<td>Hatcher, Charles</td>
<td>Executive Committee, South</td>
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<td>Rommereim, Steve</td>
<td>Executive Committee, District-at-Large</td>
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<tr>
<td>Alley, J Lee</td>
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<tr>
<td>Bradshaw, Philip</td>
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<tr>
<td>Breitmeyer, Richard</td>
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<tr>
<td>Determan, Barbara</td>
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<td>Hagerty, Thomas</td>
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<td>Halstead, Steven</td>
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<td>Hillman, Bob</td>
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<td>King, Bruce</td>
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<td>McCapes, Richard</td>
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I.B. USAHA BOARD OF DIRECTORS

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<td>Willer, Richard</td>
<td>Past President</td>
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<td>Williams, Larry</td>
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<td>Zirkle, Ernest</td>
<td>Past President</td>
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*Denotes Also a Past President
C. 2020 USAHA Committees

- 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 CATTLE AND BISON
  - SUBCOMMITTEE ON BRUCELLOSIS
  - SUBCOMMITTEE ON BVDV
  - SUBCOMMITTEE ON CATTLE IDENTIFICATION
  - SUBCOMMITTEE ON TRICHOMEONIASIS
  - SUBCOMMITTEE ON TUBERCULOSIS
- USAHA/AAVLD COMMITTEE ON DIAGNOSTIC LABORATORY AND VETERINARY WORKFORCE DEVELOPMENT
- COMMITTEE ON EQUINE
  - SUBCOMMITTEE ON EQUINE VIRAL ARTERITIS (EVA)
- USAHA/AAVLD COMMITTEE ON FOOD AND FEED SAFETY
- COMMITTEE ON FOREIGN AND EMERGING DISEASES
- COMMITTEE ON GOVERNMENT RELATIONS
- COMMITTEE ON GLOBAL ANIMAL HEALTH AND TRADE
- USAHA/AAVLD COMMITTEE ON NATIONAL ANIMAL HEALTH LABORATORY NETWORK
- COMMITTEE ON NOMINATIONS AND RESOLUTIONS
- COMMITTEE ON PARASITIC AND VECTOR BORNE DISEASES
- COMMITTEE ON PROGRAM
- COMMITTEE ON ONE HEALTH
  - SUBCOMMITTEE ON PHARMACEUTICAL ISSUES
  - SUBCOMMITTEE ON RABIES
  - SUBCOMMITTEE ON SALMONELLA
- COMMITTEE ON SHEEP, GOATS AND CAMELIDS
  - SUBCOMMITTEE ON SCRAPIE & IDENTIFICATION
- COMMITTEE ON POULTRY AND OTHER AVIAN SPECIES
  - SUBCOMMITTEE ON AVIAN INFLUENZA (AI) AND NEWCASTLE DISEASE (NDV)
I. C. USAHA COMMITTEES

- COMMITTEE ON SWINE
- COMMITTEE ON WILDLIFE

Rosters of each committee as of the 2020 Annual Meeting are included within each report.

A current listing for committee rosters can be found on the USAHA website, listed under each committee page, respectively.
II. 2020 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
II. A. USAHA/AAVLD President’s Reception and Dinner

WELCOME
Tennessee Governor Mr. Bill Lee

MEMORIAL SERVICE
Charles Hatcher

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. Let us keep in mind that life is fragile, but also enjoy the memories, contributions and fellowship that we have shared with those 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 the following individuals that have passed on:

Thomas G. Murnane, Texas (July 2017)
Max L. Crandall, Virginia (June 2014)
Robert A. Crandell, Texas (December 2019)
Bob Dittmar, Texas (August 2020)
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

PRESIDENT’S DINNER SPONSOR’S RECOGNITION

Special Thanks to our 2020 President's Dinner Supporter, Boehringer Ingelheim

Steve Parker, Boehringer Ingelheim
This banquet has been a focal point of the annual meeting and I'm honored to be our USAHA host for this program.

This event brings together professionals from all corners of the animal health and diagnostic science arenas and I regret that the coronavirus pandemic has deprived us of a precious in person opportunity.

But there are reasons to celebrate the first reason to celebrate is that I don't have to compete with the talk given last year by Doctor Haas and has now past President her highly informative, funny and touching speech where she recounted some experiences from her African Safari was something to relish.

The second reason to celebrate is that technology allows us to do the lion's share of our critical work in furthering policy and doing our best for animal health, animal care and public health.

Lastly, the remote format has facilitated a dramatic increase in access and participation.

I want to pause and welcome the 300 or so first-time attendees that are able to take part in the 2020 annual meeting.

This type of growth, driven by our quality program unhindered by travel costs and time away from work and home, is the greatest byproduct of our online venue.

So going forward, one of the biggest challenges for the organization is how to integrate the capability and access provided by the online format into traditional meetings in the future.

In other words, how do we make the next conference more accessible, more inclusive and more concise while also building on the long tradition of in
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

person meetings that facilitate consensus, building relationships, friendships, and ultimately contributes to the right decisions to support our mission?

To develop and promote sound animal health solutions for the public good.

Indeed, when I see the richness of committee topics, the broad representation of attendees, and the ready adoption of the new online format, I can see that you, as Members, take the mission of the USAHA seriously.

Before I close, I want to thank our sponsors and the rest of the USAHA Executive Committee for their work and extra time to guide the organization in this difficult year.

And of course, to our partners at AAVLD for working closely along the way.

And I want to make my final statement to acknowledge the hard work of USAA staff who have had to turn on a dime to convert a meeting from an in-person format that accommodates 1100 or so attendees to an online format for more than 1500. Thank you, Ben Richey. Kelly Janicek and Kaylin Taylor for all that you do. I am proud to call you and the Members in attendance colleagues and friends. Enjoy the meeting.
Greetings all from Deep Tewari, your AAVLD president for 2020. Thank you for giving me this opportunity to serve you. It was a great experience and collectively we got some very important work done. This meeting will go down as one of the most historic meetings ever to be held. I hope you all are enjoying this new experience.

The cooperation I receive from fellow lab directors, committee chairs, USDA and our partner organizations like USAHA, just to name a few. It was fantastic to make this journey easier and enjoyable during very difficult times. When COVID struck, my responsibility was not only to keep our lab running, but provide all members and labs support from AAVLD and from all over. The AAVLD COVID task force was born out of this need and thanks to each member of that task force for doing an outstanding job. Kudos to all of you in laboratories who kept working and also many of you ended up helping with the COVID testing and continue to do so whenever health partners needed that assistance. You are my community heroes.

This really speaks to the training infrastructure quality over labs bring together and is what we advocated to Congress and with our partner organizations throughout the pandemic. As a result of your work, our network labs are better recognized, and I appreciate it.

Throughout this journey and otherwise, I felt our organization cares deeply about each member. Inclusivity and diversity, or the mainstay of this organization. I and my leadership team reflects this fact as we look to the future. I have asked the diversity and inclusivity task force that was created this year to further make AAVLD stronger.

I consider myself very fortunate in having grown up in the foothills of Himalayas. A lifetime treat for me, I got to study at Cambridge and worked with top disease experts including including Nobel Prize winners, and have lived with my family and worked in a state where agriculture is just a way of life. And so has been this leadership experience.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

Finally, I would like to say thank you to my friends, family, my wife Aruna, parents, mentors as well as the administrative staff and the board for your belief and support during the course of this year.

Thank you. Long live this association.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

RECOGNITION OF 2020 SPONSORS

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VMRD
II. A. USAHA/AAVLDPRESIDENT’S RECEPTION AND DINNER

APHIS Administrator’s Award

Dr. Michael Neault, with Dr. Barry Meade of APHIS-VS.

Dr. Michael Neault is recognized by USDA for his leadership in a number of key areas. As Director of Livestock Programs, Mike coordinated and hosted recurring crucial conversations and communications on behalf of the National Assembly of State Animal Health Officials (SAHO) for both African Swine Fever (ASF) preparedness and the challenges posed by the impacts of COVID-19 on processing plants resulting in significantly reduced processing capacity. These calls provided a platform to discuss the reality of large-scale depopulation and disposal the swine industry would face if ASF were introduced into the USA. These calls provided a venue for SAHOs, swine industry representatives, allied industries, and federal government representatives to discuss the situation in each affected state, and to share what was working, PR challenges, and ideas for support as the situation changed.

As the capacity issues begin to wane, Dr. Neault leveraged this opportunity to broaden the conversation with allied groups, such as the rendering industry and USDA-Natural Resources and Conservation Service (NRCS), to foster a closer association with these cooperators and discuss disposal options for swine carcasses in the face of a national disaster or a widespread animal disease event.

Mike is a tireless and consistent collaborator with USDA and other stakeholders on many emergency management activities, including Veterinary Services National Training and Exercise Program projects and the Secure Pork Supply exercise development. His contributions to animal health during these difficult times serve to strengthen our relationships and build toward the future.
AAVLD AWARDS

OUTSTANDING PERFORMANCE AWARD FOR DIAGNOSTIC SERVICE

Dr. Mindy Plunkett

AAVLD Distinguished Service Award

Dr. Tim Baszler
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

AAVLD E.P. Pope Award

Dr. William Fales
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. The recipient need not be a member of USAHA, but have a positive impact on animal health related to the work of USAHA.

Our 2020 Federal Partnership Award goes to Dr. Darrel Styles, Senior Staff Veterinarian in the Diagnostics & Biologics Division of United States Department of Agriculture Animal Plant and Health Inspection Service Veterinary Services

Dr. Styles has been a tireless worker and advocate for over 12 years on behalf of federal efforts to improve USDA foreign animal disease preparedness and response policy, outreach and programs. This is underscored by his public outreach efforts of delivering numerous informational and technical lectures to professional and lay groups, including regulatory agencies and academia, on diseases affecting the entire range of U.S. livestock, especially Foot and Mouth disease (FMD), Classical and African Swine Fevers, and influenzas.

Dr. Styles is an effective educator and liaison with industry stakeholders. He is the epitome of an agency role model for the public-private partnership objectives of APHIS. He has advanced the efforts of State Ag response planning serving as an advisor and subject matter expert providing guidance
addressing the most difficult preparedness challenges at all levels of production from individual farms, to local, regional, and national perspectives.

Dr. Styles received his DVM from North Carolina State University in 1990, his MS in Pharmacy: Medicinal Chemistry from the University of Texas in 1999 and his PhD in Veterinary Microbiology, specializing in virology, from Texas A&M University in 2005. Darrel joined the USDA in 2006. At USDA, Dr. Styles has worked for the betterment of the U.S. livestock and poultry industries in the following areas:

- **Epidemiology and Surveillance**
- **Policy & Development**
- **Response Countermeasures Development**
- **Direct Foreign animal Disease Mitigation**
- **One Health/Public Health Coordination**

These represent the tip of the iceberg for Dr. Styles’ engagement in animal health, with so many areas he has positively impacted.

We are pleased to present the 2020 Federal Partnership Award to Dr. Styles, and recognize his work for the industries we all serve. Thank you and congratulations Dr. Styles!
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

USAHA Medal of Distinction Award

Dr. John Clifford

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.

This year we are honored to present this award to a long-time partner and supporter of the work of USAHA.

Dr. John Clifford is your 2020 USAHA Medal of Distinction awardee.

Dr. Clifford is the current president of Clifford Veterinary Consulting and resides in Bowling Green Kentucky. Dr. Clifford graduated from the University of Missouri Veterinary School in 1983 and joined a mixed animal practice in Kentucky. He started his 33-year long career with USDA, APHIS Veterinary Services (VS) in 1985 during which time he served in numerous roles. From 2004 to 2016, he was the Deputy Administrator of APHIS and the nation’s Chief Veterinary Officer (CVO), holding that position for longer than any of his predecessors. As CVO he also became the U.S. delegate to the World Organization for Animal Health (OIE) based in Paris. The OIE is the standard setting body for international trade in animals and animal products.

Dr. Clifford presided over responses to numerous foreign animal health emergencies during his tenure as CVO including Exotic Newcastle Disease, Bovine Spongiform Encephalopathy and Highly Pathogenic Avian Influenza. His compassionate support of livestock and poultry producers during these difficult times was exemplary and beyond reproach. His consistent and steadfast leadership and support of state, federal and industry partnerships and collaborations were instrumental in assuring the success of these efforts. Furthermore, he has been a strong and reliable supporter of the USAHA.
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

throughout his time as CVO, regularly sanctioning the attendance of scores
of Veterinary Services employees at regional and annual USAHA meetings. He has further continued his engagement, with the U.S. Poultry and Egg Export Council at USAHA in recent years. These partnerships that Dr. Clifford supported and led helped guarantee the survival and profitability of the nation’s farmers and assured the safety, quality and abundance of the U.S. food supply.

So, on behalf of USAHA, thank you Dr. Clifford and congratulations!
II. A. USAHA/AAVLD PRESIDENT’S RECEPTION AND DINNER

National Assembly Award

Dr. Michael Neault

The National Assembly Award is given to an active regulatory official or an industry representative for outstanding service in animal health regulatory programs. The National Assembly is please to present the 2020 Award to Dr. Michael Neault of North Carolina.
II. B. USAHA/AAVLD Keynote Session

COVID-19 Response & Lessons Learned; AgView: The Path to Protection – Bill Even, Chief Executive Officer, National Pork Board
II. B. USAHA/AAVLD PLENARY SESSION

COVID-19 RESPONSE & LESSONS LEARNED; AGVIEW: THE PATH TO PROTECTION

Bill Even

Bill Even is the Chief Executive Officer for the National Pork Board based in Des Moines, IA where he has responsibility for leading Checkoff-funded research, promotion and education projects on behalf of the nation's 60,000 pork producers.

Prior to his employment with the National Pork Board, Bill served as the Global Industry Relations Lead and Commercial Unit Lead for DuPont Pioneer. Bill also served as South Dakota Secretary of Agriculture from 2007 to 2010 where he managed six department divisions: Agriculture Regulatory Services, Agriculture Development, State Fair, Wildland Fire, Resource Conservation and Forestry, and Agricultural Policy.

Bill also served as Deputy Secretary of Tourism and State Development, Director of the Governor’s Office of Economic Development, State Energy Policy Director, and Policy Advisor for Governor Mike Rounds.

Bill holds a degree in Agricultural Production from Lake Area Technical Institute, a B.S. in Agricultural Business from South Dakota State University; and a Juris Doctorate from Drake University Law School.

While in law school, Bill served as executive editor of the Drake Journal of Agricultural Law, clerked for the law firm of Hefner and Bergkamp, P.C., and interned with the Soil and Water Conservation Society and the U.S. Senate Agriculture Committee in Washington, D.C.

Bill and his family own and operate a diversified crop and livestock farm near Humboldt, South Dakota. The farm was homesteaded in 1883 by his great-grandfather and Bill began farming in 1983. Bill and his wife, Janell, have three children and live in Adel, Iowa.
II. C. Joint Scientific Session Papers, Abstracts, and Posters

1. Papers and Abstracts

Determining the seroprevalence of Anaplasma marginale infected beef herds in Georgia – L. Jones

Comparison of Mycoplasma hyopneumoniae DNA detection in oral fluid samples – A. Paula Poeta Silva

Association of border disease virus with a high mortality outbreak amongst 3-month-old feeder lambs shipped from Colorado to New York State – E. Frye

Clostridium botulinum type A detected by MALDI-TOF mass spectrometry in bovine rumen contents after ingestion of feed contaminated by a raccoon carcass – E. Frye

Development of an experimental challenge model for Streptococcus equi subsp. zooepidemicus in pigs – N. Macedo

Insights into pathogenesis and treatment for SARS-CoV-2 infection in small animal models at Colorado State University – T. Aboellail

Diagnostic trends of five swine endemic bacterial pathogens using data from the Iowa State University Veterinary Diagnostic Laboratory (2010-2019) – A. Paula Poeta Silva
DETERMINING THE SEROPREVALENCE OF ANAPLASMA MARGINALE INFECTED BEEF HERDS IN GEORGIA

Lee Jones¹, Hemant K. Naikare², Roy D. Berghaus¹, Allen Aref Kalantari²

¹Population Health, UGA College of Veterinary Medicine, Tifton, GA
²Microbiology, Tifton Veterinary, Investigational Diagnostic Laboratory, Tifton, GA

The main objective of our proposed study was to determine the seroprevalence of A. marginale infected beef herds in Georgia and to identify herd risk factors associated with A. marginale positive herds. In addition, we compared the cELISA serology and Taqman qPCR for determining the prevalence of A. marginale infected herds in Georgia. Blood samples were collected from 1059 adult beef cattle (≥ 2 years) from 33 herds. The sera samples were screened using a commercial cELISA Anaplasma antibody test kit (VMRD). Eighty-six (8.1%) of 1059 cattle and 14 (42.4%) of 33 farms had positive ELISA results. EDTA whole blood samples from a subset of corresponding seropositive samples (n=73) were tested by Taqman qPCR and 77% (56/73) were PCR positive. Out of the 406 sero-negative samples, none of those animals were found to be PCR positive for A. marginale DNA. There was almost perfect agreement by Cohen kappa statistics between PCR and cELISA (κ= 0.85). Management questionnaires were completed by all owners of each herd tested. Surprisingly, 27% (9/33) of owners had not heard of anaplasmosis, 18.2% (6/33) herds had been diagnosed with anaplasmosis prior to this study, 55.2% (16/29) did not disinfect instruments between calves when dehorning or castrating, and 87.8% (29/33) of the operations used the same needle to inject more than one animal. Given the presence of Anaplasma in Georgia beef cattle and findings of the survey, educational programs on effective preventive management practices to control anaplasmosis is warranted.
COMPARISON OF *MYCOPLASMA HYOPNEUMONIAE* DNA DETECTION IN ORAL FLUID SAMPLES

Ana Paula Poeta Silva¹, Gabriel Storino², Franco Ferreyra¹, Jessica Miller¹, Karen M. Harmon¹, Phillip Gauger¹, Wendy Witbeck³, Kent Doolittle³, Silvia Zimmerman³, Rachel Derscheid¹, Maria Jose Clavijo¹, Bailey Arruda¹, Jeffrey Zimmerman¹

¹Iowa State University, Ames, IA
²Escola de Agricultura e Ciências Veterinárias, Universidade Estadual de São Paulo, Sao Paulo, Brazil
³IDEXX Laboratories, Portland, ME

Control of *Mycoplasma hyopneumoniae* (*MHP*) is dependent upon detection of infected pigs using effective monitoring protocols. Oral fluids samples are routinely used in disease monitoring programs in swine production systems because it does not require animal restraint and offers an assessment of population status. However, the detection parameters of *MHP* DNA in oral fluids have not been clearly defined. The goal of this study was to compare 4 protocols for DNA detection in oral fluids from pigs of known *MHP* infection status.

Oral fluid samples of known status were collected daily from 5 groups of 6-week-old pigs from day post-inoculation (DPI) -4 through DPI 59. The negative control group consisted of 3 pigs; the 4 treatment groups contained 9 pigs each. Treatment groups differed in the number of pigs inoculated with *MHP* (lung homogenate, 105 CFU/mL *MHP*) at time zero: 1/9, 3/9, 6/9, and 9/9 pigs. Tracheal swabs were collected twice weekly to monitor individual pig *MHP* infection.

Two extraction and three PCR protocols were compared using oral fluids. Extraction methods included (1) MagMAX™-96 Pathogen RNA/DNA kit, Applied Biosystems™, Carlsbad, CA; and (2) IDEXX RealPCR* DNA/RNA Magnetic Bead Kit, IDEXX Laboratories Inc., Westbrook, ME. PCRs were (1a) TaqMan® Fast Virus 1-Step Master Mix (Life Technologies, Carlsbad, CA) and primer/probe described for Mhp183; (1b) TaqMan® Fast Virus 1-Step Master Mix with the addition of AmpliTaq® 360DNA Polymerase (5U/uL) (ThermoFisher Scientific), and primer/probe described for Mhp183; and (2) RealPCR* Master Mix and RealPCR* M hyo DNA Mix, IDEXX Laboratories Inc. PCRs were run to 40 cycles and performed using the Applied Biosystems® 7500 Real-Time PCR (ThermoFisher Scientific).

Using Extraction 1 and PCR 1b, 18 of 20 inoculated pigs were PCR positive (tracheal swabs) for *MHP* DNA on DPI 3. All pigs were PCR positive for *MHP* DNA in tracheal swabs on or before DPI 59.

For oral fluids, a comparison of positivity rates among protocols by mixed logistic regression showed significant differences among procedures, with the highest positivity rate achieved using Extraction 1 and PCR 2 (173 positives of 322 samples), followed by Extraction 1 and PCR 1b (148 of 322), Extraction 2 and PCR 2 (134 of 322), and Extraction 1 and PCR 1a (109 of
II. C. 1. PAPERS AND ABSTRACTS

322). Significant differences among procedures in detection of \textit{MHP} DNA suggest that further improvements in laboratorial methods may be possible.
Association of border disease virus with a high mortality outbreak amongst 3-month-old feeder lambs shipped from Colorado to New York State

Elisha Frye, Gerald E. Duhamel, Erica Butler, Leonardo Cardia Caserta, Melissa Laverack, Randall Renshaw, Nancy Zylich, Mary Smith, Ed Dubovi, Diego Diel
Population Medicine, Cornell University, Ithaca, NY

Border disease virus (BDV), a Pestivirus antigenically related to Bovine Viral Diarrhea (BVD) virus, causes a variety of reproductive disorders in sheep, including failure to conceive, abortion and the birth of persistently infected (PI) lambs, so called “hairy shakers” because of congenital infection leading to postnatal tremors and abnormal hair-like fleece. With the exception of a single outbreak with 50 percent mortality in intensively reared 3-5-month-old lambs in France in 1983, acute outbreaks of BDV leading to high mortality have not been reported previously. Here we describe an association between the presence of BDV and a high mortality outbreak in a group of 1,708, mixed-breed 3-month-old feeder lambs that started 6-weeks after transport from an open range pasture in Colorado to an enclosed barn in New York. At the beginning of the outbreak, lamb mortality ranged between 20 to 30 head per day, without demonstrating appreciable clinical signs. Over a 3-week period, more than 300 lambs died, resulting in an overall mortality rate of approximately 18 percent. Autopsies of 20 lambs revealed emaciation, pneumonia, and ruminal acidosis. Histologic examination of 3 lambs showed evidence of bronchopneumonia, polyserositis and sepsis. Whole genome sequencing of a cultured virus isolate from the outbreak revealed the presence of BDV. Three weeks after the initial outbreak, 12 of 30 apparently healthy lambs had serum neutralizing antibody (NA) titers (range 8-512) to the outbreak BDV isolate. By week 7 of the outbreak, 48 of 100 (48%) apparently healthy lambs showed significant BDV NA titers (range 8-3,072). This group included 29 from the initial sampling, of which 9 more had seroconverted. Based on our data, the outbreak was attributed to acute infection of susceptible lambs with BDV; however, BDV persistently infected (PI) lambs, which was not investigated, might have been the source of the initial outbreak. Transport over a long distance together with a change in diet and management, from range grazing to intensively housed, also may have contributed to rapid BDV transmission and high mortality rate over a short period. Sheep producers and small ruminant veterinarians should be aware of this BDV presentation in a large flock of lambs.
Clostridium botulinum type A detected by MALDI-TOF mass spectrometry in bovine rumen contents after ingestion of feed contaminated by a raccoon carcass

Elisha Frye\textsuperscript{1}, Christina Egan\textsuperscript{2}, Micheal Perry\textsuperscript{2}, Esther Crouch\textsuperscript{1}, Kyle Burbank\textsuperscript{1}, Kathleen Kelly\textsuperscript{1}

\textsuperscript{1}Population Medicine, Cornell University, Ithaca, NY
\textsuperscript{2}Division of Infectious Diseases, Wadsworth Center Biodefense Laboratory, Albany, NY

Twenty-eight lactating dairy cattle in New York State showed clinical signs of anorexia, decreased milk production, decreased tongue tone, profound weakness, and recumbency over a 5-day period. Twelve of the affected cattle died and 16 recovered, but never returned to full productivity. The day after the outbreak began, a partial raccoon carcass was found in the total mixed ration (TMR). An initial differential diagnosis included botulism, ionophore toxicity, mycotoxin toxicity, nitrate poisoning, organophosphate poisoning, cyanide poisoning, vitamin E/selenium deficiency, toxic plant ingestion and metabolic disorders. Monensin and mycotoxin testing were within acceptable limits. Autopsies and ancillary testing were performed on 5 cattle. Aqueous humor nitrate concentrations, serum cholinesterase activity and liver selenium concentrations were all within normal limits. A chemistry panel on one cow showed elevated electrolytes, liver enzymes, and creatine kinase. Anaerobic culture, real-time PCR for Clostridium botulinum toxin genes, and matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) for C. botulinum neurotoxin detection was performed on rumen contents and liver samples. Results confirmed the presence of C. botulinum type A in the rumen contents of two cattle, and C. botulinum type C in the liver of one cow. An unusual postmortem lesion suggesting a toxic myopathy was identified in 4 of the carcasses, the significance of which is unknown. This presentation will focus on the diagnostic challenges of suspect botulism cases in bovines, the significance of C. botulinum Type A in the northeastern United States, and the ability to detect preformed neurotoxin using MALDI-TOF MS.
DEVELOPMENT OF AN EXPERIMENTAL CHALLENGE MODEL FOR STREPTOCOCCUS EQUI SUBSP. ZOOEPIDEMICUS IN PIGS
Nubia Macedo¹, Panchan Sitthicharoenchai¹, Eric Burrough¹, Orhan Sahin¹, Karen M. Harmon¹, Ganwu Li¹, Maria Jose Clavijo¹, Susan Brockmeier², Suellee Robbe-Austerman³, Samantha Hau⁴, Kristina Lantz⁵, Jessica Goncalves dos Santos¹, Ana Paula Poeta Silva¹, Chelsea Ruston¹, Rodger Main¹, Rachel Derscheid¹
¹VDPAM, Iowa State University, Ames, IA
²USDA, Ames, IA;
³Diagnostic Bacteriology and Pathology Laboratory, NVSL, Ames, IA;
⁴ARS, USDA, Ames, IA;
⁵APHIS, USDA, Ames, IA

Introduction: In swine, Streptococcus equi subsp. zooepidemicus (SEZ) is not commonly recognized as a significant pathogen in the US although it occasionally causes cervicitis, metritis, mastitis, arthritis, and septicemia. However, sporadic outbreaks of SEZ in sows and feeder pigs with high mortality due to septicemia were reported in Canada in the spring and summer of 2019 and in the USA later that fall. The clinical signs included lethargy, weakness, high fever and rapid mortality affecting 30-50% among exposed populations. SEZ was isolated from internal organs of affected pigs and other potential causes were ruled out as part of the extensive diagnostic evaluation and testing on the cases submitted. Little is known on the pathogenicity of SEZ in vivo and most studies were based on in vitro models. Therefore, the objective of this study was to establish an animal experimental model to advance our knowledge about the pathogenicity and diagnosis of SEZ in pigs.

Study design: Ten 6-week-old conventional crossbred pigs were individually identified and assigned to three groups. All pigs tested negative for PRRSV, Mycoplasma hyopneumoniae and influenza. Streptococcus suis was isolated from the upper respiratory tract (URT) of all pigs. SEZ was not isolated before inoculation. Two pigs were randomly assigned to the control group (G1) and four pigs were assigned to each challenge groups. At day 0, challenged pigs received either 3 mL of 7 x 10⁸ CFU/mL (high dose – G3) or 3 mL of 7 x 10⁵ CFU/mL (low dose – G2) of the 2019 SEZ US outbreak strain, intranasally. The control pigs received 3 mL of saline.

Results: After inoculation, SEZ was isolated from URT of 3 pigs from G3 and from one pig from G2. Control pigs tested negative throughout the study. All 4 pigs from G3, and 2 pigs (50%) from G2 were euthanized due to severe clinical signs at 1 and/or 2 DPI. The remaining two challenged pigs from G2 also showed clinical signs at 8 DPI and were euthanized. Overall, clinical signs included high fever (>105°F), coughing, nasal secretion, dyspnea and vomiting. Even though the disease manifested more acutely in pigs from G3, all pigs had lesions, including marked cranioventral lung consolidation, mild splenomegaly, mild hepatic congestion, and enlarged tracheobronchial lymph...
nodes. SEZ was isolated from 7 out of 8 inoculated pigs from blood samples and tissues, such as lung, heart, liver, spleen, and submandibular lymph. Besides SEZ, lungs samples were positive for *S. suis* (4 pigs) and *Glaesserella parasuis* (2 pigs).

**Summary**: This new challenge model using the highly virulent SEZ swine strain to infect conventional 6-week-old pigs mimicked the rapid onset of clinical signs and high mortality of sows and feeder pigs observed during the fall of 2019. Therefore, this model will be extremely useful for future studies of the pathogenicity of SEZ in swine, as well as a model for testing control measures and diagnostic tools.
With severe consequences to human health and search for a suitable animal model, researchers at Colorado State University developed several small animal models for the novel severe acute respiratory syndrome coronavirus 2, SARS-CoV-2 infection (Covid-19). Jamaican fruit bats (15 animals), deer mice (15) and Syrian hamsters (20) were inoculated with 2x10⁴ TCID50 of SARS-CoV-2 (Washington State isolate 2019-nCoV/USA-WA1-F6/2020). Animals were humanely euthanized at 3-, 6-, and 14 days post infection (dpi) for bats and deer mice and at 6 dpi for the hamsters. In the deer mice animal model, histological examination of hemiskulls revealed that in early stage of the disease at 3 dpi, the virus propagated to the brain in a retrograde axonal transmission along olfactory and trigeminal pathways. Disruption to the blood brain barrier (BBB) followed at 6 dpi resulting in mild suppurative inflammation that mainly manifested in the cortex of the frontal lobe with status spongiosus at the area of lateral sulcus nucleus in the brain stem and other nuclei at the thalamus and hypothalamus. Researchers and clinicians should be aware of a wide spectrum of neuropathologies that could precipitate clinical manifestations of parasympathetic and sympathetic roots such as epiphora, trigeminal neuralgia, confusion, and more consistently hyposmia/anosmia and hypogeusia/ageusia. In Syrian hamsters, the virus replicated efficiently in the lungs precipitating severe histioneutrophilic bronchointerstitial pneumonia mimicking human disease. Highly potent fully human neutralizing antibody clone (AvGn-B), constructed from yeast display libraries against SARS-CoV-2, significantly reduced viral loads in infected lungs when treated at 1- and 3- dpi with a low dose of 1mg/hamster and a high dose of 2.5mg/hamster. At the high dose, the antibody conferred more protection diminishing macrophage infiltration into lungs of infected hamsters. Deer mice and Syrian hamsters emerged as useful models to understand the complex relationship between neuropathology and immune system of Covid-19 patients and for evaluation of vaccines, immunotherapies and antiviral compounds.
II. C. 1. PAPERS AND ABSTRACTS

DIAGNOSTIC TRENDS OF FIVE SWINE ENDEMIC BACTERIAL PATHOGENS USING DATA FROM THE IOWA STATE UNIVERSITY VETERINARY DIAGNOSTIC LABORATORY (2010-2019)
Ana Paula Poeta Silva¹, Kent Schwartz¹, Bailey Arruda¹, Jessica Goncalves dos Santos¹, Nubia Macedo¹, Orhan Sahin¹, Eric Burrough¹, Karen M. Harmon¹, Christopher Siepker¹, Phillip Gauger¹, Panchan Sitthicharoenchai¹, Michael Rahe¹, Drew Magstadt¹, Alyona Michael¹, Pablo Pineyro¹, Rachel Derscheid¹, Rodger Main¹, Eduardo Fano², Maria Jose Clavijo¹
¹Iowa State University, Ames, IA; ²Boehringer Ingelheim, Atlanta, GA

Streptococcus suis (SS), Glaesserella parasuis (GPS), Mycoplasma hyorhinis (MHR), Actinobacillus suis (AS), and Mycoplasma hyosynoviae (MHS) are considered the top 10 bacteria that affect pig production. Disease diagnosis of these agents is challenging due to their commensal ecology, lack of virulence-specific, and polymicrobial interactions. The goal of this study was to describe the frequency of disease diagnosis using data from the ISU-VDL.

Disease diagnoses were based on pathologists’ assessment by evaluating clinical history and testing results. Field cases (2010-2019) associated with disease diagnosis for the body systems (cardiovascular, musculoskeletal, nervous, respiratory, or systemic) were included. Preferred specimens for etiological diagnosis included: central nervous system tissues, fibrin, heart, joint, kidney, liver, lung, pleura, and spleen.

Over a 10-year period, 42,884 cases were associated with one of the interested body systems. From those, 8,744 cases received a final disease diagnosis as at least one of these five bacteria. Either SS or GPS diagnoses were associated with 16% of all cardiovascular cases; 16% of all musculoskeletal cases were given either a SS or MHS diagnosis. For nervous and respiratory cases, 30% and 6% were given SS diagnosis. In systemic cases, 11%, 10%, and 4% were diagnosed with SS, GPS, and MHR. Disease diagnosis of these agents increased cumulatively 20% per year. Lung and CNS samples were frequently used to diagnose SS, while lung and fibrin were used to diagnose GPS, MHR, and AS. MHS was diagnosed using joints. The lesions associated with SS disease were serositis, bronchopneumonia, and meningitis. Lesions associated with GPS were serositis and bronchopneumonia. Lesions associated with MHR diagnosis were serositis, arthritis, and sepsis. For AS diagnosis, lesions included bronchopneumonia and sepsis. MHS diagnosis was only associated with arthritis.

Results demonstrate an increase in the annual diagnoses for all agents, except for MHS. Factors as improved diagnostic protocols and tests, increased awareness and number of submissions, or changes in antimicrobial use might contribute to the increase. Lungs were frequently submitted for SS, GPS, MHR diagnosis; however, their use for systemic
disease diagnosis requires caution due to their commensal nature in the respiratory system, compared to systemic sites typically targeted by pathologists (joint, brain, spleen, etc). The anatomic location for sampling, coupled with proper animal selection, offers a more comprehensive assessment for the contribution of these bacteria to systemic disease. It is critical to evaluate their impact on pig production and to close significant gaps to develop improved control and prevention strategies.
II. C. 2. Posters

Novel bovine Actinobacillus suis-like strain identified by whole genome sequencing – R. Franklin-Guild

The diversity of mites associated with mange in American black bears (Ursus americanus) in the United States – K. Niedringhaus

Duodenal perforation in a nursery pig – Y. Bae
Bovine disease caused by pathogenic strains of *Actinobacillus* species are typically associated with *Actinobacillus lignieresii*. Over a period of eighteen months, eight bovine cases from seven unique locations were submitted to the New York State Veterinary Diagnostic Laboratory for testing that resulted in the isolation of a similar *Actinobacillus* organism from sites including lung (4), kidney (2), joint fluid (1) and lymph node (1). All the isolates showed strong similarities to both *Actinobacillus equuli* and *Actinobacillus suis* by Bruker Daltonics MALDI-TOF MS Biotyper and the use of conventional morphological and biochemical methods based on standard references. Neither of these organisms has been previously described in literature as being pathogenic in bovine cases. Additional testing was performed, including Sensititre™ automated identification panel, 16s rDNA sequencing, *infB* sequencing and whole genome sequencing (WGS). All methods other than WGS were unable to distinguish between *Actinobacillus equuli subspecies haemolyticus* and *Actinobacillus suis*. WGS showed that these cases were more closely related to *Actinobacillus suis* than *Actinobacillus equuli*, however they cluster together into their own clade when compared to porcine *Actinobacillus suis* samples. The isolates also have an average nucleotide identity (ANI) of ~0.99 compared to one another as opposed to ~0.97 compared to the other *Actinobacillus suis* genomes and ~0.94 compared to *Actinobacillus equuli*. These data suggest that this organism may be a novel subspecies of *Actinobacillus suis*. This study was supported by the Food and Drug Administration’s Veterinary Laboratory Investigation and Response Network (FDA Vet-LIRN) under grants 5U18FD006379 and 1U18FD006716.
American black bears (*Ursus americanus*) are iconic North American mammal that are expanding their range across many parts of North America. This range expansion provides additional opportunities for intraspecific pathogen transmission as well as transmission to humans and domestic animals. While mange was previously considered rare in black bears throughout the country, there have been increased reports of severe and fatal sarcoptic mange (caused by *Sarcoptes scabiei*) in bears in multiple regions, notably the mid-Atlantic and northeastern populations. However, sporadic cases of mange in bears have been reported to be caused by mites other than *S. scabiei* including *Demodex ursi*, *Ursicoptes americanus*, and a newly-reported *Chorioptes* species. This report summarizes the basic natural history that is currently known for these pathogens, specifically related to bears, including geographical location, summary of lesions and severity of disease, and the importance of these pathogens at the population level through a brief review of the current literature. Finally, this study discusses diagnostic assays and key identification features for these pathogens and emphasizes the role of skin scrapes, which are currently the best method to detect and identify the species involved in mange cases. These data are critical as we attempt to monitor the geographical extent of these parasites in bears, learn more about the epidemiology and pathology, and develop management decisions to mitigate the risks of pathogen transmission.
DUODENAL PERFORATION IN A NURSERY PIG
Youchan Bae, Hyunkyoung Lee
Animal and Plant Quarantine Agency, Gimcheon, Korea (the Republic of)

Intestinal perforation is an uncommon condition in pigs, and can result in sudden death associated with peritonitis and consequential septicemia. A specific etiology has not been recognized, but hard plastic brush bristles have been found in a few cases. Herein, we describe the sudden death of a nursery pig caused by duodenal perforation, possibly due to stress. A 10-week-old nursery pig died suddenly, without any significant clinical history of illness. The farm had 800 nursery pigs at that time, and gastric ulcers and polyserositis caused by Streptococcus suis had been detected in the herd. The carcass was submitted for postmortem examination. Grossly, the skin contained numerous scratches all over the body, a 1.5-cm diameter ulcer in the flank, and tail necrosis. The lungs were diffusely red and rubbery in consistency. The abdominal cavity contained a large quantity of green turbid fluid. The serosa of abdominal organs was diffusely reddened, and covered with green fibrinous material. The proximal duodenum contained a perforation (3 x 4 cm). Microscopically, the duodenal perforation contained severe mucosal necrosis and severe neutrophilic infiltration along the margins of the perforation. The intestinal serosa contained diffuse severe fibrino-suppurative serositis. Severe congestion and thrombosis were found in the lungs and spleen. In the ulcerated skin, there were bacterial colonies on the ulcerated epidermal surface. Considering multiple scratches of the skin, ulcerative dermatitis, and tail necrosis, and the history of common gastric ulcer in the herd, duodenal perforation in this case might be associated with stress, and consequential septic peritonitis as the cause of death.
II. D. USAHA Membership Meeting
USAHA MEMBERSHIP MEETING
WEDNESDAY, OCTOBER 21, 2020
Marty Zaluski, Presiding

The Membership Meeting was called to order by Dr. Marty Zaluski. Special thanks was given to Boehringer Ingelheim, represented by Steve Parker for their support of the virtual meeting.

Photo Contest Winners
People’s Choice for the following categories:
- Animal Agriculture - Guarav Rawal, Iowa State University
- Laboratory Science - Randi Gold, Texas A&M Veterinary Medical Diagnostic Laboratory

Committee Chair Recognition
The following committee chairs were recognized for their service:
- Harry Snelson – NAHLN
- Gary Anderson – Diagnostic Laboratory and Veterinary Workforce Development
- Amy Hendrickson – Sheep, Goats and Camelids
- Lisa Becton – Swine
- Donna Kelly – Salmonella
- Shelley Rankin – Salmonella
- Cheryl Miller – Scrapie
- Larry Forgey – Scrapie

Treasurer’s Report
Annette Jones, Treasurer

The United States Animal Health Association (USAHA) realized a minimal gain in 2019-20, and despite rapid adjustments to COVID 19 restrictions, the organization continues to operate on a sound financial basis. The annual audit conducted by Clifton, Larson, Allen LLP, quarterly sampling audits conducted by the USAHA Treasurer, and the review of the 2020 Statement of Financial Position by the USAHA Committee on Audit found all accounting practices and financial statements to accurately reflect the financial positions of USAHA and that that all financial affairs of the Association are in order.

USAHA finished the 2019-20 fiscal year with a $7,761 net gain primarily due travel savings in Spring 2020 that off-set some added expense occurred for signage and software for the Providence meeting. Considering that the USAHA management team controls a $574,000 budget, they did another excellent job of managing revenues and costs throughout the year.
The Association’s net worth on June 30, 2020 was $1,113,479. The current reserve is $1,070,248 held in securities divided as valued on June 30, 2020, to include: $218,002 money markets, $459,298 CD’s, $186,851 equity mutual funds, and $206,097 Treasury Exchange funds. During fiscal year 2019-2020, the Association’s reserve accounted for $25,992 in realized and unrealized net investment income. Because USAHA continues the policy of maintaining two years’ expenses in reserve, and expenses have been increasing faster than the value of the reserve for several years, USAHA fell approximately $80,000 short of this conservative reserve goal at fiscal yearend.

Looking forward, 2020 comes with several unknowns including the degree of 2020 annual meeting profitability and total revenues from membership dues. To be prepared to make decisions in the face of these uncertainties, the Executive Director began working with the Executive Committee last March to contingency plan various annual meeting scenarios and financial impacts as the COVID-19 pandemic unfolded. The current reality, a 100% remote meeting and no venue cancellation contract penalties, was the best case from a financial perspective. The FY 2020-21 USAHA budget based on this scenario estimates a $50,000 loss to be covered by reserve funds. Over the next several months, the Executive Committee will assess the result of the 2020 annual meeting and make a financial plan to slowly recover the reserve over the next several years. While a range of options will be considered in this longer-term plan, a recommendation will be made to the Board that a motion to increase membership dues by no more than $10 for individuals and $35 for organizations, for a total maximum of $190 and $750 respectively. In the next several weeks, the Treasurer will also send membership survey to better understand the impacts of increasing “membership dues” vs “meeting registration fees”. The final dues will be set based on the survey and annual meeting analysis, balancing the need for a financially stable organization with sensitivity to member’s personal and organizational budgets as the economic impacts of the COVID-19 pandemic evolve.
Report of the Committee on Nominations
Kristin Haas

The following officers and delegates have been slated for nominations by
the Committee on Nominations and Resolutions.

PRESIDENT..................................................Charles Hatcher, Nashville, TN
PRESIDENT-ELECT........................................Dustin Oedekoven, Pierre, SD
FIRST VICE-PRESIDENT..........................Steven Rommereim, Alcester, SD
SECOND VICE-PRESIDENT.......................Manoel Tamassia, Trenton, NJ
THIRD VICE-PRESIDENT.........................Peter Mundschenk, Waddell, AZ
TREASURER..................................................Beth Thompson, St. Paul, MN

DISTRICT DELEGATES
NORtheast..................................................Belinda Thompson, New York
                                               David McElhaney, Pennsylvania
NORTH CENTRAL.......................................Paul Brennan, Indiana
                                               Jamee Eggers, Iowa
SOUTH......................................................L. “Gene” Lollis, Florida
                                               Eric Jensen, Alabama
WEST..........................................................H. M. Richards, Ill, Hawaii
                                               Timothy Hanosh, New Mexico

A motion was made and seconded to approve the nominations report and
elect the individuals as slated in the report. The motion was approved without
dissent.
Proposed Bylaw Amendments

The following bylaw changes were reviewed and proposed by the Executive Committee and approved by the Board of Directors at the 2019 Annual Meeting. The amendments are subject to approval by the full membership. The following were distributed in advance, reviewed by the membership and approved by Consent Calendar.

**Article III**
- Replaced “and” with “or” in 3.1.c and 3.1.f to clarify that individual and international members are eligible for membership if they are engaged in at least one of the stated categories of work rather than all of them.
- Modernized and clarified the requirements for student membership to better define those members who are eligible for this category.
- Added language specifying the supporting document that may be necessary for students to become USAHA members.
- Updated language in 3.1.f pertaining to specific international members.
- Changed language in 3.3.a to acknowledge that some international members have not paid dues for an extended period and remain USAHA members, albeit in a non-voting status. The replacement of “shall” with “may” allows decision making in this regard to be flexible.

**Article IV**
- Modernized language to comport with the electronic means of communication utilized by USAHA.
- Reduced the number of years needed for notice of Annual Meeting location from the Executive Committee to the Board of Directors from five to three.

**Article V**
- Simplified language in 5.1.g regarding the timing of reports presented by the Committee on Nominations and Resolutions.
- Added section 5.1.h specifying the means by which elected USAHA officers may resign.
- Added section 5.1.i outlining a process by which vacated officer positions may be filled if vacancies occur between annual meetings. Executive Committee positions have been vacated multiple times in recent years. We must allow a mechanism for filling these vacancies with officers who can be immediately functional in their roles, even if only on an interim basis.
- In 5.1.j, added a Treasurer term limit of 6 years to be equivalent to the time commitment of other Executive Committee members and
make it more likely that successors will be willing to fill this important position.

**Article VI**
- Modernized language to comport with the electronic means of communication utilized by USAHA.

**Article VII**
- In section 7.2, deleted the word “forthwith” to reflect the fact that the referenced submission(s) are occurring immediately.
- In section 7.4, added language that allows the Executive Committee to vote electronically in emergency circumstances.

**Article IX**
- Simplified language in section 9.3.b re. the deadline for submission of officer nominations from USAHA districts.

**Article X**
- Added language in section 10.1.a that specifies the method by which amendments to the bylaws must be submitted and by whom. Added additional language that references the modernized communication pathways that USAHA currently utilizes.
- Simplified the language in section 10.3 without changing intent.
- Added language in section 10.4 that specifies that USAHA members’ personal information is confidential and will not be disclosed or sold by USAHA.
- Added section 10.9 to allow electronic communication and action.

**Report of the Committee on Nominations and Resolutions**
Kristin Haas

The Committee on Nominations and Resolutions presented its report with the following recommendations:

Combine the following Resolutions:
1, 10, and 18
2, 5, and 15
3 and 12

It was moved and seconded to combine the resolutions as stated. Motion approved without dissent.

The following Resolutions were held for individual action, with final action indicated.
3 (Combined with 12). Approved
II. D. USAHA MEMBERSHIP MEETINGS

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

Passing the Presidential Gavel

Immediate Past President Marty Zaluski presented incoming President Charlie Hatcher with his president’s gavel and pin.

Dr. Charlie Hatcher

Recognition of Immediate Past President

Kristin Haas presented Marty Zaluski with the Past President’s plaque, recognizing his dedicated leadership and service to USAHA.
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
COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT
Chair: Sara McReynolds, KS
Vice Chair: Todd Tedrow, SD

Bruce Akey, TX; Gbenga Alade, ON; Gary Anderson, KS; Marianne Ash, IN; Rich Baca, CO; Sarah Bailey, ND; Maggie Baldwin, CO; Lisa Becton, IA; Pierce Bennett, MO; Melissa Berquist, TX; Danelle Bickett-Weddle, IA; Carolyn Bissett, VA; Fred Bourgeois, LA; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; Charlie Broadus, VA; Minden Buswell, WA; Randolph Chick, AR; Maria Cooper, IN; Stephen Crawford, NH; Evelyn Crish, NJ; Tarrie Crnic, KS; Marie Culhane, MN; Susan Culp, TX; Angela Daniels, TX; Brad DeGroot, WY; Ignacio dela Cruz, MP; Amy Delgado, CO; Thomas DeLiberto, CO; Barbara Determan, IA; Leah Dorman, OH; Brandon Doss, AR; Roger Dudley, NE; Stéphanie-Anne Dulièpre, NY; Tracy DuVernoy, MD; Anita Edmondson, CA; Jamee Eggers, IA; Cheryl Eia, MN; Bridgid Elchos, MS; Dee Ellis, TX; François Elvinger, NY; Allison Flinn, MD; Larry Forgey, MO; Tam Garland, TX; Cyril Gay, MD; Robert Gerlach, AK; Sandra Gilmore, IL; Michael Gilsdorf, MD; K. Fred Gingrich II, OH; Linda Glaser, MN; Alicia Gorczyca-Southeller, OK; Kristin Haas, VT; Rod Hall, OK; Timothy Hanosh, NM; Charles Hatcher, TN; Susannah Haupt, MI; Andy Hawkins, KS; Bill Hawks, DC; Burke L. Healey, CO; Carl Heckendorf, CO; Julie Helm, SC; Janemarie Hennebelle, GA; Melinda Hergert, TX; Warren Hess, IL; Siddha Hines, WA; Heather Hirst, DE; Donald Hoening, ME; Dennis Hughes, NE; Lucia Hunt, MN; David Hunter, MT; Annette Jones, CA; Jamie Jonker, VA; Jeffrey Kaisand, IA; Subhashinie Kariyawasam, FL; Bradley Keough, KY; Naree Ketusing, VA; Krystina Kimmett, SC; John King, MN; Patrice Klein, DC; Darlene Konkle, WI; Charlotte Krugler, SC; Linda Lackman, MO; T.R. Lansford, TX; Dale Lauer, MN; Elizabeth Lautner, IA; Brad LeaMaster, OR; Molly Jean Lee, IA; Randall Levings, IA; Mary Jane Lis, CT; Eric Liska, MT; Lindsey Long, WI; Pat Long, NE; Margie Lyness, GA; Kathryn MacDonald, SC; Brooke MacNeill, CO; Kevin Maher, IA; Gita Malik-Dahiya, ON; Brett Marsh, IN; Scott Marshall, RI; Michael Martin, NC; Beatriz Martinez Lopez, CA; Chuck Massengill, MO; James Maxwell, WV; Katherine McNamara, VT; Tiffany McQueen, TX; Sara McReynolds, KS; David Meeker, VA; Gay Miller, IL; Mendel Miller, SD; Peter Mundschken, AZ; Lee Myers, GA; Yvonne Nadler, IL; Sherrie Nash, MT; Michael Neault, NC; Cheryl Nelson, KY; Dustin Oedekoven, SD; Greg Onstott, MO; Kristy Pabilonia, CO; Elizabeth Parker, TX; Steve Parker, GA; Boyd Parr, SC; Allison Phibbs, DC; Amanda Price, UT; Maryn Ptaschinski, TX; Lisa Quiroz, CA; Jeanne Rankin, MT; Jonathan Roberts, LA; Keith Roehr, CO; Susan Rollo, TX; James Roth, IA; Margaret Rush, MD; Mo Salman, CO; John Sanders, WV; Amy Schafer, KS; Patty Scharko, SC; Joni Scheftel, MN; David Schmitt, IA; Aaron Scott, CO; Shelley Mehlenbacher, VT; Rachel Shuey, MO; Kathryn Simmons, DC; Julie Sinclair, GA; David Smith, NY; Julie Smith, VT; Justin Smith, KS; Harry Snelson, IA; Diane Stacy, LA; Sandra Strellec, NJ; Steve Strubberg, MO; Darrel Styles, MD; Gregory Suskovic, MN; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Todd Tedrow, SD; Belinda Thompson,
The Committee met on October 7, 2020 virtually, from 12:00 to 2:16 p.m. Eastern Standard Time (EST). There were 255 members and guests present. During the welcome and overview, instructions for sign-in, and requests to join the committee were shared, the committee mission statement was reviewed.

Presentations and Reports

Lessons Learned from Swine Market Disruptions in Minnesota
Mike Eisenmenger, Swine Veterinary Center

1. **Unable to see the future** - I have always respected people who have the ability to see the future based on the facts at hand. When I saw the empty streets in China, I did not foresee the globally connected world and how the virus would affect the U.S. Or understand the affects on packing plants, toilet paper and the stock market. Lessons learned.

2. **Just in time production** - most industries are rewarded on efficiency. The capital intense swine industry was no exception. This become very visible in most industries where just in time manufacturing and use was the norm.
   a. Not utilizing space efficiently is a major cost. Leaving a typical swine growing facility empty for a day is $400-$500.
   b. Sow farm space is >$2,500 and WTF space is >$300
   c. Seasonally space needs change. In summer space gets very tight due to a slow down in growth and space is at a premium. Most production systems carry just enough space to make it thorough summer months w/o a large drop in market weight. Production operations cannot afford to carry extra space to allow for market disruptions, growth slow downs or ease of operation.
   d. Even if we thought that the packing plants could experience another incident where labor was impacted and caused a shutdown of plant, it would be difficult to make the decision to carry extra space to allow some wiggle room and flexibility to get through the situation. If company A was the only one that made this decision their cost per pig marketed would exceed the competition and therefore be priced out of the market.
   e. Same logic exists in a foreign animal disease (FAD) event. We all know that if the U.S. got infected with African Swine Fever tomorrow, we would instantly need >20% less pigs.
We all can see that fact but what do we do? Cut production 20% now? Who? Really no one. We wait for the crisis and react.

f. Supply chains were hit with the same dilemmas.

3. **Market channels** - market channels of many products, not just pork, are very specific and develop tight properties to narrow customers. For example, customer A wants a product packaged a specific way with a specific label. During COVID, many specific markets were eliminated, leading to product not needed. Manufacturers of product could not just switch gears rapidly to access a different market or change the supply channel.

4. **Reducing pig numbers to plants** - once packing plants began to slow down or shut doors in the U.S., it was obvious quickly in a just in time manufacturing business, that pigs were going to have to be slowed in growth, depopulated, and stop filling the pipeline. Having the ability of producers to find alternate markets filled the need on a small number of pigs but was unable to reduce the quantity of hogs going to plants to meet the needs of large production companies. It was interesting to follow the geographic distribution of plant closings. Parts of the U.S. at times were relatively unaffected while other areas were in crisis. This inequity leads to confusion of what needed to be done. Often if you are not feeling the issue yourself it did not seem like there was a need for action. In addition, many producers were tied to an individual plant. When that plant was affected it may have been a small percent of the total industry packing capacity, but it was 100% of packing capacity for that individual producer. Decisions needed to be made quickly.

5. **Weighing the balance of all the methods to reduce pigs to market** - many options were on the table to reduce the number of pigs going to a packing plant:
   a. Growth slow down options - changing nutrition
   b. Increase stocking densities in barns
   c. Reducing number of pigs filling pipeline by altering culling at specific stages of production
   d. Depopulation of pigs

   The process of deciding which ones to implement and how was made by a select group of people with the best information at the time. The primary concern with slowing growth and decreasing stocking densities of barns was that it was kicking the can down the road. Eventually these pigs needed to go to market during a situation of total uncertainty. The packing plants were like the production companies and farms and were operating w/o excess capacity and in the mode of maximum efficiency and just in time production. If thousands of hogs were going to be delayed going to market the question was “when would the market fit them in to a system already at full capacity?” The other question was, “if and when the plants
returned to operation, at what level would they return and what would the "new normal" level of operation be?"

Several points seemed clear at the time:

- Careful evaluation was needed on crowding the systems and the welfare and production considerations of this decision
- Careful evaluation of effects of decisions on producers/employees' long-term thought process and pigs care standards
- Try to keep ramifications of depopulation/increased culling away from producers and employees if possible. Keep them focused on daily pig chores and pig production. Their job is saving pigs.
- Lack of ready to use industry knowledge to put into action quickly

6. **Knowledge acquisition** - immediately attempted to gain as much information as possible on depopulation and slow down growth strategies. Little was known on ventilation shut down (VSD), large scale use of CO₂, or reduction of growth rate strategies. Veterinarians began to do trials and gained information. The good news was the sharing of information among veterinary colleagues in similar situations was occurring freely.

- We are today in a much better spot in understanding how to handle a FAD event involving the logistics of depopulation and composting. I recall prior to COVID in meetings on what to do if we had to depopulate sites and still feeling like we just did not know for sure what to do or what would happen. COVID and market interruptions really helped understand what exactly to do in a FAD event. Further work will be around the ability to transport pigs to a depopulation location versus need to stay on a site due to biosecurity during a FAD event.

7. **Animal welfare** - comforting to know that animal welfare was always in the forefront of all decisions. Often, a more difficult path was chosen that involved more cost and more complexity, but that decision was made in the best interest of the animal.

8. **Very small group of people that truly understand the current industry** - it became evident quickly that current understanding of the swine industry as it stood today was lacking. This included: size/scale, transportation, geography, flow options, space options, packing plant options. All too often “solutions” offered were unable to meet current size and scale of modern production.

The misunderstanding of industry and options available to fix the imbalance of supply with processing was not only the general public at large (much work to do here) but also elected officials as well as swine industry personnel and leaders.
At times during the crisis, I was overwhelmingly frustrated. Yet, working with similarly affected people, and sharing knowledge and experiences gained during COVID, led to positive outcomes and friends for life.

**COVID-19 Mitigation Steps Taken at Processing Facilities**
KatieRose McCullough, North American Meat Institute

On March 13, the COVID-19 pandemic was declared a national emergency. Very quickly the meat and poultry industry arrived at the forefront of much of the discussion regarding worker safety. Early on in the pandemic, the industry implemented important protocols and procedures to protect its workforce from the threats posed by the pandemic. Meat and poultry plants across the nation implemented strict worker safety controls to assist in controlling the potential spread of the virus inside establishments. KatieRose McCullough will discuss the timeline of events that occurred early in the pandemic and what controls industry implemented to protect the workforce.

**COVID-19: Lessons Learned from a New York Animal Health Official’s Perspective**
David Smith, New York State Department of Agriculture and Markets

The current COVID-19 pandemic posed unprecedented challenges for individuals, animal agriculture, veterinary medicine, public health officials, and animal health officials.

The New York metropolitan area was the epicenter of the early pandemic in the U.S., affecting both citizens and their animals. As New York’s state veterinarian, David Smith witnessed and confronted many of the challenges faced by New York. His presentation will attempt to cover the frustrations, successes, and lessons learned from this ongoing incident.

**Southern Agriculture and Animal Disaster Response Alliance (SAADRA)**
Kathryn MacDonald, Clemson University

A short review highlighting activity of the Southern Agriculture and Animal Disaster Response Alliance’s (SAADRA) from the last year including achievements and upcoming events.

**Multi-States Partnership for Security in Agriculture (MSP)**
Lucia Hunt, Minnesota Department of Agriculture

A short review highlighting activity of the Multi-States Partnership for Security in Agriculture (MSP) from the last year including achievements and upcoming events.

**New England States Animal Agricultural Security Alliance (NESAASA)**
Kristin Haas, Vermont Agency of Agriculture, Food and Markets

A short review highlighting activity of the New England States Animal Agricultural Security Alliance (NESAASA) from the last year including achievements and upcoming events.
Committee Business:

The status (and responses) of each of the 2019 resolutions was briefly discussed.

One resolution titled National Veterinary Stockpile Resources for Mass Depopulation of Animals Laboratories was submitted, amended and passed by committee members.

The meeting was adjourned at approximately 2:16 p.m.
The Committee met on October 9, 2020 virtually, from 2:30 to 4:30 p.m. EST. There were approximately 198 individuals logged into the virtual meeting at the peak. The meeting was called to order at 2:32 pm by co-chair Maria Cooper. There were no resolutions from the previous year to discuss. The committee’s mission statement was reviewed, attendees were reminded that any business would be accomplished using Robert’s Rules of Order and only committee members, not guests, could cast a vote. All attendees were encouraged to participate in discussions.

Presentations and Reports

Use of Multiple Testing Modalities for Disease Surveillance in a Control Area
Marie Culhane, University of Minnesota, College of Veterinary Medicine

Early control of disease outbreaks is necessary to prevent further spread and damage. For example, early control of H5 or H7 low pathogenicity avian influenza (LPAI) is necessary to prevent possible mutations of the virus into highly pathogenic avian influenza (HPAI) virus. Therefore, pre-move LPAIV testing to minimize chances of moving infected but undetected flocks may be desired for continuity of business during high-risk periods like fall and spring migration or when deciding the fate of populations in disease control areas. The combined use of both antigen and antibody detection tests can
play a significant role during such LPAI surveillance and are applicable to deploy as surveillance testing for any disease from which animals may recover. Proactive assessment of diagnostic test performances is necessary to standardize surveillance and testing protocols and should be included as part of any proactive risk assessments conducted. Diagnostic test results can be used to inform risk management decisions by indicating the stage of infection in the population. Evaluations of surveillance scenarios that include testing on two separate days have shown that such strategies can decrease uncertainty in the estimated within-population transmission rate and can improve the accuracy of predicted epidemiological outcomes. In studies conducted on LPAI both in the field and experimentally, performing PCR in addition to serology or AC testing on two separate days can further improve prediction accuracy. That pathogen detection can be improved when PCR is supplemented with a different type of test (serology or antigen capture) is worth exploring and may improve disease control during an outbreak, be it LPAI or another disease of consequence. Extensive evaluations of surveillance strategies have been performed to detect LPAI by combining serology and polymerase chain reaction (PCR) and have been used for estimating the time of introduction and time to stop shedding. There are many situations where multiple testing modalities can be applied to improve surveillance. For instance, HPAI infection in an upland gamebird flock can be detected via increased mortality and mortality-based triggers can be used to find HPAI. However, we have to balance early detection and false trigger rates and also determine optimum mortality triggers for HPAI suspicion in upland game bird flocks. Optimum mortality or morbidity triggers and surveillance strategies to provide a high probability of detection of any high-consequence disease must be determined to have effective, risk-based, outbreak management.

**The Wildlife Health Information Sharing Partnership - Event Reporting System**

Jonathan Sleeman, U.S. Geological Survey (USGS), National Wildlife Health Center

WHISPers, or the Wildlife Health Information Sharing Partnership - event reporting system is a partner-driven, web-based repository for sharing basic information about historic and ongoing wildlife mortality and/or morbidity events. The information, such as county-level locations, onset and ending dates, species affected, and diagnosis has been shared with the USGS National Wildlife Health Center over time by natural resource managers and stakeholders across the U.S. and beyond. The primary goal of the system is to provide natural resource management partners, other agencies, and the public with timely, accurate information on where wildlife disease events are occurring or have occurred for better situational awareness and decision making. The information is opportunistically collected and does not reflect all the mortality events that occur in North America.
WHISPers provides a place and a reporting structure for natural resource managers to enter event information and for anyone, including the public, to learn about verified (laboratory diagnosed) wildlife disease events. The records in WHISPers can be searched by species, disease, location (to county level), and event starting and ending dates.

Historically, information provided by partner agencies was summarized and managed by staff at the USGS National Wildlife Health Center. In response to partner needs for more timely understanding of wildlife disease occurrence, the refactored WHISPers will allow authenticated partners to directly enter event information for real-time display. They can also share information with colleagues within and across agencies for better communication and event response coordination.

The second phase of refactoring WHISPers is nearing completion, with several new features released. Key among these is the ability for registered system users to receive nightly email notifications for mortality events meeting user-specified criteria (e.g., species, disease, location, etc.). Collaboration features in WHISPers have also been enhanced whereby natural resource management agencies can invite other wildlife health professionals to collaborate on disease events in a secure environment. WHISPers was designed as a wildlife health collaboration platform where agency wildlife and disease managers can enter and track information regarding wildlife mortality and morbidity events in their jurisdictions, provide situational awareness to partner entities, help inform the biosecurity community with early detection/documentation of disease events, and request diagnostic and technical services from the USGS National Wildlife Health Center (NWHC). An example of WHISPers' situational awareness utility is tracking the ongoing rabbit hemorrhagic disease (RHDV, RHDV2) outbreak in the southwestern U.S. We are working closely with the Iowa Department of Natural Resources, the Kansas Department of Wildlife, Parks and Tourism, and the Florida Fish and Wildlife Conservation Commission on a WHISPers pilot. This effort, funded by the 2020 Multistate Conservation Grant Program, is allowing these agency partners to actively enter information about current and historic mortality events into WHISPers, and provide valuable feedback on system usability. In addition, the Science Gateways Community Institute (SGCI) recently completed a “user experience review” of the WHISPers interface. We are continuing work with SGCI to implement many of the suggestions resulting both from this review and from feedback provided by state and federal beta testers.

Finally, we continue to conduct WHISPers demonstrations for interested agencies and optimize WHISPers data structures to best meet their needs. To date, we are actively working to enroll users with the Southeastern Cooperative Wildlife Disease Study (SCWDS), the National Park Service, U.S. Fish and Wildlife Service, state agencies in the Midwest Association of Fish and Wildlife Agencies, and states currently impacted by RHDV2.
Phased implementation of Standardized Veterinary Nomenclature Across Laboratories
Craig Carter, University of Kentucky, Veterinary Diagnostic Laboratory

It is no surprise that testing data generated by 60 American Association of Veterinary Laboratory Diagnosticians (AAVLD) accredited laboratories is of very high quality and quantity. Unfortunately, this data rarely used for anything beyond confirming diagnoses for a single animal or a group of animals. Most accredited laboratories utilize a computer-based Laboratory Information Management System (LIMS) to capture accession, testing data and diagnoses to create an integrated case report for their clients. However, almost none of these laboratories adhere to a recognized veterinary terminology standard such as Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT) or Logical Observation Identifiers Names and Codes (LOINC) to capture these data elements (diagnoses, etiologies, specimens). Because of this limitation, electronic summarization of multiple diagnostic laboratory data streams from more than one state or region is extremely difficult. The retrospective studies have been accomplished utilizing veterinary diagnostic laboratory data have been accomplished only through tedious manual manipulation and normalization of data sets collected from many laboratories, often taking 1-2 years. Therefore, National Animal Health Laboratory Network (NAHLN) LIMS data is currently unusable in its current form for conducting regional and national animal health studies that could lead to the discovery of new animal health knowledge leading to peer-reviewed scientific publications. Further, the data is also unusable in its raw state for alerting, disease monitoring and mapping systems and other near-real-time thematic products. I hereby propose that AAVLD Accreditation Requirements be strengthened to require that accredited laboratories utilize a standardized veterinary terminology system to capture and share their data. This new requirement, which could be implemented over a number of years, would enable straight-forward summarization and analysis of high-quality diagnostic laboratory findings that would open many opportunities to advance animal and public health.

National List of Reportable Animal Diseases (NLRAD) and National Animal Health Reporting System (NAHRS) Updates
Mary Donahue, NLRAD

The development of the National List of Reportable Animal Diseases (NLRAD) began with initiatives and resolutions from USAHA and the National Assembly of State Animal Health Officials (NASAHO). Currently, State animal health officials voluntarily report in the National Animal Health Reporting System (NAHRS) monthly. During 2019, 23 States submitted all 12 monthly reports, 44 States submitted at least one report, and 503 reports...
were submitted in total. In April 2020, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) published the NLRAD proposed rule to the Federal Register for public comment. The comment period closed August 21, 2020, and the Center for Epidemiology and Animal Health (CEAH) is addressing the comments received. The intent of NLRAD is to harmonize and unify reportable diseases in animals to achieve accurate and timely disease reporting collaboratively within the U.S. and for reporting to the World Organization of Animal Health (OIE). NLRAD is structured with two main categories of reportable diseases: “Notifiable” and “Monitored.”

“Notifiable” diseases require immediate reporting and “Monitored” diseases would be reported monthly to NLRAD. Reporting within NLRAD will be supported with 133 case definitions available on the NLRAD webpage. The proposed rule expands reporting responsibilities for “Notifiable” diseases beyond State animal health officials to all animal health professionals. Collaboration between animal health professionals, State animal health officials and Federal animal health officials will improve data reporting to help streamline animal disease detection and the safeguarding of animal health. USDA-APHIS-VS is actively working to progress the proposed rule to the next steps in the federal rulemaking process.

Swine Hemorrhagic Fevers Surveillance – First Year Evaluation
Kevin Spiegel, USDA

VS conducted an evaluation of the effectiveness of USDA’s swine hemorrhagic fevers: African swine fever (ASF) and classical swine fever (CSF) integrated surveillance system based on its ability to meet the predefined objectives at the end of its first year of implementation. In the plan, two objectives are outlined: 1) to strengthen detection capabilities and enhance outbreak preparedness, and 2) to support claims of disease freedom from ASF and CSF.

Three primary populations were targeted for surveillance: larger commercial swine, higher risk swine and feral swine. These populations were targeted through the implementation of five surveillance system components: sick pig veterinary diagnostic laboratory submissions (VDL), slaughter and aggregation point sampling, higher risk sampling, feral swine sampling, and foreign animal disease investigations.

The evaluation found that the surveillance objectives are being met. The investments in education and implementation of new data collection and data management systems have yielded benefits. These include improved data flexibility, timeliness, acceptability, and ease of analysis. With the help of private veterinarians, farm managers, State and Federal Field Operations staff, Federal regulatory staff, and NAHLN laboratory staff, we have achieved consistent field sample collection from all targeted surveillance components and reliable diagnostic results. During the first year of implementation, 6,520 specimens were tested for both ASF and CSF and 5,013 specimens were tested for CSF only, strengthening detection capabilities and supporting claims of disease freedom.
The evaluation also identified areas for improvement. These include 1) geographic coverage in sick pig VDL sampling and slaughter and aggregation point sampling and 2) slow adoption of the new electronic data submission system. Solutions to these improvement areas are currently being explored. The evaluation also noted substantial impacts of COVID-19 on all surveillance streams, with the greatest impacts on the Slaughter and Aggregation point sampling. We anticipate that as a result of this presentation and subsequent release of the evaluation summary, VS will be able to continue improving our active ASF/CSF Integrated Surveillance system through targeted enhancements in sampling quotas, geographic coverage of surveillance components, and data integration.

Committee Business:
A motion was made by Bruce Akey and seconded by Marianne Ash to expand the mission scope of the Animal Health Surveillance and Information Systems (AHSIS) Subcommittee on eCVI Data Standards to investigate and develop a set of data standards for emergency movement permits that would be utilized in the case of a high-consequence disease outbreak. The motion passed unanimously.
There was no further business, and the committee meeting was adjourned at 4:37 p.m.
As the subcommittee continues to evaluate and enhance the Extensible Markup Language (XML) schema, there are two issues that have been identified that require input on a policy level. The subcommittee is requesting the support of the parent committee to engage the National Assembly of State Animal Health Officials (NASAHO or NA) to provide input and guidance. The first question involves the support of the Sovereign Tribal Nations and if certificate of veterinary inspections (CVI’s) using the XML schema are acceptable to the Tribal Nations for animals entering or leaving tribal lands. Additionally, the subcommittee is looking for guidance on whether the XML schema should be undated to allow for addresses within tribal nations. The second issue that we would like to refer to the NASAHO’s for discussion is the matter of allowing more than one species on a CVI. The current schema does allow for multiple species due to no consensus by the NA during the version one development. The question for the NA is this still an acceptable approach.

Lastly, the eCVI Data Standards subcommittee is asking the Joint Committee on Animal Health Surveillance and Information Systems to consider the expansion of their mission scope to include the development of a data standard for emergency movement permits that would be utilized during a high consequence disease response. The subcommittee feels their past work and experience could be leveraged to facilitate this data standard in an efficient and concise manner.
The Committee on Animal Welfare
Chair: Chelsea Good, KS
Vice Chair: Sherrie Webb, IA

Bobby Acord, NC; Chris Ashworth, AR; Bill Barton, ID; Peter Belinsky, RI; Carolynn Bissett, VA; Nancy Boedeker, IN; Paul Brennan, IN; Charlie Broaddus, VA; Beth Carlson, ND; Michael Carter, MD; Tim Condict, OK; Stephen Crawford, NH; Barbara Determan, IA; Leah Dorman, OH; Brandon Doss, AR; Roger Dudley, NE; Jamee Eggers, IA; Brigid Elchos, MS; Dee Ellis, TX; Jessica Emerson, FL; Joseph Essler, TX; Kathy Finnerty, NY; Katie Flynn, KY; Larry Forgy, MO; Tolani Francisco, NM; Robert Gerlach, AK; Colin Gillin, OR; Eric Gingerich, IN; K. Fred Gingrich II, OH; Gail Golab, IL; Eric Gonder, NC; Chelsea Good, KS; Tony Good, OH; Alicia Gorczyca-Southerland, OK; James Grimm, ; Kristin Haas, VT; Thomas Hairgrove, TX; Rod Hall, OK; Steven Halstead, MI; Charles Hatcher, TN; Karyn Havas, MN; Andy Hawkins, KS; Bill Hawks, DC; Carl Heckendorf, CO; Julie Helm, SC; Maggie Highland, KS; Robert Hilsenroth, FL; Clayton Hilton, TX; Heather Hirst, DE; Donald Hoenig, ME; Dennis Hughes, NE; Carolyn Hurwitz, ME; Eric Jensen, AL; Annette Jones, CA; Jamie Jonker, VA; Anne Justice-Allen, AZ; Susan Keller, ND; Donna Kelly, PA; Bradley Keough, KY; Diane Kitchen, FL; Patrice Klein, DC; Terry Klick, OH; Michael Kopp, IN; Dale Lauer, MN; Maureen Lee-Dutra, CA; Mary Jane Lis, CT; Pat Long, NE; Travis Lowe, MN; Mark Luedtke, MN; Bret Marsh, IN; David Marshall, NC; Scott Marshall, RI; Chuck Massengill, MO; Brittany McCauslin, Otago; David Meeker, VA; Antone Mickelson, WA; Gay Miller, IL; Mendel Miller, SD; Eric Mohlman, NE; Peter Mundschenk, AZ; Michael Neault, NC; Dustin Oedekoven, SD; Gary Olson, MN; Elizabeth Parker, TX; Boyd Parr, SC; Elisabeth Patton, WI; Allison Phibbs, DC; William Pittenger, MO; Maryn Ptaschinski, TX; Dave Pyburn, IA; John Ragan, VA; Tim Richards, HI; Keith Roehr, CO; Susan Rollo, TX; Ron DeHaven, CA; Mark Ruder, GA; Travis Schaal, IA; Shawn Schafer, OH; David Schmitt, IA; Stacey Schwabenlander, MN; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Chelsey Shivley, CO; Kathryn Simmons, DC; Staci Slager, IL; Caleb Smith, MN; David Smith, NY; Julie Smith, VT; Harry Snelson, IA; Diane Stacy, LA; Philip Stayer, MS; Sandra Strilec, NJ; Manoel Tamassia, NJ; Belinda Thompson, NY; Beth Thompson, MN; Alberto Torres, AR; Charles Vail, CO; Liz Wagstrom, DC; Michele Walsh, ME; John Walther, LA; Jessica Watson, MI; Patrick Webb, IA; Sherrie Webb, IA; Cliff Williamson, DC; Ross Wilson, TX; Josh Winegarner, TX; Nora Wineland, MI; Richard Winters, Jr., TX; Stephanie Wisdom, IA; Cindy Wolf, MN; Peregrine Wolff, CA; Marty Zaluski, MT; Ernest Zirkle, NJ.

The Committee met on Friday, October 16, 2020 virtually, from 12:00 p.m. to 2:00 p.m. Eastern Standard Time (EST). There were approximately 160 members and guests present. The meeting began with brief review of the mission of the Committee.

Presentations and Reports

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Impact of COVID-19 on the Swine Industry
Sherrie Webb, American Association of Swine Veterinarians (AASV)

Webb described the impacts COVID-19 had on the swine industry and how the industry has adapted to the pandemic. She outlined existing farm and veterinary emergency planning and how these tools were utilized in 2020. Webb also discussed strategies used to address packing plant disruptions. It was estimated that 2.5 – 3 million hogs did not have access to processing plants when needed. Alternative strategies included changes to diets, breeding adjustments, alternative housing arrangements, and alternative marketing strategies (i.e., state inspected facilities, food bank donations, auctions/private sales). Depopulation was an option of last resort. The AASV position statement states that swine producers should work with their veterinarian to develop situation-specific strategies. If depopulation is required, priority should be given to American Veterinary Medical Association (AVMA) preferred methods under the AVMA Guidelines for the Euthanasia of Animals.

Iowa’s Response to COVID-19 Market Disruption
Jamee Eggers, Iowa Pork Producers Association

Eggers provided an overview of Iowa’s unified command response to, and the response activities associated with the pork supply chain disruptions in April/May due to the COVID19 pandemic. Eggers provided the committee first-hand experience on what was seen in Iowa during this time frame.

Guidance for Management of Companion Animals during COVID-19
Gail Golab, American Veterinary Medical Association

Dr. Golab provided a brief overview of what is known about SARS-CoV-2 across animal species, prior to focusing on dogs and cats. She shared information about the number of canine and feline cases identified in the U.S. and globally, and indicated that—as for people—transmission appears to be through direct contact with bodily fluids and or aerosols in the environment. Dogs and cats may show clinical signs or they may not. Dogs’ and cats’ primary source of exposure appears to be close contact with owners who have COVID-19.

Dogs and cats are not routinely tested for SARS-CoV-2, because few become seriously ill; they do not appear to spread the disease back to people; and there are a wide range of other more common infections, diseases and conditions that cause similar clinical signs. If more common diseases and conditions are ruled out, and the pet’s history of exposure suggests that testing for SARS-CoV-2 may be advised, veterinarians need to coordinate with local, state, and/or federal public and animal health officials in deciding to test, and to ensure that samples are appropriately collected, stored, and transported. Testing is available through state animal health, university, and private laboratories. While infection with SARS-CoV-2 is not
included in the World Organization for Animal Health’s (OIE) List of Diseases, consistent with the general obligations of OIE members, the USDA reports any animal that tests positive for SARS-CoV-2 in the United States to the OIE.

Golab commented that, should a dog or cat be determined to be positive for SARS-CoV-2, in most cases the animal can be cared for in the home. However, if the dog or cat needs significant nursing care, or the owner is not able to safely care for the animal, it may need to be hospitalized. She then shared guidance developed by the Centers for Disease Control and Prevention (CDC) and the AVMA to support safe care for affected animals in the home and in the hospital, as well as how to determine when isolation, monitoring, and movement restrictions for affected dogs and cats can be ended. She concluded with a list of multiple online resources where up-to-date information can be readily accessed.

**International Poultry Welfare Alliance**

Ryan Bennett, International Poultry Welfare Alliance and U.S. Roundtable for Sustainable Poultry & Eggs

Bennett introduced the group to the International Poultry Welfare Alliance (IPWA) and U.S. Roundtable for Sustainable Poultry & Eggs (US-RSPE). The IPWA mission is to continuously advance poultry welfare via a global, multi-stakeholder alliance by fostering open dialogue, sharing best practices and supporting science-based research. The IPWA vision is to drive overall improvement of poultry welfare while also improving the sustainability of global poultry production in a manner that is ethically, environmentally and economically viable.

IPWA recognizes that poultry welfare cannot be viewed as a standalone topic. IPWA believes that welfare must be viewed, discussed and promoted in a manner that reflects global awareness, improves sustainable food production practices, builds community trust, and emphasizes a commitment to scientific and technological knowledge that will benefit poultry. Joint membership and collaborative leadership from IPWA and US-RSPE allow members to collaborate on various themes related to poultry welfare and sustainability.

**Committee Business:**

The committee considered and passed a resolution related to the National Veterinary Stockpile Resources for Mass Depopulation of Animals.

At 2:00 p.m. Eastern Standard Time (EST), the meeting was adjourned.
The Committee met on October 13, 2020 virtually, from 12:00 p.m. to 2:00 p.m. Eastern Standard Time (EST). There were approximately 65 to 100 attending the meeting at any time.

Presentations and Reports

Offshore Aquaculture: Beyond the Blue Horizon
Neil Anthony Sims, Ocean Era
Provided background and future of off-shore aquaculture in the U.S. A number of issues including environmental validation, fish performance, health, scalability, and legislative framework were covered. Examples of off-shore operations in other countries were covered. US off-shore has been limited mostly restricted to WA, HI and ME. Potential development in the Gulf of Mexico does exist. A demonstration farm is planned for off-shore Florida under the NOAA Sea Grant 2017 Aquaculture Initiative. The use of therapeutics off-shore was covered and the beneficial role vaccines could play.

Sustainable Yellowtail Amberjack Culture: An Introduction to the Kingfish Company
Megan Sorby, Kingfish Mai
Provided an overview of Zeeland Kingfish (parent company) and their operations in the Netherlands growing Seriola lalandi. An update was provided as to their expansion plans in Maine with their new venture Kingfish Maine. They discussed the need for a collaborative approach with respect to state and local governments and residents. Their current focus is on utilizing facilities at the Center for Cooperative Aquaculture Research (ME) to operate
a hatchery and leverage existing broodstock. Several key research and innovation areas were covered including genetics, feed and diet, waste treatment, and various aspects of the regulatory environment.

**Aquaculture Program Update**

Kathleen Hartman, USDA, Animal and Plant Health Inspection Service (APHIS)

Updates to the current USDA programs included the APHIS Veterinary Services (VS) 5-year Aquaculture/Aquatic Animal Health Program Business Plan and National Aquaculture and Aquatic Animal Health Plan were covered. The USDA’s current and planned responses to the Federal Executive Order 13921 issued May 2020 were discussed concerning promoting American seafood company competitiveness and economic growth. The tentatively named National Aquaculture Health Protection and Inspection Plan (NAHIP) was explained. The Comprehensive Aquaculture Health Standards (formerly known as “Commercial Aquaculture Health Standards”) was also covered. Goals included preparing for and responding to foreign animal disease incursions and significant endemic diseases and providing outreach and education to support the productivity and viability of aquaculture industry sectors.

**Our Seafood Future and Aquaculture Opportunity Area Development**

Danielle Blacklock, National Oceanic and Atmospheric Administration (NOAA)

The role of the NOAA Aquaculture Program was explained including the agency role in research and federal policy making and regulation to grow sustainable aquaculture in the United States, supporting both commercial and recreational fisheries. Explanations included the future of aquaculture in promoting human and environmental health, population increases, seafood security and economic opportunities. Further explanation of NOAA’s role implementing Federal Executive Order 13921 included ameliorating regulatory barriers by simplifying the permitting process, establishing NOAA as lead agency in limited circumstances, and researching Aquaculture Opportunity Areas, geographic regions within oceans identified as sustainable for aquaculture development.

**Committee Business:**

The Committee briefly presented our mission statement and 2019 resolutions and responses. Then the committee discussed each of our three resolutions and voted upon these final resolutions. The full resolutions are included in the report of the Committee on Nominations and Resolutions.

The committee chairs solicited resolutions for next year and nominations for a USAHA member for Vice-Chair to be voted on at the 2021 annual meeting. An open discussion, question and answer session then continued until the end of the committee session.
A presentation (USDA Aquaculture Facility Registration update) by Alicia Marston (USDA-APHIS) was made available on the virtual meeting platform.
COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
Chair: Keith Haffer, SD
Vice Chair: Alan Young, SD

Gary Anderson, KS; Chris Ashworth, AR; Randall Berrier, CO; Duane Chappell, KY; Maria Cooper, IN; Barbara Determan, IA; James England, ID; James Evermann, WA; William Fales, IA; Allison Flinn, MD; Patricia Foley, IA; K. Fred Gingrich II, OH; Gail Golab, IL; Keith Haffer, SD; Joseph Huff, CO; Elizabeth Lautner, IA; John Lawrence, ME; Randall Levings, IA; Joanne Maki, GA; David Marshall, NC; Will McCauley, DC; Scott McVey, NE; Leela Noronha, KS; Steve Parker, GA; Allison Phibbs, DC; Kathryn Simmons, DC; Caleb Smith, MN; Jessica Watson, MI; Dennis Wilson, CA; Josh Winegarner, TX; Mark Wood, GA; Alan Young, SD.

The Committee met on October 9, 2020 virtually, from 2:30-4:30 p.m. Eastern Standard Time (EST). There were 11 members and 48 guests present.

Presentations and Reports

Center for Veterinary Biologics (CVB) Update 2020
Byron Rippke, CVB

- COVID -19 response
  - With the exception of on-site inspections, CVB has maintained operations at “normal” levels.

- Budget & Staffing
  - Currently under a continuing resolution. Will maintain spending at FY2020 levels.
  - Brought on seven new positions with increase of $800K received.

- Decision Tracker – New system for knowledge management related to policy development
  - Captures contextual information as well as versions of policy
  - Helps with succession planning

- Pharmacovigilance implementation
  - Final rule in 2018, implementation in February 2021
  - Requires mandatory reporting

- Revised Inspection Memo (800.91)
  - Puts U.S. more in line with other global inspection systems
  - Provides a U.S. Good Manufacturing Practices (GMP) Inspection Certificate

- Virtual Inspections – limited to currently licensed, new or remodeled facilities
- Potency Specification Policy – data driven overages
- Policy on cancer immunotherapies – provides guidance to industry of what’s required for this class of products
Autogenous vaccine policy revision
  - Extension of isolates
  - International movement of isolates and product
  - Third party stockpiling/distribution of product

Ingredients of Animal origin – looking at tightening requirements

Reference monitoring – extend the “life span” of references if possible

Updating diagnostic policy – evaluating current diagnostic kit policy

Perspectives, Priorities, and Updates from the Veterinary Biologics Industry
Will McCauley, Animal Health Institute (AHI)

Ingredients of Animal Origin
The animal health industry and the USDA continue to discuss potential new requirements for the testing and sourcing of ingredients of animal origin (IAO) used in the manufacture of veterinary biologics. The pertinent regulation/guidance on this topic is Title 9 of the Code of Federal Regulations Sec. 113.53 and Draft Veterinary Services Memorandum 590 - Ingredients of Animal Origin Testing. There are multiple points of contention between manufacturers and the USDA, but a major disagreement is on the “workability” of a proposed requirement for the use of a particular reagent in the manufacture of master seed and cell stocks for veterinary biologics. The reagent in question, a particular type of fetal bovine sera, is not available in sufficient amounts to meet the needs of the veterinary biologics industry, even if global sources are included.

Potency Specifications of Veterinary Biologics
The animal health industry and the USDA have reached an agreement on the overage levels of antigens that must be present in US-produced veterinary biologics, as well as appropriate testing/evaluation methods to confirm potency. This information will be included in a pending version of VSM 440 - Guidelines for Potency Specifications of Biological Products Administered to Animals. Focus has now shifted to discussion of the stability of biologics; manufacturers and USDA continue to actively pursue an agreement on appropriate requirements/measurements of product stability and look forward to completion of Draft VSM 155 - Guidelines for Conducting Product Stability Studies.

USDA GMP Inspection Certificate
USDA plans to finalize creation of its GMP Inspection Certificate soon and will begin issuing this document for manufacturers who export product to countries that require/desire GMP language on their import documentation. The hope is that this will help address the (unfounded and incorrect) perception that U.S. veterinary biologics manufacturing facilities are sub-standard as compared to some international manufacturers. The certificate will include:
  - All addresses the USDA-CVB Specialist(s) visits
  - The start/end date of the inspection
• A 5-year expiration date, which starts with the inspection date
• CVB authority signature

Diagnostics-focused industry meeting held by Animal Health Institute (AHI) on September 30
The Animal Health Institute held its Fall Veterinary Biologics Section meeting on September 30, 2020; the meeting’s General Session focused on conversations around needed changes to diagnostics regulation and the plans on how to address these changes. AHI will be establishing a Diagnostics Working Group to begin the task of determining what USDA-CVB should and should not be expected to regulate within the realm of diagnostics, with other topics/issues to follow as determined.

Domestic testing option for swine biologics exported to China
AHI continues to advocate for domestic testing options for biologics manufacturers seeking to abide by Announcement #172 from the Chinese Ministry of Agriculture and Rural Affairs. Announcement #172 requires that any foreign biologic (or component) imported into China for use in swine must be tested for the presence of the African Swine Fever (ASF) virus by polymerase chain reaction (PCR) methods. While there are U.S. companies who are willing and able to provide this testing within the United States, APHIS recommends that this testing be performed at overseas laboratories at this time. AHI will continue to work with APHIS and various diagnostic entities to find an appropriate way to offer this testing stateside until Announcement #172 can be dealt with in trade negotiations, as it represents a non-tariff trade barrier that is not allowed by current World Trade Organization (WTO) guidelines.

ARS Veterinary Biologics Industry Training Program
The USDA’s Agricultural Research Service is seeking contact from veterinary biologics manufacturers who are interested in hosting ARS employees at their facilities to learn “hands on/real world” knowledge of the vaccine manufacturing process. ARS’s goal is for their staff to gain valuable information on:
• Quality Assurance/Quality Control
• Assay development
• Master seed and cell production
• Clinical development
• Technology transfer
• Etc.

SARS-CoV-2 RealPCR Test: development and commercial release of a veterinary test
M. Alexis Seguin, IDEXX Reference Laboratories
Early in the course of the COVID-19 pandemic, there were questions about the role of companion animals in the transmission of SARS-CoV-2 infection. Due to these concerns, IDEXX Reference Laboratories quickly developed and analytically and clinically validated a novel real-time polymerase chain reaction (PCR) test to detect SARS-CoV-2 (COVID-19) for
use in veterinary species. The IDEXX SARS-CoV-2 (COVID-19) RealPCR Test is based on a unique alignment to the published genetic sequences of the virus from the human outbreak and targets the same nucleocapsid gene as used in CDC assays. This target was based on sequence analysis showing high conservation and adapted to meet the melting temperature and analytical requirements of our standardized platform.

Analytic validation of the test first involved sequence blast analysis against more than 300 publicly available genetic sequences. Second, a synthetic positive control was used to functionally validate the assay for performance, which met requirements for robust signal-to-noise ratio, amplification efficiency, intra-run and inter-run reproducibility, and correlation. In addition, IDEXX implemented three CDC assays to run in parallel with the IDEXX assay for confirmatory purposes. Specificity studies showed no cross-reactivity with the new PCR test against common veterinary coronaviruses affecting companion animals. Likewise, currently available RealPCR tests for these veterinary coronaviruses were demonstrated to not detect synthetic COVID-19 nucleic acid.

Clinical validation was performed using characterized clinical isolates from humans. Forty-eight clinically characterized human isolates (32 SARS-CoV-2 positive and 16 negative) were tested and compared to results from an approved human diagnostic laboratory. All characterized SARS-CoV-2 positive specimens tested positive and all characterized negative specimens tested negative with the IDEXX SARS-CoV-2 (COVID-19) RealPCR Test. IDEXX Reference Laboratories was also invited to participate in two rounds of proficiency testing, resulting in external quality-control assurance certification through the European group, INSTAND e.V. This proficiency testing involved testing of characterized clinical specimens, including heat-inactivated specimens positive for SARS-CoV-2 in varying concentrations, and specimens positive for seasonal human CoV and MERS-CoV in varying concentrations. IDEXX achieved certification after demonstrating 100% sensitivity and specificity in detection of SARS-CoV-2 virus in these specimens.

In April 2020, the IDEXX SARS-CoV-2 RealPCR veterinary test was released for ordering by veterinarians in 23 countries across the Americas, Europe and Asia-Pacific. Due to the internationally reportable nature of this disease, consultation with regulatory authorities in each country was critical to navigate the complex and varied requirements. Clear diagnostic guidance is provided that testing of animals is recommended only in specific exceptional cases where there is a strong reason to suspect infection including known exposure, consistent clinical signs, after more common veterinary causes have been ruled out, and following consultation with relevant public health authorities.

Since the global release, testing has been appropriately low, in accordance with diagnostic guidance. Species tested include dogs (53%), cats (42%) and other species (5%) including exotic felids (lions, tigers, clouded leopards) and small mammals (e.g., ferrets, rats, chinchillas and
otters). Only seven positives (five cats and two dogs) have been detected to date by IDEXX Reference Laboratories. All positives were in the United States and were confirmed by the National Services Laboratory (NVSL-USDA).

Committee Business:
A quorum of the committee was present and voted on a resolution brought forth by Joseph Huff. The resolution, Reaffirmation of commitment of CVB to continue risk-based policy development, was voted on, passed by unanimous vote and forwarded to the Committee on Nominations.

The meeting was adjourned at 4:36 p.m.
COMMITTEE ON CATTLE AND BISON
Chair: Beth Thompson, MN
Vice Chair: Thomas Hairgrove, TX

Bruce Addison, MO; Sara Ahola, CO; Bruce Akey, TX; Carissa Allen, MN; Erika Alt, WV; Gary Anderson, KS; Chris Ashworth, AR; Rich Baca, CO; Savanna Barksdale, TX; Nancy Barr, MI; Bill Barton, ID; David Baum, IA; Samantha Beaty, TN; Peter Belinsky, RI; Randall Berrier, CO; Danelle Bickett-Weddle, IA; Carolynn Bissett, VA; Nancy Boedecker, IN; Tom Bragg, NE; Richard Breitmeyer, CA; Becky Brewer-Walker, AR; Kevin Brightbill, PA; Charlie Broaddus, VA; Charles Brown, WI; Beth Carlson, ND; Michael Carter, MD; Randolph Chick, AR; Robert Cobb, GA; Tim Condict, OK; Kathleen Connell, WA; Karen Conyngham, TX; Maria Cooper, IN; Michael Costin, IL; Stephen Crawford, NH; Angela Daniels, TX; Donald Davis, TX; Brad DeGroot, WY; Bud Dinges, TX; Leah Dorman, OH; Brandon Doss, AR; Roger Dudley, NE; Sean Eastman, SC; Anita Edmondson, CA; Cody Egnor, AZ; Leonard Eldridge, WA; Dee Ellis, TX; Philip Elzer, LA; James England, ID; James Evermann, WA; William Fales, IA; Shollie Falkenberg, IA; Kathy Finnerty, NY; John Fischer, GA; Keith Forbes, NV; Larry Forgey, MO; Tony Forshey, OH; Charles Fossler, CO; Tony Frazier, AL; Tam Garland, TX; Robert Gerlach, AK; Michael Gilsdorf, MD; K. Fred Gingrich II, OH; Linda Glaser, MN; Chelsea Good, KS; Tony Good, OH; Alicia Gorczyca-Southerland, OK; Michael Greenlee, WA; Dale Grotelueschen, DC; Daniel Hadacek, VA; Keith Haffer, SD; Thomas Hairgrove, TX; Joel Hall, TX; Rod Hall, OK; Steven Halstead, MI; Timothy Hanosh, NM; Noel Harrington, ON; Andy Hawkins, KS; Burke L. Healey, CO; Carl Heckendorf, CO; Janemarie Hennebelle, GA; Jamie Henningson, KS; Terry Hensley, TX; Bob Hillman, ID; Clayton Hilton, TX; Siddra Hines, WA; Bruce Hoar, WY; Donald Hoenig, ME; Sam Holley, OH; Dennis Hughes, NE; Noah Hull, WY; David Hunter, MT; Nancy Jackson, MS; Annette Jones, CA; Jamie Jonker, VA; Melissa Justice, IN; Anne Justice-Allen, AZ; Susan Keller, ND; Bradley Keough, KY; Diane Kitchen, FL; Terry Klick, OH; Darlene Konkle, WI; Charlotte Krugler, SC; Todd Landt, IA; T.R. Lansford, TX; John Lawrence, ME; Brad LeaMaster, OR; Gregory Ledbetter, CA; Nick Ledesma, IA; Nick Ledesma, IA; Molly Jean Lee, IA; Wen Chi Lee, CA; Scott Leibsle, ID; Donald Lein, NY; Ailam Lim, WI; Rick Linscott, ME; Mary Jane Lis, CT; Eric Liska, MT; Coleman Locke, TX; Jim Logan, WY; Gene Lollis, FL; Lindsey Long, WI; Pat Long, NE; Travis Lowe, MN; Mark Luedtke, MN; Kevin Maher, IA; Bret Marsh, IN; Scott Marshall, RI; Michael Martin, SC; Beatriz Martinez Lopez, CA; Chuck Massengill, MO; Jay Mattison, WI; Patrick McDonough, NY; Thomas McKenna, MD; Sara McCReynolds, KS; Antone Mickelson, WA; Cheryl Miller, IN; Gay Miller, IL; Mendel Miller, SD; Richard Mock, NC; Eric Mohlman, NE; Jason Moniz, HI; Peter Mundschenk, AZ; Gleeson Murphy, IA; Sherrie Nash, MT; Alecia Naugle, MD; Michael Neault, NC; Cheryl Nelson, KY; Dustin Oedekoven, SD; Steve Olsen, IA; Gary Olson, MN; Greg Onstott, MO; Kathleen Orloski, CO; Mitchell Palmer, IA; Elizabeth Parker, TX; Roger Parker, TX; Boyd Parr, SC; Elisabeth Patton, WI; William Pittenger, MO; Jenny Powers, CO; Amanda Price, UT; Michael Pruitt, TX; Valerie Ragan, VA; Jennifer Ramsey, MT; Jeanne Rankin, MT; Grant
CATTLE AND BISON

Rezabek, OK; Tim Richards, HI; Suelee Robbe-Austerman, IA; Jonathan Roberts, LA; Keith Roehr, CO; Susan Rollo, TX; Mark Ruder, GA; Mo Salman, CO; Larry Samples, PA; Shawn Schafer, OH; Patty Scharko, SC; David Schmitt, IA; Brant Schumaker, WY; Stacey Schwabenlander, MN; Andy Schwartz, TX; Aaron Scott, CO; Charly Seale, TX; Laurie Seale, WI; Shelley Mehlenbacher, VT; Michael Short, FL; Kathryn Simmons, DC; Daryl Simon, MN; Shri Singh, KY; David Smith, NY; Julie Smith, VT; Justin Smith, KS; Rebecca Smith, IL; Sreenidhi Srinivasan, PA; Diane Stacy, LA; Susan Stehman, PA; Robert Stout, KY; Kelly Straka, MI; Steve Strubberg, MO; Diane Sutton, MD; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Tyler Thacker, IA; Beth Thompson, MN; Tracy Tomascik, TX; Sarah Tomlinson, CO; Alex Turner, CO; Michael VanderKlok, MI; Elizabeth Warren, DE; James Watson, MS; Jessica Watson, MI; Scott Wells, MN; Carl Williams, NC; Ross Wilson, TX; William Wilson, KS; Josh Winegarner, TX; Nora Wineland, MI; Thach Winslow, TN; David Winters, TX; Cindy Wolf, MN; Peregrine Wolff, CA; Mark Wood, GA; Melissa Yates, MD; Alan Young, SD; Marty Zaluski, MT; Glen Zebarth, MN; Ralph Zimmerman, NM.

The Committee met virtually on October 19, 2020, from 12:00-2:00 p.m. EST with over 260 virtual participants. Drs. Thompson and Hairgrove welcomed the members, reviewed the Committee purpose statement, and described the meeting process including how the Committee members could participate in the virtual meeting. They determined there was a quorum of members present, for purposes of conducting committee business, including any work relevant to resolutions.

The first group of presenters for the committee meeting included the reports from the Subcommittees. The Chair requested that all subcommittee reports be held for the Consent Agenda and voted on during the Business portion of the meeting.

Reports of the following subcommittees were presented:
- Brucellosis – Janemarie Hennebelle, Georgia Department of Agriculture
- Cattle Identification – Rod Hall, Oklahoma Department of Agriculture
- Bovine Viral Diarrhea Virus (BVDV) – Shollie Falkenberg, USDA Agricultural Research Service (ARS) National Animal Disease Center (NADC)
- Trichomoniasis (Trich) – Carl Heckendorf, Colorado Department of Agriculture
- Tuberculosis – Beth Carlson, North Dakota Board of Animal Health

The Subcommittee on Tuberculosis (TB) report was given by Beth Carlson. The Subcommittee is chaired by Dr. Michael VanderKlok, and met on October 14, 2020, virtually, from 10:00 a.m. to 12:00 p.m. EST. Presentations included the TB Scientific Advisory Working Group report, an update on TB in Texas, a TB Program Update from USDA-APHIS-VS, and
information presented on Human-to-Cattle M. TB complex Transmission in the United States. There were no resolutions discussed in the Subcommittee. The final report of the Subcommittee is appended to this report.

The Subcommittee on Cattle Identification report was presented by Rod Hall. Committee Chair Hall called the meeting to order at 2:30 p.m. EST. He recognized Vice Chairs Drs. Charlie Broaddus and Alicia Gorczyca-Southerland. Rules for voting and resolution submission were discussed and the subcommittee mission statement was read.

The subcommittee heard presentations from:

- Savanna Barksdale with Texas Cattle Feeders Association. She gave a summary of their two-year pilot project to study electronic identification (ID) in feeder cattle.
- Brandon Depenbush with U.S. CattleTrace. He summarized the two-year pilot phase of this project and discussed what the program looks like moving forward.
- Ken Griner with Florida Cattlemen’s Association. He discussed their two-year pilot project that focused on electronic ID and collection of data in Florida livestock markets.
- Dr. Aaron Scott, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS). He discussed APHIS’ efforts in Animal Disease Traceability and their efforts to transition to electronic ID to enhance traceability.
- Rich Baca, USDA-APHIS-VS. He discussed changes to software and databases to make it more efficient and easier to collect, submit, and retrieve data for animal health officials (AHOs) and private practitioners.
- Jim Akers, Bluegrass Livestock Marketing. He compared and discussed low frequency radio frequency identification (RFID) and ultra high Frequency RFID technologies and their applications in cattle traceability.
- Dr. Andy Schwartz, Texas State Veterinarian. He summarized Texas’ Ultra High Frequency RFID back tag project and how it has worked in their livestock markets.
- Dr. Mike Short, Florida State Veterinarian. He summarized Florida’s Ultra High Frequency RFID back tag project and how it has worked in their livestock markets.
- Dr. Darlene Konkle, Wisconsin State Veterinarian. She gave a brief summary of their planned Ultra High Frequency RFID back tag project and the challenges they have had getting it started.

One resolution was proposed, entitled “Backup Identification of Livestock in Commerce.” The resolution was discussed briefly, and minor changes were suggested. The subcommittee membership approved those changes and then voted to approve the resolution.

The meeting adjourned at 5:15 PM EST. The final report of the Subcommittee is appended to this report.
The Subcommittee on BVDV met virtually on October 13, 2020, at 10:00 a.m. EST. There were over 100 people present at the session and the topic for this year’s meeting was focused on Pestivirus control as it relates to non-bovine species. Two presentations were given; 1) Dr. Chris Chase from South Dakota State University on a bovine viral disease virus (BVDV) outbreak in bison and 2) Dr. Peter Kirkland from Elizabeth Macarthur Agriculture Institute, Australia on a Border disease virus (BDV) outbreak in a large sheep flock.

The current herd was investigated due to a decrease in calving rate and due to several bison cows observed to be thin and unthriftly. Only history of viral vaccination was in 2008. Initial testing for viral antigen was negative, so serology was conducted. All 26 animals evaluated were positive for BVDV1 with BVDV2 titers less than the BVDV1, suggesting potential BVDV1 exposure. Samples from suspect animals were collected for sequencing determine that there were PI animals in the herd. It appeared the virus was a BVDV1a based on genetic assessment. This appears to be the first bison BVDV PI and of interest is the unusual serology suggestive of a disassociation of genetic and antigen similarity.

A case study from a border disease virus (BDV) outbreak in a large flock of sheep in Australia was presented and an overview of the clinical presentation of Border disease and the prevalence was discussed. The flock was reported to have early embryonic death and abortions. Initial testing of aborted fetuses suggested no Pestivirus infection, so affected and non-affected ewes were tested and Pestivirus antibody tests were suggestive of a recent exposure of a Pestivirus. VNT test was used to initially discriminate what Pestivirus was associated with the outbreak and BDV was implicated. Visually, 15% of the lambs had hairy coats, 5% had extra hair around face and legs, and the rest appeared normal. Of the lambs with abnormal coat were tested, 68% were PI suggestive that abnormal hair coat strongly correlates with PI status. This case study highlights the value of the use of multiple diagnostic assays to better understand the causative agent involved. The final report of the Subcommittee is appended to this report.

The Subcommittee on Trichomoniasis report was presented by Carl Heckendorf. The subcommittee meeting was called to order by Chairman, Dr. Heckendorf and introductions were made. The Subcommittee had three presenters:

- Dr. Dustin Loy, Nebraska Veterinary Diagnostic Center Bacteriology and Molecular Diagnostics, presented “Direct Detection of Trichomoniasis foetus at the Nebraska Veterinary Diagnostic Center.”
- Dr. Berit Bangoura, Wyoming State Veterinary Laboratory, Department of Veterinary Sciences, University of Wyoming, presented “Trichomoniasis foetus testing in Wyoming.”
• Suzanna Leckman, Quality Coordinator at Colorado Animal Health Laboratory, presented “Trich Transport in LRS and PBS”.

Following the presentations, we held a panel discussion with our presenters as panelists. A panel discussion was held with the three presenters fielding questions. Initial discussion focused on the criteria for laboratories performing Trich testing. Importing states can be assured that tests performed by laboratories outside of their state are getting accurate results if testing laboratories are accredited and testing procedures are validated.

Various state Trich requirements were discussed including import requirements for female cattle and management of herds for in-state control of the disease. It was determined that having a review of state requirements and further discussing best management practices to develop information/education/outreach materials would be a good agenda theme for next year’s meeting.

There were no resolutions or recommendations presented for consideration by the subcommittee. The subcommittee discussed potential topics for the next meeting agenda and adjourned at 4:20 p.m. EDT. The final report of the Subcommittee is appended to this report.

The Subcommittee on Brucellosis report was presented by Janemarie Hennebelle. The Subcommittee on Brucellosis met virtually on Tuesday, October 13, from 12:00–2:00 p.m. EST. There were over 200 members and guests in attendance.

The three Greater Yellowstone Area (GYA) states provided updates on their surveillance area activities. There were seven new affected herds identified during FY2020: five in Wyoming (beef, bison), one in Montana (livestock), and one in Idaho (domestic elk). During the 2020 legislative session, Idaho lowered the test eligible age for DSA cattle from 18 months to 12 months and is now allowing adult brucellosis vaccination of non-Idaho origin female cattle not previously officially calf hood vaccinated. Montana continues a high rate of testing in the designated surveillance area (DSA) and expanded the boundary of the DSA in the Ruby Mountains due to the finding of two positive elk outside the DSA boundary. Based on advice from the State Veterinarian and the Game and Fish Department, the Wyoming Livestock Board repealed the Brucellosis Area of Concern in the Big Horn Mountains in the spring of 2020. Wyoming’s USDA Brucellosis Program review was postponed due to COVID-19. In-person reviews are tentatively scheduled for both Wyoming and Idaho in 2021.

Dr. Aimee Hunt provided a National Brucellosis Program Update and noted that slaughter surveillance samples are now coming from just four slaughter plants. There were 465,785 samples from those four plants between October 2019–August 2020; this is above the 350,000 samples needed to meet our detection level goal. At the time the presentation was recorded, it was still anticipated that the Proposed Domestic Brucellosis Rule (9 CFR 78) would be published this calendar year with state statuses based
on disease management rather than prevalence. Subsequently, that timeline has been updated with expected publication in spring 2021.

Dr. Ryan Clarke gave three short presentations. The first presentation discussed the revised GYA testing protocol utilizing fluorescence polarization assay (FPA) plate as the primary screening test, buffered acidified plate antigen (BAPA) as the secondary screening test, and Caudal Fold (CF) as the primary supplemental test. His second presentation provided an overview of the protocol for seronegative young wild bison from Yellowstone National Park (YNP) to qualify as brucellosis-free prior to relocation among other tribes and states around the nation. Dr. Clarke’s final presentation, in collaboration with Dr. Randy Capsel, was an update on the biennial review of the Select Agent List. Currently, recommendations from both USDA and CDC are for delisting *Brucella abortus*, *Brucella suis*, and *Brucella melitensis*. The advanced notice for proposed rulemaking and final rulemaking process is ongoing with expected completion in late 2021 or early 2022. In the interim, the Federal Select Agent Program (FSAP) has drafted a policy statement to address the needs for large animal brucellosis studies in outdoor containment settings. The draft policy statement was subsequently posted on October 14 (https://www.selectagents.gov/regulations/policy/animalstudy.htm) and will be published in the Federal Register soon for public comments.

Dr. Kelly Rhodes closed out the presentation portion of the meeting with an overview of bovine brucellosis in Mexico. Brucellosis is endemic in cattle and other ruminants in most parts of Mexico. The National Campaign against Brucellosis in Animals was established in 1996 and is highly decentralized, with a single lead agency at the national level (Development, Fisheries and Food, Mexico [SENASICA]) and implementation delegated to State-Federal-industry partnerships at the State level. SENASICA considers 15 States or zones to be in the Eradication Phase and two States to be Free (Sonora and Baja California Sur). APHIS does not currently recognize the brucellosis status of any State in Mexico, although a recent evaluation of Sonora concluded that that State has a very strong program and close to zero prevalence. This supports classifying Sonora as Level I for brucellosis in accordance with new APHIS import regulations that go into effect October 19, 2020.

The Subcommittee moved into the business meeting and held a discussion of feedback provided by subcommittee members regarding responses to Resolution #32 from 2019. No new business items were introduced for 2020. The final report of the Subcommittee is appended to this report.

**Presentations and Reports**

**USDA-APHIS Cattle Health Program Update**
Sara Ahola, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)
Dr. Ahola presented details of the current status of FMD vaccine funding and a National Animal Health Preparedness, Response and Emergency Planning update. There is currently up to $15 million in the next cycle of funding; during the current funding cycle, 39 NADPRP and 26 NAHLN projects funded. Dr. Ahola shared a status update on the rule process for Brucellosis and Tuberculosis and spoke about the changes within the Strategy and Policy Unit of the Ruminant Health Center.

**Malignant Catarrhal Fever Vaccine Updates**
Cristina W. Cunha, USDA, Agricultural Research Service (ARS) Animal Disease Research Unit

Sheep-associated malignant catarrhal fever (SA-MCF) is a lymphoproliferative disease caused by ovine herpesvirus-2 (OvHV-2). The virus is carried asymptomatically by sheep but can cause an often-fatal disease when transmitted to other animals, including cattle and bison. There is no treatment or vaccine to SA-MCF, and producers rely solely on separating susceptible and carrier animals to control OvHV-2 transmission and avoid disease outbreaks. Although separating animal species is a common practice, in certain circumstances it is difficult or even impossible to achieve. Therefore, MCF continues to be a serious problem with significant economic impact for the cattle, bison and sheep industries. It has been clear for a long time that a vaccine is necessary to efficiently control MCF. Vaccine development is a top priority for researchers at the Animal Disease Research Unit, ARS-USDA, where we have a well-established program on SA-MCF research. In collaboration with Washington State University and University of Wyoming, our research has led to better understanding of the disease by elucidating OvHV-2 transmission, host response to infection, establishing animal models, and developing improved diagnostic methods. Together, this knowledge serves as a base for vaccine development, which has been our focus in the last few years. Substantial progress has been obtained on the identification of vaccine candidates and evaluation of delivery methods, including DNA-based and viral-vectored systems. Most importantly, vaccine trials performed in a laboratory animal model showed significant levels of protection upon exposure to OvHV-2. These promising results allow us to expand vaccine trails to more relevant animal species. Thus, our next step is to test the safety and efficacy of preeminent SA-MCF vaccine formulations in bison. The availability of a SA-MCF vaccine will greatly benefit the cattle, bison and sheep industries. Besides reducing animal losses due to MCF, having susceptible animals protected through vaccination will allow them to be in close contact with sheep without the risk of developing SA-MCF, resulting in better land use and creating opportunities for sustainable management operations.

**Committee Business:**

It was determined a quorum was present. Dr. Thompson asked for a motion to accept all Subcommittee reports on the Consent Agenda. A motion
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was made and seconded, virtually. All voice votes supported the motion, and
the subcommittee reports were accepted.

Drs. Thompson and Hairgrove led a discussion of the 2019 Committee
on Cattle and Bison Resolutions, and responses.

Regarding the resolution entitled “Backup Identification of Livestock in
Commerce,” a motion was made and seconded virtually, and passed. Dr.
Thompson called for discussion. There being no discussion, a virtual voice
vote was called for; the motion passed unanimously.

With no other committee business, the meeting was adjourned at 2:00
p.m. EST.
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON BRUCELLOSIS
Chair: Eric Liska, MT
Vice Chair: Janemarie Hennebelle, GA

The Subcommittee met virtually on Tuesday, October 13, from 12:00-2:00 p.m. There were over 200 members and guests present. Drs. Janemarie Hennebelle and Tahnee Szymanski co-chaired the meeting.

Presentations and Reports

GYA State updates
Idaho
Bill Barton, Idaho State Department of Agriculture
Summary unavailable for these proceedings.

Montana
Martin Zaluski, Montana Department of Livestock
Montana continues a high rate of testing in the designated surveillance area (DSA) for brucellosis with nearly 80,000 tests completed in fiscal year 2020. While mandatory compliance testing remained high, voluntary testing dipped because of producers’ concerns over the transition to a new testing methodology which lost specificity compared to the prior method. The new method relies on fluorescence polarization assay (FPA) initial screening and replaces the rapid automated presumptive (RAP) which had to be abandoned because the antigen needed for the RAP is no longer available.
Montana expanded the boundary of the designated surveillance area (DSA) in the Ruby Mountains due to the finding of two positive elk outside the DSA boundary in early calendar year 2020. The new addition includes approximately 10,000 additional cattle and approximately 60 producers.
An annual compliance assessment that cross references movement documentation to test records indicated a compliance of 99.6% on a per movement and change of ownership basis.

Wyoming Brucellosis update
Jim Logan, Wyoming Livestock Board
Summary unavailable for these proceedings.

USDA National Brucellosis Update
Aimee Hunt, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Ruminant Health Center
There were seven new affected herds between Wyoming, Montana and Idaho. All were within the current DSAs.
- National surveillance samples from the four slaughter plants that process a majority of cattle from the GYA states and supplemental surveillance within those states exceeded our threshold to meet a
detection level goal of a disease prevalence of 1 in 100,000 with 95% confidence. There were 465,785 samples from the four plants enrolled in the national surveillance plan between October 2019 – August 2020, which is above the 350,000 samples needed to meet our detection level goal.

- VS conducted an abbreviated virtual review of Wyoming’s brucellosis management due to COVID. No significant changes since their last review and plan to conduct a full in person review in April.
- Still anticipate the Proposed Domestic Brucellosis Rule (9 CFR 78) to be published this calendar year with state statuses based on disease management rather than prevalence.

**GYA Testing Protocol**

Ryan Clarke, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Ruminant Health Center

Loss of Rapid Automated Presumptive (RAP) test:

- Resulted in some Greater Yellowstone Area (GYA) states looking for another screening test to replace the RAP
- The FPA plate test was chosen as the new initial screening test
- Old GYA protocol = RAP > FPA + CF supplemental in series
- Initial proposed GYA protocol = FPA plate + CF supplemental in series
- Initial use of new GYA protocol quickly revealed two problems:
  - New protocol did NOT provide enough combined specificity to match the old protocol…resulting in increased false positives that needed quarantines and investigations (totally unacceptable!)
  - Local regulatory officials were unprepared to use the FPA as a screening test after years of using it as the confirmatory test (i.e. FPA screening test values were treated as if they were confirmatory test values regardless of secondary test results.)

USDA then adjusted the initial protocol by adding the BAPA in series as the confirmatory test in order to provide specificity

- Revised GYA protocol = FPA plate > BAPA + CF supplemental in series
- This change matched the combined specificity of the old protocol before the loss of the RAP test and problem was solved
- However, using the FPA as screening test still caused concern with local epidemiologists who were not used to calling samples negative after having positive FPAs!
- But protocol has now been implemented for several months and feedback from GYA states is very positive and it seems to be working well and as expected.

Initial proposed GYA protocol = FPA plate + CF supplemental
Combined protocol Se = 97.5% and Sp = 99% (or 100 FPs per 10,000 tested)
- Revised GYA protocol = FPA plate > BAPA + CF supplemental in series
  - Combined protocol Se = 93.02% and Sp = 99.97% (or 3 FPs per 10,000 tested)
- New revised GYA protocol matches the combined Se and Sp of the National Brucellosis
- testing protocol and the old GYA testing protocol that included the RAP test
- Assuming a .2% DSA herd prevalence and above combined Se & Sp:

  Estimated Positive and Negative Predictive Values (PPV & NPV)
  - NPV with FPA pos and BAPA neg = 99.8% (truly disease free)
  - PPV of combined FPA + and BAPA + = 89% (truly diseased)

The presentation also included a table describing test interpretation.

**Bison Relocation**

Ryan Clarke, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Ruminant Health Center

**Bison Quarantine Process:**
- Take seronegative young wild bison from Yellowstone National Park (YNP)
- Put them through Uniform Methods and Rules (UM & R) [2003] protocol
- Minimum of a year of testing (calving for females) in residence to qualify as brucellosis-free
- APHIS and YNP have separate but cooperating facilities in the Montana (MT) endemic area
- Graduates are transported to Fort Peck for assurance testing
- Assurance testing: Quarantine Bison are obligated to be held and tested for another year after graduation (assurance testing)
- Ft. Peck Indian Reservation has acreage and bison working facility near Poplar, MT
- Facility has been approved as an Approved Bison Assurance Testing Facility (ABATF) by APHIS and Montana Department of Livestock (MTDOL)
- As of today, APHIS and YNP have supplied 104 bison to Ft. Peck for assurance testing
- Ft. Peck is committed to distributing bison that have completed assurance testing to other Tribes (zoos, parks)
- Intertribal Buffalo Council (ITBC) is native organization of 69 Tribes in 19 states with a collective herd of over 20,000 buffalo
CATTLE AND BISON

- ITBC is acting as a broker/advisor to Ft. Peck to facilitate the dispersal of assurance tested bison throughout the U.S.
- Recent distribution of 40 bulls to 16 tribes in 9 states
- Certified as brucellosis free by MT State Animal Health Officials (SAHO) upon graduation from Quarantine facility
- State requirements for import vary
- Importing State’s level of discomfort varies
- What to label these bison is part of issue - Wildlife versus livestock versus bison

**AgSAS Delisting Update**

Ryan Clarke, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Ruminant Health Center

Randy Capsel, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Agriculture Select Agent Services

Biennial review process overview:

- Critical note: *Brucella* spp. are overlap select agents, and biennial review of the agents is conducted by both APHIS and CDC for recommendations
- Review of *Brucella* spp. as select agents was conducted by subject matter expert technical committees for the USDA Agriculture Select Agent Services (AgSAS) and Health and Human Services (HHS) Division of Select Agents and Toxins (DSAT)
- Recommendations from each technical committee review is supplied to the respective Director offices and is published for public comment in the Federal Register
- The DSAT and AgSAS Directors provide a set of recommendations to their respective department Secretary on what to add/remove from the list (internal process) for Final Rulemaking
- Currently, recommendations from both agencies are for delisting of *Brucella abortus*, *Brucella suis*, and *Brucella melitensis*
- The Advanced Notice for Proposed Rulemaking (ANPR) process is ongoing in preparation for publishing Final Rulemaking language
  - This Final Rulemaking process can be a long-term process and currently are projecting a 12-18-month period for finalizing the Final Rulemaking process
  - Recommendations from the ANPR process to the Final Rulemaking publication can be modified
- Pursuing conclusion of the ANPR process
  - Interagency discussions involving ANPR comments received from the Federal Register notice to pursue delisting of the three *Brucella* spp.
  - Finalizing workplan and language to be published in the Federal Register for Final Rulemaking proposal
REPORT OF THE COMMITTEE

- Reviewing a policy statement avenue to address the needs for large animal (bovine, cervid, swine) brucellosis studies in outdoor containment settings
  - All select agent regulatory requirements would remain
  - Reviewing and assessing biosafety criteria related to conducting such studies

**Bovine Brucellosis in Mexico**
Kelly Rhodes, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Regionalization Evaluation Services

Brucellosis is endemic in cattle and other ruminants in most parts of Mexico. The Federal government established the current National Campaign against Brucellosis in Animals in 1996. It is highly decentralized, with a single lead agency at the national level: Development, Fisheries and Food (SENASICA) and implementation delegated to State-Federal-industry partnerships at the State level. The Campaign has three phases, or status levels: Control (prevalence > 3%), Eradication (prevalence < 3%), and Free (no cases for 3 years). Vaccination with Strain 19 or RB51 is mandatory in the Control Phase. Mexico relies primarily on serological testing for surveillance, using the Rose Bengal card test for screening. Confirmatory tests are rivanol and complement fixation, in series. Culture and isolation of *Brucella abortus* is also required to confirm infection in the Free Phase. SENASICA has authorized 269 slaughter plants nationwide to take blood samples for brucellosis testing; other surveillance streams include area testing, annual reaccreditation of free herds, annual dairy herd testing, and testing for movement between States or export. Prevalence at the national level was 0.047% in December 2019, ranging from 0.0-7.53% between States. SENASICA considers fifteen States or zones within States to be in the Eradication Phase and 2 States to be Free (Sonora and Baja California Sur). APHIS does not currently recognize the brucellosis status of any State in Mexico, although a recent evaluation of Sonora concluded that that State has a very strong program and close to zero prevalence. This evaluation supports classifying Sonora as Level I for brucellosis in accordance with new APHIS import regulations.

**Subcommittee Business:**

The business meeting was called to order. A review of attendees indicated that a quorum was present for voting purposes. The first item of business was a discussion of feedback provided by subcommittee members regarding responses to 2019 Resolution #32. The responses to Resolution #32 were deemed sufficient for the current time. Additional follow-up will be needed at the Spring Government Relations Meeting for a progress report. No new business items were introduced for 2020. A motion was made to adjourn the meeting.
The Subcommittee met virtually on October 13, 2020 at 10:00 a.m. EST. There were over 100 people present at the session. The topic for this year’s meeting was focused on Pestivirus control as it relates to non-bovine species.

**Presentations and Reports**

**Bovine Viral Disease Virus (BVDV) Outbreak in Bison**  
Chris Chase, South Dakota State University

Dr. Chase provided an overview of bovine viral diarrhea virus outbreak in a bison herd. Pestiviruses have been shown to infect various wildlife species such as white-tail deer, mule deer, antelope, and bison. The current herd was investigated due to a decrease in calving rate and due to several bison cows observed to be thin and unthrifty. Only history of viral vaccination was in 2008. Initial testing for viral antigen was negative, so serology was conducted. All 26 animals evaluated were positive for BVDV1 with titers ranging from 1:256 to 1:8192, with BVDV2 titers less than the BVDV1, suggesting potential BVDV1 exposure. Two animals were introduced to the herd and there was concern about persistently infected (PI) status of the two animals, so testing was conducted and determined that they were PI with a BVDV1a strain as determined by 5' UTR phylogenetic alignment. While genetically the isolate was most related to a BVDV type 1a, results from antigenic assessment of the bison isolate suggestive a lack of antigenic similarity to other BVDV 1a isolates. Another interesting observation was the detection of a bosavirus in these animals when conducting next generation sequencing. Histological evaluation of the animals was unremarkable for the thymus, but ileocecal value there was underdevelopment of follicles in the PI animals. Furthermore, in the ovary, the cellular density was less and less follicles of the PI animals and in the testis, there is lack of mature spermatozoa. In summary, this appears to be the first bison BVDV PI and of interest is the unusual serology suggestive of a disassociation of genetic and antigen similarity.

**Border Disease Virus (BDV) Outbreak in a Large Sheep Flock**  
Peter Kirkland, Elizabeth Macarthur Agriculture Institute, Australia

An overview of the clinical presentation of Border disease and the prevalence was discussed. Part of the interesting observation with this case outbreak is the lack of prevalence that is typically observed and the
survivability of these lambs, as BDV is predominantly thought to be short, but in some cases, lambs have longer survivability. Viral detection methods were discussed, and while Pan-pesti methods may be reactive, the sensitivity is less, and usually a BDV specific test is necessary for confidence to ensure you are picking up all positive samples. Serology was also discussed and the cross-reactivity among pestiviruses was discussed, but in general, virus neutralization titers can be a way when run in parallel to compare serological responses and demonstrate a higher virus neutralization titer (VNT) to BDV rather than Bovine Viral Diarrhea Virus (BVDV). This is useful to indicate what pestivirus might be implicated in the outbreak rather than just looking at antigen tests. In the current case study being investigated, the flock was reported to have early embryonic death and abortions, so a variety of reproductive pathogens were explored. Initial testing of aborted fetuses suggested no pestivirus infection, so affected and non-affected ewes were tested and pestivirus antibody tests were suggestive of a recent exposure of a pestivirus. VNT test was used to initially discriminate what pestivirus was associated with the outbreak and BDV was implicated and specific polymerase chain reaction (PCR) tests for BDV were employed and intensive sampling was undertaken to better understand the role and extent of the BDV infection in this flock. Visually, 15% of the lambs had hairy coats, 5% had extra hair around face and legs, and the rest appeared normal. Of the lambs with abnormal coat were tested, 68% were PI suggestive that abnormal hair coat strongly correlates with PI status. This case study highlights the value of the use of multiple diagnostic assays to better understand the causative agent involved.

Committee Business:

Dr. Falkenberg asked if there was other business to be discussed, and without hearing any, the meeting was adjourned at approximately 11:45 a.m. EST.
The Subcommittee met on October 13, 2020 virtually from 2:30-4:30 p.m. There were 248 members and guests present. The Purpose and Goal of the Committee were read by the Chair. Membership requirements were stated and processes for voting and resolutions were briefly discussed. The five resolutions passed in 2019 were discussed. Dr. Alicia Gorczyca-Southerland assisted with the meeting.

Presentations and Reports

Emerging Infectious Diseases (EID) Pilot Project Reports
Savanna Barksdale, Texas Cattle Feeders Association; Brandon Depenbusch, U.S. CattleTrace; Ken Griner, Florida Cattlemen's Association

Ms. Barksdale gave an update on the Texas Traceability Project that spanned from October 2018 to its conclusion in October 2020. Final summary of the project is in progress. She reported that over 100,000 head of cattle were enrolled into the project but only a total of 425 head were traced through the complete chain from ranch to packer. Preliminary findings suggest that automation of readers would have improved the number of sightings of tags and that the technology needs to be customizable for each sector of the cattle industry. They are currently retiring animals in the system and redirecting data and participants to U.S. CattleTrace.

Mr. Depenbusch provided program updates for CattleTrace which transitioned into U.S. CattleTrace (USCT) in January 2020. USCT is currently in Phase 2 and they have hired an Executive Director and Program Director. This phase over the next two years will continue to focus on developing leadership, relationships, and establishing long term funding to adhere to their mission of being an industry led voluntary animal disease traceability system.

Mr. Griner provided an update on the ongoing traceability projects in Florida that originally focused on the use of low frequency (LF) technology on cattle moving through livestock markets and has expanded to include a collaboration with a Texas producer to conduct a parallel study of LF and ultra high frequency (UHF) ear tags and the inclusion of UHF back tags at livestock markets.

Update of Proposed Emerging Infectious Diseases (EID) Transition Timeline and Update on USDA Data Management Tools
Aaron Scott, Rich Baca; USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Dr. Scott discussed reduction in animal disease through a robust traceability system is an overarching USDA goal and not just a goal for APHIS. To support this goal, they have been able to provide funding to
purchase RFID tag and readers, to support traceability pilot projects with partners, and to states to continue their traceability missions. Since the first of the year, over two million low frequency (LF) radio frequency identification (RFID) tags have been distributed. This includes both orange object character recognition (OCV) and white RFID tags purchased through contracts with Y-Tex, Allflex, and Datamars. They are working on contracts to be able to provide UHF RFID tags but a timeline for distribution has yet to be determined. New guidelines and standards are in place to approve new tags to ensure a variety of RFID tags are available. In July, a Federal Register Notice was posted to allow for public comments on the decision to only approve RFID tags for official identification (ID) and if so, the timeline to do so. The comment period closed on October 5th. Dr. Scott advised this process is not a vote and APHIS will address the comments in a later update. Comments received included both support and opposition for the change as well as several radical misconceptions. The comments can be viewed at www.Regulations.gov through the following Docket: APHIS-2020-0022.

Mr. Baca provided an update on the modernization of VS Information Systems. The Enterprise Message Service (EMS) is the overarching system that allows for data sharing between VS, States, and laboratories through subscription services. This data includes information from the Animal Health Events Repository, the Animal Health Services, and finally data from interstate Certificates of Veterinary Inspection. The Animal Health Services (AHS), formerly known as Mobile Information Messaging System (MIMS), will have similar activities like tuberculosis (TB) and brucellosis testing as the old platform but will be much more robust as it will now allow for the generation of interstate certificates of veterinary inspection (iCVIs) through Veterinary Services Process Streamlining (VSPS). VSPS has been updated to adhere to the xml data schema developed by the joint USAHA/AAVLD Committee on Animal Health Surveillance and Information Systems. Goals for FY21 include adding activities for scrapie programs, swine surveillance, NVAP 1-36A generation, Coggins, and much more. Animal health surveillance (AHS) will be available as an application for iOS, Android, and Windows devices and can be used offline. Limited release to production was started on September 30 and several states are participating in pilot testing of the program. The Animal Health Events Repository (AHER) is a dashboard that incorporates VS Data Integration Services. This service is available to SAHOs and allows for users to search for animals involved in traces and query large numbers of identification numbers. The data contained in AHER is a summary of data available from source systems. Training for SAHOs was conducted this past year on how to effectively use the program.

Comparison of Capabilities, Limitations, and Strengths of LF vs UHF Technology in Cattle ID
Jim Akers, COO Bluegrass Livestock Marketing

Mr. Akers provided a summary of the pros and cons associated with low frequency (LF) and ultra high frequency (UHF) technology for cattle
identification. He advised that each technology is beneficial and effective depending on the sector it is being used in. He ended his presentation with a discussion point that the industry should be focusing on dual frequency tags and not dual frequency readers to help facilitate electronic identification (ID) in the cattle industry.

**UHF Back Tag Project Updates**
Andy Schwartz, Texas Animal Health Commission; Mike Short, Florida Department of Agriculture and Consumer Services; Darlene Konkle, Wisconsin Wisconsin Department of Agriculture

Dr. Schwartz provided an update on the Texas’ ultra high frequency (UHF) radio frequency identification (RFID) back tag project, which is a collaboration between Texas Animal Health Commission and the Texas Cattle Feeders Association, utilizing UHF back tags in livestock markets. They are in their final year of the pilot project and have received overwhelming positive response from the participating livestock markets as it has help improved their operation efficiency. This project is demonstrating that the utilization of UHF back tags at livestock markets and subsequent association of permanent identification device numbers with these back tags is effectively bridging the current gap in traceability to farm of origin.

Dr. Short provided a summary of Florida’s UHF RFID back tag project. This project is evaluating the retention and readability of UHF back tags as well as their use at the “speed of commerce” in participating livestock markets, slaughter establishments, and at private farms and ranches.

Dr. Konkle provided an overview of Wisconsin’s planned UHF RFID back tag project. A unique feature to this project will be the utilization of a dual frequency reader at a slaughter establishment. Unfortunately, COVID-19 restrictions have resulted in delays in beginning this project.

**Subcommittee Business:**

Resolutions were discussed as follows:

**Backup Identification of Cattle in Commerce**

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA) and State Animal Health Officials (SAHOs) to work with livestock exporters to identify a secondary official identification option for animals being exported to account for loss of the primary official identification. The USAHA requests that the USDA initiate this collaboration between USDA, SAHOs, and livestock exporters within the first quarter of calendar year 2021 to guarantee a secondary official identification solution is available prior to and in the event of NUES tags being phased out for all purposes.

The resolution passed.
The Subcommittee met on October 14, 2020 virtually, from 12:00-2:00 p.m. EST. There were 102 participants present. Dr Heckendorf welcomed participants and reminded the committee of its mission statement. He reminded meeting participants to thank our meeting sponsors and then introduced our guest speakers. Each speaker presented on Trichomonas foetus sample transport and submission protocols (summaries of each below) and then participated on a panel discussion.

Presentations and Reports

Direct Detection of Trichomonas Foetus at the Nebraska Veterinary Diagnostic Center
J. Dustin Loy, Veterinary Diagnostic Center

A new method for detection of T. foetus was published which utilizes parasite ribosomal ribonucleic acid/deoxyribonucleic acid (RNA/DNA) as a target using a reverse transcription real time polymerase chain reaction (PCR) approach (Summarell JVDI 2018). The authors validated this assay using a comparison with Inpouch and a commercial PCR assay, which is currently approved for use at the Nebraska Veterinary Diagnostic Center (NVDC). NVDC made minor adjustments to the published methods to integrate with our current workflows. Results indicated that this new assay (Direct RT-qPCR) with minor modifications was equivalent or superior to existing methods and demonstrated enhanced sensitivity and increased dynamic range. NVDC also evaluated direct RT-qPCR on a variety of field samples including those collected in PBS, indicating the potential for use of this assay with simplified and direct collection techniques without T. foetus (TF) pouches or media. The direct RT-qPCR method was initially verified using laboratory cultured T. foetus spiked samples of bovine smegma in phosphate-buffered saline (PBS) and included limit of detection and assay dynamic range evaluation using enumerated parasites. Additional archived samples and known positives were then tested. A field comparison in which samples were collected in parallel in both PBS and TF media, tested using our current assay and the direct RT-qPCR was also conducted in samples submitted by collaborating veterinarians. In summary, data supports the use of the Direct RT-qPCR as performance was superior to the current PCR assay in sensitivity and limit of detection and had 100% agreement in a parallel comparison on field samples.

An additional experiment was conducted to validate the recommendation made by NVDC that submitting veterinarians could collect preputial scrapings/smegma from bulls in PBS transport media, and submit to the laboratory within 72 hours while maintaining the samples under refrigeration.
temperature (4° C). Results following experimental parasite enumeration, inoculation and incubation in PBS/Smegma or TF/Smegma indicate that there is no significant differences in these collection media for T. foetus RNA stability. Lower Ct values were observed in specimens being held at 4° C vs 20° C, respectively, supporting recommendation of refrigeration. These experiments also support establishment of a Ct cutoff value for samples that have been maintained at 4° C and submitted in either TF transport media or PBS.

**Tritrichomonas Foetus (TF) Testing in Wyoming**

Berit Bangoura, Wyoming State Veterinary Laboratory, Department of Veterinary Sciences, University of Wyoming

Currently, trichomoniasis testing is routinely performed by quantitative polymerase chain reaction (PCR) based on samples submitted in TF Transit Tubes (Biomed Diagnostics, Inc.) in the state of Wyoming. These commercially available tubes are expensive and feature a limited shelf-life. In addition, up to date there is limited data available on the relationship between T. foetus PCR test sensitivity and the use of TF Transit Tubes versus other media such as Modified Diamonds Medium for transport of field samples under realistic conditions. Several previous studies indicate that multiple factors such as transport temperature, bacterial sample contamination, and transport duration may influence test sensitivity for any commonly used media.

We are planning to perform a comparative study on experimentally T. foetus spiked preputial samples mailed from operation to diagnostic laboratory. We will evaluate the comparative sensitivity of different combinations of transport media and PCR protocols that are currently in use in different locations. The goal is to identify which test method is most suitable to provide reliable detection of T. foetus under Wyoming field conditions.

**Trich Transport in LRS and PBS**

Suzanna Leckman, Colorado Department of Agriculture

Lactated ringers solution (LRS) and phosphate buffered saline (PBS) were tested as alternatives to BioMed TF Transit Tubes™ as transport media for Tritrichomonas foetus testing. Samples of various cell counts were tested in each media at 24, 48, and 72 hours after inoculation into the media. In this study, both LRS and PBS showed similar results to Biomed TF Transit Tubes™. Samples were tested with and without added smegma and the addition of smegma made Tritrichomonas foetus detection more difficult in all media types. At 72 hours, in all media types, low cell numbers were difficult to detect suggesting that longer transit times are not advisable. Further investigation is needed before either of these alternatives is accepted as a viable Tritrichomonas foetus transport media.

A panel discussion was held with the three presenters fielding questions.
Initial discussion focused on the criteria for laboratories performing Trichomoniasis (Trich) testing. It was concluded that most state laboratories are AAVLD Accredited and therefore must have validated procedures and are audited for proficiencies. There are differences between AAVLD Accreditation and International Organization for Standardization (ISO) Accreditation but it was suggested that ISO Accreditation should be recognized as long as testing criteria and proficiencies are validated. Importing states can be assured that tests performed by laboratories outside of their state are getting accurate results if testing laboratories are accredited.

Various state Trich requirements were discussed including import requirements for female cattle and management of herds for in-state control of the disease. It was determined that having a review of state requirements and further discussing best management practices to develop information/education/outreach materials would be a good agenda theme for next year’s meeting.

Committee Business:

There were no resolutions or recommendations presented for consideration by the subcommittee. The subcommittee discussed potential topics for the next meeting agenda and adjourned at 4:20 p.m. EST.
The Subcommittee met on October 14, 2020 virtually, from 10:00 a.m. to 12:00 p.m. EST. There were 174 members and guests present. Dr. Michael VanderKlok welcomed committee members and guests, introduced Dr. Beth Carlson as Vice Chair, and determined there was quorum for the committee to meet and vote on all business, including resolutions.

Presentations and Reports

USAHA TB Scientific Advisory Working Group report
Kathy Orloski provided a summary of the activities of the Scientific Advisory Working Group. The full paper is included at the end of this report.

Update on TB in Texas
Susan Rollo, Texas Animal Health Commission

Status of the TB affected herds in Parmer and Lamb Counties: Two organic dairies and a feed yard (~12,000 head) completed an assessment test in April 2015, and 15 subsequent removal tests. To date, there are 68 histocompatible samples disclosed. Currently, the dairy is pending the verification and quarantine releasing test in November. If negative, then annual assurance testing will be scheduled for five years.

Status of the TB affected dairy in Bailey County (feed yard and associated dairy in Parmer/Bailey): The dairy is released from quarantine.

Status of the TB affected dairy in Sherman County and two associated grower operations in Dallam County that are epidemiologically linked to the positive dairy:

- The ~8,700 head dairy was previously tested annually 2015-2017 with negative test results after they received exposed heifers from a bovine TB affected dairy. The fourth test in December 2018, resulted in a high response rate. Further testing led to the identification of 68 animals with confirmed TB by culture after one assessment and three removal tests. Of the original 68, WGS revealed that 67 had a strain of last known linkage with cattle in central Mexico and one had an unusual strain which was 49 SNPs from the most recent ancestor. The fourth removal test is scheduled for October.

- One associated grower facility is a ~70,000 head calf ranch. To date, one positive heifer was disclosed on March 1, 2019. Approximately 12,000 head at the facility are considered ‘exposed’. The exposed group completed a testing plan and the quarantine was released in October 2020.
The positive dairy and a second Colorado dairy under the same management utilized a heifer raising premises with ~4,500 head in Dallam County. The first whole herd test on April 8, 2019 disclosed one positive heifer. The remaining heifers at the facility returned to the affected Texas dairy and with the completion of cleaning and disinfection, this facility is closed.

**Status of TB affected beef herd in Austin County:** In June 2019, a positive beef herd was disclosed from a slaughter trace back. After one assessment test, an additional positive cow was identified. Whole genome sequencing (WGS) describes a unique strain to the U.S. with Mexican origin. The verification test yielded negative results and the quarantine was released this month.

- Two trace investigations are being conducted. The trace in investigation was conducted to determine the origin on TB introduction to the herd. The index cow arrived to Crystal City, Texas from North Carolina in 2013. A trace of the index cow’s South Texas pen cohort (2 years duration) has been completed. This trace involved 34 animals including the pen bull. Out of state traces involved New Mexico, California, South Dakota, Mississippi and Kansas and 13 animals.
- The trace out investigation aims to disclose whether TB was transferred into additional herds. This work is ongoing, with some cases closed involving USDA indemnity. To date, TB has not been detected in those cows under enhanced slaughter surveillance. Over 90 different buyers involving > 300 animals have been identified over the 5-year trace time frame. Pass through herds where the trace animal no longer resides or cannot be positively identified result in a whole herd test of all test age eligible animals by CFT as per USDA recommendations.

**Status of slaughter traced to a dairy in northeastern Panhandle:** A whole herd assessment test was completed in April 2020 with no additional positive cattle disclosed. A second whole herd test is underway. To date, this dairy is not considered a TB affected dairy unless any positives are disclosed. Genetically the strain indicates a new strain to the US with historic ties to Mexico.

**Status of new Sutton County beef herd investigation:** In July, a slaughter trace back was identified that originated in a beef herd in Sutton County. The 12-year-old animal was a natural born addition in the herd. Further testing identified three additional positive cattle and one additional slaughter traceback. A herd plan is pending the results of the USDA CEAH model. In addition, an epidemiological investigation which includes identifying and tracing cattle sold within the previous five years is underway. The whole genome sequence describes a one SNP difference to a common ancestor of TB positives disclosed on a 2012 TB affected beef herd in Coke County.
Status of new roping steer investigation: On June 30, a slaughter trace back from a California plant was traced to a Panhandle feed yard that received roping steers from a premises in Archer County. Unfortunately, the lesion DNA did not match the official ID. A second slaughter trace back from a Wisconsin slaughter plant traced back to the same feed yard. The Mexican origin steer had DNA on the official ID that matched the lesion. The investigation revealed that a Limestone County producer imported the animal in February 2019. Whole genome sequencing on both steers revealed two different unique strains to the U.S. from Mexico. TB testing was conducted on all exposed or potentially exposed steers presently residing at the two premises. One gamma positive retired steer at the Limestone County premises did have lesions and was subsequently histocompatible and PCR positive. The WGS is pending. Both the Wisconsin slaughter trace back and the newly identified positive had ‘CHS’ tags (crossing papers are pending on the newest one).

Additional TB slaughter trace cases in the FY2020: One slaughter trace which was Mexican origin led to a feed yard in the Panhandle. The animal did not have an official tag and was closed as MXU (unknown) no official id.
- A second trace led to a different feed yard. This animal did have an official ID which was Mexican origin originating in Tamaulipas.
- The third trace was an animal that originated in Nebraska.

USDA APHIS VS TB Program Update
Mark Cammacho, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Development of a New Proposed Brucellosis/TB Rule: At the request of USAHA, APHIS is developing new regulations and supporting standards for the TB programs. Working groups have been set up and discussions have already been completed to craft a new version of a proposed rule. USDA is in the final stages of readying the TB rule for administrative and then public review. The goal is to include the TB rule in the Spring Regulatory Agenda. The publication of TB Proposed Rule for public comment is estimated to be late in Calendar Year 2021.

Bovine State Status: As of September 30, 2020, 49 States, two Territories (Puerto Rico and the U.S. Virgin Islands), and one zone (Michigan) were TB accredited-free. Michigan still maintains an modified accredited (MA) zone and USDA is actively negotiating a new tuberculosis (TB) memorandum of understanding (MOU) with them in 2020.

Captive Cervid State Status: All States and territories have MA status.

TB Program Reviews: The Michigan TB program was reviewed in FY 2020. A report has been written and in the process of being submitted back to the state for comment and response.

TB-Affected Herds Identified in FY 2020: There were 4 TB-affected cattle herds identified during FY 2020. Three herds were found in Michigan. Two of the
Michigan affected herds were found in the modified accredited zone (MAZ) as a result of annual surveillance testing while the third herd was found in the accredited free zone by epidemiologic tracing from one of the affected herds in the MAZ. The only Texas affected herd found in FY2020 was found on a 6-35 slaughter trace from Lone Star Packing plant in Texas in July 2020. This infected slaughter animal was traced to a 600 cow ranch in Sutton County which was divided into four separate units over two counties. The index animal in this herds was a 12 year old beef cow and a natural addition (home raised, not purchased). NVSL whole genome sequencing revealed that the 2020 infection is related to a 2012 Texas affected beef herd… by only one single nucleotide polymorphism (SNP) difference from the 2012 case!

National TB Surveillance

- **Granuloma Submissions:** For FY 2020, an estimated 4,745 granulomas from 163 federally inspected establishments were submitted. Overall, 1.8 granulomas were submitted per 2,000 adult cattle (culled dairy and beef cows and bulls) slaughtered, an increase from 2019 when the granuloma submission rate was 1.55 per 2000 carcasses slaughtered.

- **Slaughter Cases:** During FY 2020, a total of 10 granuloma submissions had histology compatible with mycobacteriosis, out of 4,745 granuloma submissions (0.2 percent). Of these, TB was confirmed in nine (90 percent) cases. TB is confirmed by polymerase chain reaction (PCR) testing of formalin-fixed and direct PCR and culture of fresh tissue.
  - Of the nine confirmed TB slaughter cases, six occurred in adult cows over two years of age while three cases occurred in feeder cattle. Of the three fed cattle cases, two occurred in Mexican-origin cattle and one was in a domestic origin heifer traced to OK. Of the six adult cases, one was traced to a NE herd which was depopulated, one was traced to a large TX/OK Dairy complex which tested negative, two were traced to TX herds that tested negative, one was traced to a TX beef herd where infection was found and one traced to a TX feedlot.

- **Mexican-Origin Slaughter Cases:** A total of two 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 Tamaulipas (two cases) and one case could not be traced to a MX state of origin.

- **Animal Identification Tissue Matching for Slaughter Cases:** Of the nine histocompatible cases found at slaughter, four cases had ID DNA that matched the lesion, four cases had no tissue submitted with their identification (ID) device and one ID did not match the lesioned tissue.

- **Live Animal Testing, Cattle:** Tuberculin skin testing in live animals is another component of national TB surveillance in cattle and bison. During October 1, 2019 through August 31, 2020, a total of 731,141 caudal fold tuberculin skin tests (CFT) of cattle and bison were reported,
CATTLE AND BISON

with 13,028 responders (1.8 percent, 46 states and one Territory reporting, data not available for four states).

The gamma interferon test was reinstated in June 2019 incorporating the IDVet PPD and a Prionics plate. The following summary facts describe its performance since then:

- ~3643 total tests since June 2019 reinstatement
- 3324 tests in 2020 as of (Sept 2020)
- 118 Invalids (3.5%)
- 2612 Texas samples (78.5%)
- 2887 affected/trace herd tests (87%)
- 437 movement tests (13%)
- 18 total positives (0.5%)
- Specificity = 2/437 = 99.54%
- Positive Predictive Value – 10/18 = 56%
- PPV in Affected/Trace herds – 10/16 = 63%
- Found truly infected animals in five different herds in three different states
- Continue gathering data
- Compare to CCT performance

- **Live Animal Testing, Cervids:** Data available from Cervid Commodity Center.

**Human-to-Cattle M. TB complex Transmission in the United States**

Jason Lombard, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

The *Mycobacterium tuberculosis* complex (MTBC) species includes *M. tuberculosis*, the primary cause of human tuberculosis (TB) and *M. bovis*, the primary etiologic agent of bovine tuberculosis (bTB), and other closely related *Mycobacterium*. The transmission of *M. bovis* from cattle to humans was recognized more than a century ago. Mitigations, such as pasteurization of milk and the detection and removal of lesions from cattle infected with bTB from the food chain, were put in place in the U.S. to limit human infection. These mitigations have been successful, as the prevalence of human and cattle infection with *M. bovis* has decreased significantly since the U.S. Bovine TB Eradication Program was started in 1917.

The potential of human to cattle transmission of bTB was recognized as early as 1942 when Tice reported on a herd owner with bTB in New York state that appeared to transmit *M. bovis* to four separate herds over a 2.5-year period. Another NY dairy herd owner with bTB apparently infected his herd in the 1960’s. Both owners were confirmed with bTB and had spent time in hospitals prior to their herds becoming detected as infected. These two case reports lack the laboratory data to confirm that the strains in the dairymen and the cattle were the same.

Since 2013, there have been three possible cases of human-to-cattle MTBC transmission in the U.S. The first case was a dairy herd in North
Dakota where an employee with active TB disease (*M. bovis*) led to the detection of three bTB infected cattle. One of these animals was an exact match to the dairy employee. Based on the extent of infection in the human and the small lesions in the affected heifer, it was concluded that the employee liked infected the heifer. The second case involved a 4-month-old heifer calf that was born in New Mexico and transported to Texas. The calf was tested per entry requirements and found to have *M. tuberculosis*. Humans as the suspected source of *M. tuberculosis* in cattle and there are no reports of cattle-to-cattle transmission of *M. tuberculosis*. Although an infected human associated with the cattle operation wasn’t found, there were matching human strains in the local area. Public health was unable to find any potential links between infected humans and the cattle. The third case also involved a Wisconsin dairy herd where an employee was detected with TB disease in 2015. The herd was tested twice with no disease detected. In 2018, a slaughter detection of bTB was traced back to the Wisconsin herd and the strains matched the past employee. Twelve infected cows have been detected to date.

These three cases provide additional evidence that human-to-cattle transmission of MTBC organisms is possible. There are multiple published reports from around the world where human-to-cattle transmission of MTBC organisms is highly suspected. Based on these findings and the fact that the source of infection for most bTB cattle herds is never determined, the potential for human introduction of bTB into cattle herds needs to be considered. A One Health approach is needed to address this issue, where industry, public health and animal health work together to evaluate and address the impact of TB-affected cattle herds on human health and the impact of human TB disease on cattle herds.

Discussion and Q&A was held on presentations.

**Subcommittee Business:**

Dr. VanderKlok opened the floor for receipt of recommendations or resolutions regarding tuberculosis to be considered for discussion, approval, and forwarding to the USAHA Committee on Cattle and Bison. There were no resolutions or recommendations brought from committee members.

There was no additional new business.

A motion to adjourn was made and seconded. The meeting concluded at 12:00 p.m. Eastern Time.
The Working Group met virtually on Wednesday, October 7, 2020, 2:30-4:30 p.m. EST. In addition to presentations, participants discussed potential sources of bovine tuberculosis (TB) introduction into the U.S. These include Mexican imported cattle exposure to U.S. domestic cattle, TB testing stray cattle that cross into the U.S. at the U.S./Mexico border, legal and illegally imported raw milk and cheese products from Mexico, and reverse zoonosis (*M. bovis* human transmission to cattle). Dr. Rick Linscott, IDEXX, volunteered to summarize the USAHA history of resolutions and actions related to cattle imported from Mexico into the U.S., for the working group. It was also noted that this working group will look for opportunities to contribute to the TB Initiative.


**Bovine TB Vaccination Project in Michigan Deer, Overview of Upcoming Study**

Kurt VerCauteren, USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS), National Wildlife Research Center

Dr. VerCauteren provided an overview of upcoming research on vaccine bait delivery and bovine tuberculosis vaccine in white-tailed deer in Michigan.

**World* Mycobacterium bovis* Characterization Project**

Claudia Perea, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL)

Strain characterization is indispensable for understanding disease epidemiology. At present, whole genome sequencing (WGS) of *Mycobacterium bovis* is giving significant insight into the evolution and spread of bovine tuberculosis (bTB) throughout the world. The resolution of WGS can provide great benefit to disease investigations and research, but the method is only as good as the database of isolates used for comparison. WGS analysis in the United States has contributed significantly to the USA official bTB eradication program by identifying sources of infection and thus increasing the success and efficiency of disease investigation when bTB is confirmed in cattle and farmed cervids. This update on the World *M. bovis* Characterization Project includes the analysis of sequences from the
Dominican Republic, Costa Rica, Chile, Jalisco (Mexico) and Poland. In all, these additions provided five more major genetic groups to the NVSL database. The isolates from the Dominican Republic, Costa Rica and Jalisco closely matched isolates from humans in the United States. The acquisition of isolates from Costa Rica is part of a wider effort to obtain isolates from Central American countries (Guatemala, Honduras, El Salvador and Costa Rica) through bilateral agreements between APHIS and the animal health authorities in each country. Two agreements (Honduras and Costa Rica) have been successfully finalized, and the other two are the process of completion. Also, collaborations have been established to obtain isolates from Bulgaria, the Republic of Georgia, Brazil, Ecuador and Venezuela. Since there is no predicting where the workforce will be coming from in the future, the continued addition of sequences from other countries and resultant strain characterization is very important so that we can achieve successful source attribution and understand the introductions into the U.S.

**Bovine Tuberculosis (TB) Initiative**

Suelee Robbe-Austerman, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL)

Despite a highly successful TB eradication program, new introductions into our national herd are seriously straining the resources of affected states and indemnity funding. A long-term multipronged approach that focuses on surveillance, modernizing diagnostics, source attribution and biosecurity, and animal vaccination is needed. The TB initiative is a 5-year effort to identify solutions that will reduce introductions into the country, improve surveillance and better coordinate with public health to improve and protect the health of people working in the cattle industry. A major cornerstone is a Bacille Calmette-Guérin (BCG) vaccination trial that APHIS-VS will conduct in collaboration with Secretariat of Agriculture and Rural Development (SAGARPA) in Mexico. APHIS will be initiating this project in fiscal year 2021 and plans to regularly update stakeholders on the progress of the initiative over the coming months and years.
The Committee met virtually on October 8, 2020, from 12:00-2:00 p.m. There were 10 members, and 24 guests present.

Presentations and Reports

Survey results from USAHA/AAVLD members
A brief survey was created to determine the level of concern or issue with recruitment and retention within the USAHA and AAVLD. The survey was distributed to the main listservs of the USAHA and AAVLD. Over 100 responses were received from organizations across North America.
Report is attached and key findings are shown below.

Q5 - Is your organization/workplace experiencing challenges with recruiting, maintaining staffing levels, or retaining professional staff?
National Bio and Agro-Defense Facility (NBAF) Scientist Training Program and NBAF Laboratorian Training Program
Kim Dodd, USDA, Animal and Plant Health Inspection Service (APHIS)
Roxann Motroni, USDA-APHIS, Agricultural Research Service (ARS)

Both speakers provided an overview of the training programs taking place to provide opportunities for advancement and career development for scientists and veterinarians, both for research project funding, mentorship, and career development.

Factors and Attitudes Affecting Veterinary Career Paths; a Summary of Survey Completed January 2020
Melanie Barham, University of Guelph

A brief presentation summarizing the findings of a survey completed by Dr. Barham and Dr. Sean Lyons at the University of Guelph was shared. Just over 1,000 veterinarians responded globally to the survey and covered what factors caused veterinarians to leave and stay in primary care clinical practice, resources needed and wanted to leave and stay, as well as attitudes and feelings related to leaving primary care practice were discussed.

American Association of Veterinary Medical Colleges (AAVMC) Actions for Workforce Development in Non-primary Care Areas
Ted Mashima, AAVMC

Dr. Mashima provided an update from the accrediting body from veterinary colleges (the American Association of Veterinary Medical Colleges). A portion of veterinary colleges across North America have career path counsellors providing guidance and training opportunities for students in veterinary and graduate programs in clinical and non-clinical roles within the profession. The career counsellors have formed a network that meets to share resources and can be contacted through the AAVMC.

Committee Business:
The committee met and divided into break-out rooms to determine committee priorities for the year. Each group was asked to determine what the committee should focus on. When convened together, several major
themes emerged that were developed collaboratively into the committee’s workplan for the year:

1) Compile resources for members around where to list jobs, hiring practices, recruitment and retention efforts. The Committee will seek approval from AAVLD/ REPORT OF THE to post these resources on their websites for members to access.

2) Approach USAHA/AAVLD to request speakers on topics such as management practices, recruitment and retention at subsequent annual meetings/conferences.

3) Continue to create linkages with organizations such as the veterinary colleges, career advisors so that careers outside of primary care practice are promoted and seen as a career path by graduates of veterinary and biological sciences programs in both undergraduate and graduate programs in North America.
COMMITTEE ON EQUINE
Chair: Katie Flynn, KY
Vice Chair: Joe Fisch, FL

Udeni Balasuriya, LA; Samantha Beaty, TN; Becky Brewer-Walker, AR; Charlie Broaddus, VA; Craig Carter, KY; N Jo Chapman, MD; Duane Chappell, KY; Stephen Crawford, NH; Brandon Doss, AR; Roger Dudley, NE; Stéphie-Anne Dulièpre, NY; Sean Eastman, SC; Dee Ellis, TX; Joe Fisch, FL; Katie Flynn, KY; Tolani Francisco, NM; Tony Frazier, AL; Joseph Garvin, VA; Robert Gerlach, AK; Scarlett Zirkle Gotwals, PA; Michael Greenlee, WA; Kristin Haas, VT; Rod Hall, OK; Steven Halstead, MI; Timothy Hanosh, NM; Andy Hawkins, KS; Carl Heckendorf, CO; Terry Hensley, TX; Michael Herrin, OK; Siddra Hines, WA; Heather Hirst, DE; Rebecca Jones, CO; Rachel Lacey, FL; T.R. Lansford, TX; Donald Lein, NY; Mary Jane Lis, CT; Karen Lopez, DE; Kevin Maher, IA; Scott Marshall, RI; Patrick McDonough, NY; Sara McReynolds, KS; Linda Mittel, NY; Richard Mock, NC; Jason Moniz, HI; Kenton Morgan, MO; Peter Mundschenk, AZ; Lee Myers, GA; Alecia Naugle, MD; Cheryl Nelson, KY; Boyd Parr, SC; Angela Pelzel-McCluskey, CO; Jeanne Rankin, MT; Grant Rezabek, OK; Jonathan Roberts, LA; Keith Roehr, CO; Susan Rollo, TX; Abby Sage, VA; Andy Schwartz, TX; Michael Short, FL; Ben Smith, WA; David Smith, NY; Justin Smith, KS; Diane Stacy, LA; Robert Stout, KY; Sandra Strilec, NJ; Tahnee Szymanski, MT; Manoel Tammassia, NJ; Jane Teichner, FL; Peter Timoney, KY; Josie Traub-Dargatz, CO; Alex Turner, CO; Kathleen Turner, FL; Charles Vail, CO; Albert van Geelen, IA; Michele Walsh, ME; James Watson, MS; Courtney Wheeler, MN; Nathaniel White, KY; Cliff Williamson, DC; Thach Winslow, TN; Ryan Wolker, AZ; Ernest Zirkle, NJ.

The Committee met on Monday October 12, 2020 virtually, from 2:30 to 4:30 p.m. Eastern Standard Time (EST). There were 152 individuals present. The meeting began with introductions and discussion of the agenda. The participants were made aware of pre-recorded presentations available to registered attendees which included the following presentations:

a. African Horse Sickness, A threat to the United States Equine Industry by Dr. Peter Timoney
b. EEE- An Overview and New Test Development for Improved Diagnostics by Dr. Linda Mittel
c. Equine Disease Communication Center Update by Dr. Nat White
d. National List of Reportable Animal Diseases (NLRAD) Update by Dr. Laura Miles
e. AAEP COVID and Equine Infectious Disease Update by Dr. Katie Flynn

Additionally, the following resource documents were made available to the meeting participants:

a. 2020 Equine Sector Meeting USDA Commitments Document
b. USDA Responses to the 2019 Resolutions
c. USDA 2020 Equine Import/Export Data Report and USDA 2020 Summary of Advances in Equine Import and Export - Dr. Amber Headen's Reports

d. USDA Equine Disease Summary Written Report by Dr. Angela Pelzel McCluskey

e. Equine Viral Arteritis (EVA) UM&R Revised Draft submitted by the EVA Subcommittee Chair, Dr. Terry Hensley

f. Farm Bill Section 12203 Q&A (Note this is USDA’s response to request for information regarding the USDA Plant and Animal Pest and Disease List)

The introductory discussions were followed by Jill Stowe’s presentation titled “COVID-19 and the Economic Impact to the Equine Industry”. The meeting transitioned into a panel discussion with Jill Stowe, Economist with University of Kentucky, Courtney Mangano from New York Department of Agriculture and Markets, private practitioner Barbara Jones and Cliff Williamson from the American Horse Council. Upon completion of the panel discussion, four questions and answer sessions were conducted with representatives from USDA Import/Export, USDA Equine Health Team, EVA Subcommittee and Equine International Working Group. The meeting concluded with the business meeting which included discussions on the USDA responses to the 2019 resolutions and on the Equine Sector Meeting topics.

Committee Business:

The business meeting focused on discussion of USDA resolution responses and the Equine Sector Meeting.

Discussion regarding the 2019 Equine Viral Arteritis Import Testing Requirement Resolution included the following comments:

- Committee will send letter to USDA to request additional guidance on what constitutes a national program, for example specifically what would need to be the scope of a program, e.g. number states with control programs, would there need to be a specified number of tests performed annually by National Animal Health Laboratory Network (NAHLN) laboratories.

- Additionally, the letter will request that, USDA specify where in the 14 articles of the World Trade Organization (WTO) Sanitary and Phytosanitary (SPS) agreement, it states there must be a domestic control program for an animal disease for a country to require an import test requirement for that same disease.

Discussions regarding the 2019 Contagious Equine Metritis (CEM) resolution raised the following issues:

- Concerns raised about horses being castrated immediately prior to import resulting in a welfare issue for these horses during transport and quarantine. The industry has proposed that castration is occurring to eliminate requirement for CEM quarantine once horses as part of the importation process into the U.S. There was discussion
on how long prior to importation a stallion should be castrated to avoid this problem. Proposed periods mentioned ranged from 21 to 60 days. The point was brought up that if this was a period as long as 60 days prior to import and the horse was recently purchased, it would create a logistical problem for the new owner as there would be cost and risk with keeping the recently gelded horse in its country of origin for this long.

- USDA is revising regulations to require that an animal health official oversee the live breeding of stallions while in the CEM quarantine facility.

- National Veterinary Services Laboratories (NVSL) is continuing with validation of two polymerase chain reaction (PCR) multiplex assays for testing for CEM causative agents; they verified that both tests would detect *Taylorella equigenitalis* and *T. asigentilalis*. The USDA hopes to perform testing on experimentally inoculated stallions in 2021. USDA will develop protocols to use in comparison of the PCR test results to the traditional culture methods and results of live breeding. The USAHA Committee on Equine would like to be involved in providing input to USDA as they develop the protocols for the live animal studies.
  
  o One member of the committee suggested that along with the evaluation of the PCR test perhaps there could be assessment of additional sampling method such as a prepuce lavage sample.

- A USDA representative clarified there is no plan to replace the current requirement for test breeding of stallions being imported to the U.S. with the PCR test but rather to utilize PCR as a supplemental testing method at least for the near future.

Other discussion during the business meeting included, whether we know anything at this time about the susceptibility of the equine to CoV-2 infection.

**Subcommittee Reports**

The Subcommittee on Equine Viral Arteritis and the Equine International Movement Working Group were presented in pre-recorded presentations for the committee to view prior to the meeting. During the virtual meeting, Terry Hensley, Chair of the Equine Viral Arteritis Subcommittee, highlighted the subcommittee’s work and answered questions. Also during the virtual meeting, Katie Flynn provided a brief overview of the activities of the Equine Movement Working Group in 2020.

**Presentations**

**COVID 19 and the Economic Impact to the Equine Industry**

Jill Stowe, University of Kentucky

Since horses are luxury goods, equine-related markets are more volatile than many. Specifically when income increases, demand increases at an
increasing rate but when income decreases, demand decreases at an increasing rate. The economic slowdown resulting from COVID-19 restrictions has had numerous impacts on equine markets. The presentation included data to support the following lessons learned from the 2008-2009 recession:

- Decline in number of mares bred/foals produced across breeds
- Decline and recovery in stud fees
- Decline in organization memberships
- Decline and recovery in sale prices/revenue
- Decline in competitions and entries
- Increased animal welfare issues

Ultimately all aspects of the equine industry experienced declines following the Great Recession of 2008 and 2009. However, some measures of equine activity showed signs of recovery, others have remained below pre-recession level.

After summarizing some lessons learned from the Great Recession in ’08-’09, the discussion turned to immediate impacts of COVID-19. The immediate effects of COVID-19 shut down discussions included competition cancellations, decrease in sales and breeding, modifications to veterinary services and potential equine welfare impacts. On a positive side, the horse industry has been very innovative by including expanded bidding options in auctions, increasing the use of online sales videos, and developing ways to host virtual lessons and virtual horse shows.

As the pandemic is continuing, the long-term outlook is unknown. It will depend on the future handling of the human pandemic. The longer the restrictions last, the larger the impact will be to the equine industry. The aftermath of the Great Recession prompted the 2012 Kentucky Equine Survey and hopefully there will be a national survey post COVID-19 to inform policymakers, research and equine stakeholders on the state of the equine industry.

Panel Discussion on the Economic Impact of COVID 19 to the Equine Industry

Panel included: Jill Stow, Associate Professor Agricultural Economics, University of Kentucky; Courtney Mangano, Program Manager, New York State Department of Agriculture and Markets; Cliff Williamson, American Horse Council; and Barbara Jones, Private Practitioner

The panel members were asked the following three questions and provided the following insights:

1. What specific equine issues did you or your organization address during the COVID-19 pandemic?
   a. American Horse Council - Weekly newsletters with educational material and reporting
   b. Private practitioner - Addressing the governor’s orders regarding what was emergency/essential services, protocols for reopening veterinary practices and equine facilities safely
REPORT OF THE COMMITTEE

and working to implement equine patient telemedicine options.

c. SAHO - Provide policy makers with guidance on veterinary practice, stable owners with information on safety standards. Expanded guidelines as part of phase 1 reopening. Worked with equine business to obtain essential business status.

2. What were some of the identified challenges for you or your organization during COVID-19 pandemic?

a. American Horse Council - National crisis related to animal care and care givers traveling to animal’s location.

b. Private practitioner - Telemedicine facilitated continued veterinary care but some aspects of veterinary care of equids is better done in person. Many curbside services will continue for to facilitate risk mitigation.

c. SAHO - Enforcement of guidance was at the local level and not the state level and necessary for communications across many entities. Found new entities to work with during a future animal health event based on the contacts they made during the COVID 19 pandemic.

3. What are some lessons learned by you or your agency during this pandemic?

a. AHC - sharing of non-verified information is a problem, we need improved baseline reports to better access current the issue.

b. Private practitioner - Don’t be afraid to say what you don’t know. Specifically related to animals being infected with CoV-2. As we have learned some animals such as mink and cats may show clinical signs and test positive for CoV-2 after an exposure to infected people.

c. SAHO - Improve networking as there were more entities impacted than previous communications on equine health issues.

d. Participant comment - Transportation needs of racing horses changed based on a shift of where racing was occurring in order to get animals where they were able to train and race.

USDA 2020 Summary of Advances in Equine Import and Export
Amber Headen, USDA

USDA has made many advancements to promote the international movement of equine while protecting the equine population and decreasing the risk of foreign disease introduction or exposure. The USDA has worked with industry to address many of the current import, export and animal health concerns. USDA worked this fiscal year to streamline the import process for U.S. horses returning from CEM affected countries and for European Union (EU) origin horses entering the U.S. This included updating the documentation requirements which has positively impacted the import
process for U.S. and E.U. origin horses. USDA also implemented and posted fillable health certificates for public viewing on the APHIS website that can be used by importers, exporters, and our trading partners to ensure all import requirements are met. We continuously work with individual countries to negotiate bilateral health certificates for both live equine and germplasm shipments.

USDA increased communication with equine stakeholders through multiple opportunities and platforms for stakeholders to provide their concerns and feedback and to receive updates. APHIS host a bi-monthly call with equine stakeholders to discuss topics previously received, issues observed in the quarantine facilities or with the general import process. APHIS also host port specific monthly meetings with equine stakeholders to provide information and answer questions related to that port.

USDA also worked on multiple policy and regulatory updates. This includes the guidance for the national CEM program and the equine quarantine facilities along the U.S. Mexico border which both went into effect January 1, 2020. Since implementation, all 17 approved states for Contagious Equine Metritis (CEM) quarantine have signed a memorandum of understanding (MOU) with APHIS and are carrying out CEM activities in accordance to the MOU and guidance. In addition, USDA updated and enacted sick horse procedures for all quarantine facilities and standardized the import permit process for all commodities at all port offices.

USDA is currently developing a new guidance for equine import procedures outlining the complete process for importation of horses into the U.S. USDA is updating the permanent privately owned horse quarantine facility guidance and the testing of equine during import quarantine guidance. The target implementation date of these documents is early 2021.

While there have been many advancements during this fiscal year, one of the challenges to which USDA has been working to address is the import of sick and injured horses. USDA understands the potential risk of disease introduction and the impact to receiving states and domestic horses this can present. The import of sick horses also requires the use of extra resources to ensure these horses meet import requirements prior to release. USDA is collaborating with the European Union and other affected countries to identify solutions that can be implemented pre-export to prevent the arrival of sick and injured horses. USDA is also committed to keeping our personnel and imported horses safe. Horses that are fractious and cannot be handled appropriately not only cause safety concerns but may also delay import processing and release from quarantine. We are continuously working with exporting countries and importers to reduce the import of fractious, injured and ill horses.

USDA considers Africa (excluding Morocco), Oman, Yemen, Thailand and Malaysia countries affected with African Horse Sickness (AHS). Thailand and Malaysia were added to this list during early 2020 due to recent disease outbreaks. All horses that are imported from these affected regions or transit these countries must follow the AHS protocol for entry into the U.S. This
includes a minimum 60-day quarantine at the New York Animal Import Center.

The equine import regulations are being updated to better align with international standards and improve flexibility for both the equine industry and USDA which includes the 60-90 days proposed regulation change for U.S. returning horses from CEM affected regions. The update to these regulations is currently going through the internal regulatory process. We understand the benefits these updates will be for the equine industry.

USDA has opened and expanded multiple markets this fiscal year for the export of live horses and semen from the U.S. This includes new markets to North Macedonia, expanded markets to Australia, Brazil, Taiwan, Peru, Philippines and others. There have been several retained markets as well for live horses and semen including export to Saudi Arabia, Argentina, New Zealand and Ecuador.

USDA created a new history page for live animal export updates where all stakeholders can search and find any export protocol update by species and by country. The new site has seen over 7,000 views since its creation. Stakeholders can also sign up for automatic GovDelivery notifications to stay up to date on export updates in real time.

During fiscal year 2020 there were outbreaks of Vesicular Stomatitis in eight states including Arizona, Arkansas, Kansas, Missouri, Nebraska, New Mexico, Oklahoma and Texas. Most countries restricted U.S. export at the affected premises level or premises plus a defined radius around the premises. However, some trading partners including Canada restricted export at the state level. At this time, only Kansas and Missouri are affected by Canadian restrictions and are ineligible for export to Canada.

USDA is consistently improving the customer experience using the Veterinary Export Health Certification System (VEHCS). As of this fiscal year, all live animal export certificates can be issued and submitted by USDA accredited veterinarians through VEHCS. In addition, 33 countries also accept APHIS digital endorsement. To ensure stakeholders are aware of what the requirements are for each country, there is a color-coded banner on the top of each country page located on the export regulation website. The orange color banner indicates that an original APHIS signature is required, and an embossed seal must be applied. Green banners indicate that APHIS digital signatures are accepted by the receiving county. Purple banners indicate digital APHIS signatures are accepted only for certain commodities, and original signatures are required for others. VEHCS also offers the receiving country the capability to pre-clear shipments. Port of arrival border inspection personnel can verify the authenticity of a digitally issued and endorsed U.S. origin health certificate using the VEHCS Certificate Viewer. If the paper hardcopy health certificate in hand at the port of arrival matches the document displayed in the VEHCS Certificate Viewer, the paper document is authentic. USDA is committed to facilitate the growth in international movement of equine by staying engaged with
our stakeholders, opening and expanding markets, and working to find solutions.

**USDA Equine Regulatory Disease Update**
Angela Pelzel-McCluskey, USDA-APHIS, Veterinary Services (VS)

**2019 and 2020 Vesicular Stomatitis Outbreaks**

The 2019 vesicular stomatitis virus (VSV) outbreak in the United States was the largest in the past 40+ years of recorded history. The outbreak was entirely VSV-Indiana serotype, which hadn’t been isolated in the U.S. since 1997-1998, it lasted from June 21 to December 27, 2019, and included 1,144 affected premises in eight states (Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas, Utah, and Wyoming). Of the total affected premises, 1,128 premises had only equine species clinically affected, 15 premises had only clinically affected cattle, and one premises had both equids and cattle with clinical signs. Given the size and scope of the 2019 outbreak, it was expected that overwintering of the virus would occur and that new cases were likely to appear in the historically affected southwestern and Rocky Mountain region states beginning in the spring of 2020.

On April 13, 2020, the National Veterinary Services Laboratories (NVSL) in Ames, Iowa, confirmed a finding of VSV infection (Indiana serotype) on an equine premises in Dona Ana County, New Mexico. This was the index case of VSV for the 2020 outbreak and for the state of New Mexico. As the outbreak progressed, seven additional states became confirmed as VSV-affected: Arizona on April 22, Texas on April 23, Kansas on June 16, Nebraska on June 24, Oklahoma on July 7, Missouri on July 13, and Arkansas on July 27, 2020. A total of 325 premises in these eight states have been either suspected or confirmed as VSV-infected during the outbreak to date and placed under state quarantine. Quarantines remain for a period of 14 days from the onset of lesions in the last affected animal on the premises and vector mitigation strategies and enhanced biosecurity procedures are recommended on quarantined premises to reduce within-herd spread of the disease.

Of the 325 VSV-affected premises identified, 312 premises have had only equine species clinically affected, 12 premises have had only cattle clinically affected, and one premises has had both equine and cattle clinically affected. At the time of this writing, all 325 VSV-affected premises have completed the quarantine period and been released. Surveillance for additional cases potentially associated with this outbreak are ongoing.

While the overwintering event and identification of new VSV-Indiana positive cases were expected in 2020, there were several unusual occurrences associated with this outbreak that were not predicted. Firstly, in addition to the VSV-Indiana cases that occurred in New Mexico, Arizona, and far west Texas in April/May 2020, a new incursion of VSV-New Jersey virus from Mexico simultaneously appeared in south Texas and continued northward as far as south central Texas affecting seven premises in four
counties. An outbreak involving both VSV-Indiana and VSV-New Jersey serotypes concurrently had not been seen in the U.S. since 1997-1998. Secondly, the expected continuation of the VSV-Indiana outbreak from 2019 in the Rocky Mountain region (Colorado, Utah, and Wyoming) never materialized in 2020. There were some severe drought indicators that presented in this region in late spring and early summer which may have had a significantly negative impact on the VSV-competent vector populations, but further study is needed to evaluate the climate variables that may have played a role. Finally, the appearance of an outbreak cluster in the Kansas, Missouri, Oklahoma, and Arkansas region was not expected and VSV cases this far east had not been seen since the 1930s.

Analysis of these abnormalities along with other variables involved in the 2020 outbreak are planned by the VSV Grand Challenge Team, a multidisciplinary group sponsored by USDA-Agricultural Research Service (ARS) and involving four different ARS research hubs and APHIS-VS. This team, established in 2015, explores climatic, ecological, hydrological, virus, vector, host, and epidemiological variables that drive VSV incursion and expansion in the U.S. with the goal of establishing reliable predictive information on disease transmission and outbreak scope to support the state/federal field response. The team is currently producing several peer-reviewed publications per year that capture and share the research results.

Complete situation reports for the 2019 and 2020 VSV outbreaks can be accessed on the USDA-APHIS website at the following link: [https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/cattle-disease-information/vesicular-stomatitis-info](https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/cattle-disease-information/vesicular-stomatitis-info)

**Update on Equine Piroplasmosis (EP) and Equine Infectious Anemia (EIA)**

In calendar year 2019, there were 31,391 domestic U.S. horses tested for equine piroplasmosis (EP) as part of active ongoing surveillance with much of the testing focused on the previously identified high-risk groups of sanctioned and unsanctioned Quarter Horse racehorses where iatrogenic transmission of the disease is well recognized. A total of 72 horses were found to be infected with *Theileria equi* during this time period in seven states. All 72 horses were Quarter Horse racehorses with iatrogenic transmission either confirmed or suspected to have been the cause of spread and 14 of these horses were co-infected with equine infectious anemia (EIA). Eleven (11) of the 14 co-infected EP/EIA horses were epidemiologically linked to a single racehorse trainer whose unhygienic practices of needle, syringe, and IV set re-use were determined to have caused spread within the group.

More than 17,000 U.S. horses have been tested for EP so far during the 2020 calendar year (testing numbers current through June 2020) with 19 *T. equi*-positive horses found in six states as of September 30, 2020. Eighteen (18) of the EP-positives are current or former Quarter Horse racehorses with iatrogenic transmission of the disease either suspected or confirmed. One
(1) positive horse was an Arabian stallion with a life-long history of ownership by several unsanctioned racing participants in two states and it is suspected the stallion may have been used previously in this population as a blood donor horse for blood doping the racehorses. The common practice in this population of reusing a single IV blood set for blood doping often leads to blood-borne disease spread not only to the blood recipient horses but also back to the donor horse. Two (2) of these 19 EP-positive horses were found to be co-infected with EIA. The horses that were co-infected with both EP and EIA have been euthanized and many of the remaining EP-positive horses have been enrolled in the USDA-APHIS EP Treatment Program. All EP-positive horses will remain quarantined until permanent clearance of *T. equi* through high-dose imidocarb dipropionate treatment is achieved and the horse maintains *T. equi*-negative status on all diagnostic testing. To date, there have been 365 horses treated in the U.S. for EP with 320 horses having met the clearance and test negative criteria for quarantine release.

In calendar year 2019, a total of 1,151,584 EIA tests were conducted in the U.S. with 89 horses confirmed as EIA-positive in 17 states. At least 75 of the 89 EIA cases occurred in Quarter Horse racehorses with iatrogenic transmission either suspected or confirmed to have been the source of spread in those cases. So far in 2020, there have been at least 853,000 EIA tests performed in the U.S. (January-July 2020 reported test data) with 22 EIA cases confirmed in five states as of September 30, 2020. Nineteen (19) of the 22 EIA positives occurred in Quarter Horse racehorses with iatrogenic transmission of the disease either suspected or confirmed. Many of the EIA-positive horses were found to be participating in unsanctioned racing. The EIA cases identified in 2019 and 2020 further highlight our recognition of a recent shift in the epidemiology of EIA in the U.S. While prior to 2017, many of the EIA cases were found to be in untested or under-tested equine populations where natural vector-borne transmission of the disease had occurred over time, since 2017 the majority of the EIA cases are now being found in Quarter Horse racehorses with iatrogenic transmission involved. Iatrogenic transmission of EIA is a preventable occurrence and targeted educational outreach is needed in these high-risk populations to reduce the incidence of EIA.

**Case Studies of EP/EIA Associated with Illegal Movement**

One of the 89 EIA-positive horses in 2019 was a Thoroughbred racehorse from Florida participating in sanctioned racing and is suspected to have acquired the infection during a period of injury layup in which an unidentified platelet-rich plasma (PRP) product was administered to the horse by a foreign veterinarian not licensed in the U.S. It is suspected that the PRP product may have been illegally brought into the U.S. from another country. The same unlicensed foreign veterinarian is also linked to PRP treatment of a Thoroughbred racehorse found EIA-positive in Florida in 2017.

Several in-depth EP/EIA case studies, including the EIA-positive Florida Thoroughbred racehorse case described, were presented to the committee. These cases highlighted the ongoing challenges of illegal movement of
horses from EP/EIA endemic countries, illegal interstate movement of unsanctioned racehorses and of quarantined horses for the purposes of continued racing, suspected illegal movement of blood products from other countries, and foreign veterinarians practicing in the U.S. without a license. Other challenges mentioned included: the lack of knowledge and interaction with unsanctioned racing venues in most states and the safety concerns inherent in those interactions; the apparent absence of involvement of sanctioned racing authorities in addressing EP/EIA positive horses and unsanctioned racing; and the ongoing concern about the potential for EP/EIA-positive horses to move into other equine industry sectors at the conclusion of their racing career.

**West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE)**

Equine case counts for WNV and EEE are sourced from the CDC’s ArboNET database and summarized by APHIS-VS in consultation with state animal health officials (SAHOs). Annual reports for each disease are compiled by calendar year and more current case counts during the active vector season are posted bi-weekly to the APHIS website. This information can be accessed at the following links:

For WNV information:

For EEE information:

In calendar year 2019, there were 90 equine WNV cases identified in 25 states. So far in 2020, there have been only 20 equine WNV cases identified in four states as of September 9, 2020. For EEE, there were 184 equine cases reported in 24 states in calendar year 2019 and in 2020 a total of 77 cases in ten states have been reported as of September 9, 2020. Delays in reporting equine arboviral cases in ArboNET are routinely recognized and may be magnified this year due to the public health community’s necessary prioritization of response to COVID-19.

The 2019 EEE case count in equids, while elevated, did not set any historic high records, however there were several observations surrounding EEE infections in 2019 that raised concerns both in the veterinary and human medical communities. Firstly, there were a record-setting number of human EEE infections reported in 2019; a total of 38 human cases in ten states with 15 fatalities. The number of human EEE cases across the years 2009-2018 had an average of seven cases per year recorded with the highest case count in a single year being 15 cases in 2012. Another unexplained observation was that for the first time in history, the ratio of equine WNV cases to equine EEE cases was inverted. In previous years, equine WNV cases usually outnumber equine EEE cases 2:1. In 2019, the number of EEE cases was double that of WNV in equids. Finally, the number of EEE cases confirmed in alternate and wildlife species had not been recognized at such a high level and with so many species of animals
represented as were reported in 2019. These anomalies for EEE in 2019 have yet to be explained and there is concern that 2020 could also be an unusually active year for EEE infection in all species.

**Update on African Horse Sickness (AHS) Risk Assessment**

The ongoing 2020 AHS outbreaks in Thailand and, more recently, Malaysia have elicited widespread concern in the global equine industry. For this reason, a request was made by equine stakeholders during their June 2020 meeting with the USDA-APHIS Administrator that an AHS risk assessment and modeling of potential disease spread in the U.S. be conducted. VS’s Center for Epidemiology and Animal Health (CEAH) has committed to conduct a risk assessment on incursion of AHS into the U.S. with work to begin in the first quarter of FY2021. Modeling of the potential for AHS spread is a more complicated project and requires the use of vector-borne disease spread models rather than the typical direct contact and animal movement models. A vector-borne spread model for Bluetongue has been under recent development at CEAH and may be capable of revision for AHS, however key base layers of equine data will need to be solicited including equine population and density data which have historically been inaccurate or unavailable. These challenges will take more time to work through, however APHIS-VS will continue to keep this committee updated on the progress of these proposed projects.

**Equine Disease Communication Center (EDCC)**

Nat White, EDCC

In May, EDCC started its sixth year of operations. Since operations were started, the EDCC has sent out more than 1,800 alerts for more than 4,450 cases or outbreaks to 8,400 email subscribers and 13,880 Facebook followers. Since April 2015, there have been 1,090,044 visits to the website with 878,415 of those visits to the alert page 11,645 views on the Covid-19 resource page. Case report have been submitted from all states except for Alaska and Vermont.

In 2019 there were 414 alerts posted for 523 cases and for Vesicular Stomatitis 440 premises were reported. The following list includes the number for the reported diseases from January 1 to September 25, 2020 there have been 274 alerts posted.

**Total cases in North America in 2019 - January 1, 2019 – December 31, 2019**

- Anthrax: 6 cases (6 in TX)
- Eastern Equine Encephalitis (EEE): 146 cases
- Equine Herpesvirus - Abortion: 6 cases
- Equine Herpesvirus - Neurologic: 89 cases
- Equine Herpesvirus - Respiratory: 8 cases
- Equine Infectious Anemia (EIA): 99 cases
- Equine Influenza (EI): 20 outbreaks
- Potomac Horse Fever (PHF): 3 cases
- Rabies: 1 case
REPORT OF THE COMMITTEE

- Salmonellosis: 1 case suspected
- Strangles: 110 cases
- Vesicular Stomatitis (VS): 440 Premises
- West Nile Virus (WNV): 75 cases

The EDCC works with the American Association of Equine Practitioners (AAEP) Infectious Disease Committee for oversight of the educational and biosecurity information on the website. Currently there are 29 domestic diseases listed on the website with 13 owner factsheets available to download and other links to AAEP and USDA guidelines. New owner factsheets to be added include Vesicular Stomatitis, Lyme Disease, and Parvovirus. Eight foreign animal disease are listed on the website with an owner factsheet included for African Horse Sickness (AHS). The EDCC database has been moved from a Microsoft cloud service to a server at the United States Equestrian Federation which will maintain and upgrade the system. All submissions are recorded in the EDCC database, which is used to generate the alerts. Disease reports are created each month and at the end of each year. The goal is to increase the search capabilities from all the data about diseases, dates, locations, clinical signs and test results. More work is needed to refine reporting system. The goal is to have reports created upon request and to have the database linked to the website for submissions and efficient transfer of alert information. This work will require more funding than allocated in current budget. The value of these reports and the database is only as good as the information submitted. Submission of information can be by filling out the JotForm which is a link on the “reporting a disease” on the website. Submissions can be made by filling out the PDF form on the website and by including the needed information in an email. The benefit of using the JotForm is a copy of the information is sent to the submitter at the same time the information is sent to the EDCC. We realize not all the information may be available and request as much information as possible be submitted. The following information is considered the most important for veterinarians and owners:

Required
- Date
- Submitter (name, email, phone number)
- Entity represented (State Animal Health Official; Veterinary Practitioner)
- Disease
- Location: County and state or province (towns or cities are optional; public facilities are identified)
- Status of the outbreak (quarantine/quarantine, released/voluntary, quarantine/not quarantine)
- Requested
- Facility type (farm, private facility, racetrack, etc.)
- Number of horses confirmed, suspected and exposed
- Age, breed and gender of affected horses
• Clinical signs, horse status, vaccination status
• Test and test results
• Notes about current circumstances such as current biosecurity and the current risk of disease spread

Alerts for highly contagious diseases such as equine herpesvirus or influenza are sent to the subscriber email list and posted on Facebook as soon as possible. Diseases which are not contagious from horse to horse such as WNV or EEE are posted at the end of each day. The alerts are reported in a standardized format but do have a space for information from the submitter which may be of importance to the subscriber audience. The alerts are posted on the mobile phone app which replicates the website. It is available as a download from Google Play or the Apple App Store. It has alerts, disease factsheets, biosecurity information, a filter for diseases location and date, and soon will have state veterinary contact information.

EDCC services are funding entirely by the horse industry. The current budget is $100,000 per year however this year’s expenses are decreased due to the Covid-19 pandemic. Currently the annual donations do not equal the annual budget and are not adequate to sustain the EDCC. Some form of reliable annual funding is needed to continue EDCC services. From March until August we have not actively sought funds for the EDCC due to the economic uncertainty brought about by the Covid-19 pandemic. Starting in August we are actively increasing awareness and seeking donations. This includes requests to email subscribers, Facebook followers and veterinary practices. Advertisement in publications and printed brochures are used to seek funding. Requests to owners, horse organizations, corporations and allied businesses continue. Grants to foundations have been submitted, and the American Horse Council continues to seek funding from USDA. The EDCC operations are paid from a dedicated fund with the “Foundation for the Horse” (new name for AAEP Foundation). All donations are tax deductible.

We hope you will ask questions and make suggestions for current or future EDCC services.
Contact Nat White at nwhite2@vt.edu or call 540-454-1091 or Katie McDaniel at edcc@aaep.org.
REPORT OF THE SUBCOMMITTEE ON EQUINE VIRAL ARTERITIS
Chair: Terry Hensley, TX

In 2020, the Subcommittee on Equine Viral Arteritis completed the final review and revisions to the USDA EVA Uniform Methods and Rules. Additionally, the group reviewed the export rules for U.S. horses related to the requirements for EVA testing.
In 2020, the committee worked on reviewing the testing protocols for equine import and held a discussion with National Veterinary Services Laboratory (NVSL) regarding current diagnostics and needs for advancing diagnostics. USDA provided the working group the new standard operating procedures for managing sick horses in equine import quarantine. The committee will review these protocols in 2021 along with 2020 sick horse data.
COMMITTEE ON FARMED CERVIDAE
Chair: Charly Seale, TX
Vice Chair: Shelly Chavis, IN

Udeni Balasuriya, LA; Samantha Beaty, TN; Becky Brewer-Walker, AR; Charlie Broaddus, VA; Craig Carter, KY; N Jo Chapman, MD; Duane Chappell, KY; Stephen Crawford, NH; Brandon Doss, AR; Roger Dudley, NE; Stéphie-Anne Dulièpre, NY; Sean Eastman, SC; Dee Ellis, TX; Joe Fisch, FL; Katie Flynn, KY; Tolani Francisco, NM; Tony Frazier, AL; Joseph Garvin, VA; Robert Gerlach, AK; Scarlett Zirkle Gotwals, PA; Michael Greenlee, WA; Kristin Haas, VT; Rod Hall, OK; Steven Halstead, MI; Timothy Hanosh, NM; Andy Hawkins, KS; Carl Heckendorf, CO; Terry Hensley, TX; Michael Herrin, OK; Siddra Hines, WA; Heather Hirst, DE; Rebecca Jones, CO; Rachel Lacey, FL; T.R. Lansford, TX; Donald Lein, NY; Mary Jane Lis, CT; Karen Lopez, DE; Kevin Maher, IA; Scott Marshall, RI; Patrick McDonough, NY; Sara McReynolds, KS; Linda Mittel, NY; Richard Mock, NC; Jason Moniz, HI; Kenton Morgan, MO; Peter Mundschenk, AZ; Lee Myers, GA; Alecia Naugle, MD; Cheryl Nelson, KY; Boyd Parr, SC; Angela Pelzel-McCluskey, CO; Jeanne Rankin, MT; Grant Rezabek, OK; Jonathan Roberts, LA; Keith Roehr, CO; Susan Rollo, TX; Abby Sage, VA; Andy Schwartz, TX; Michael Short, FL; Ben Smith, WA; David Smith, NY; Justin Smith, KS; Diane Stacy, LA; Robert Stout, KY; Sandra Strilec, NJ; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Jane Teichner, FL; Peter Timoney, KY; Josie Traub-Dargatz, CO; Alex Turner, CO; Kathleen Turner, FL; Charles Vail, CO; Albert van Geelen, IA; Michele Walsh, ME; James Watson, MS; Courtney Wheeler, MN; Nathaniel White, KY; Cliff Williamson, DC; Thach Winslow, TN; Ryan Wolker, AZ; Ernest Zirkle, NJ.

The Committee met on October 12, 2020, virtually, from 12:00 p.m. until 2:15 p.m. At one time there were 165 participants on the call. The committee was welcomed by Charly Seale, committee chair and Shelly Chavis was introduced as the committee vice chair. The mission statement was read. It was noted that the mission statement was developed while Farmed Cervidae was a subcommittee. Discussion commenced regarding the use of captive wildlife and alternative livestock as the species represented by this committee. A motion was made by Shawn Schafer and seconded by Walter Cook to replace captive wildlife and alternative livestock with farmed cervidae. After discussion regarding the intent of the committee and which species it represented concerning zoos, exhibitions, and captive wildlife, it was decided that the mission statement needed more attention than time allowed during the current committee meeting. Shawn Schafer withdrew his motion, and it was decided that further information would be gathered and presented to the committee before a decision to change the committee mission statement would be made.

Presentations and Reports

USDA-APHIS-VS Annual Update from the Cervid Health Team
FARMED CERVIDAE

Tracy Nichols, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Fiscal Year (FY) 2020

Voluntary Chronic Wasting Disease Herd Certification Program (HCP)

The APHIS 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 chronic wasting disease (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.

The current Cervid Health Program staff officers are as follows: Mark Lyons, Jennifer Siembieda, and Tracy Nichols

Voluntary Herd Certification Participation Summary

- Currently, 28 States participate in the voluntary CWD Herd Certification Program, encompassing 2,145 enrolled herds, of which, 1,723 had the certified status in the program.
- 1,616 enrolled deer herds, of which, 1,297 were certified
- 371 enrolled elk herds, of which, 328 were certified
- 147 enrolled mixed species herds, of which, 98 were certified

CWD in Farmed Cervids

- There were 22 newly identified CWD positive herds in FY20
- 13 of these herds were not participants in the Federal HCP
- 2 herds were considered enrolled in the HCP
- 7 herds were certified in the HCP
- Half of the herds were located within 20 miles of identified CWD in the wild, half were not

CWD Herds by State

Pennsylvania: Eight new CWD positive herds
- Breeding herd of 33 WTD, HCP certified, depopulated with Federal indemnity
- Breeding herd of 6 WTD, not in HCP, depopulated with Federal indemnity
- Breeding herd of 15 WTD, not in HCP, depopulated by owner
- Hunt preserve of 58 WTD, not in HCP, populated and under quarantine
- Breeding herd of 75 WTD, not in HCP, populated and under quarantine
- Breeding herd of WTD, not in HCP, populated and under quarantine
REPORT OF THE COMMITTEE

- Breeding herd of 90 WTD, not in HCP, populated and under quarantine
- Breeding herd of 4 WTD, not in HCP, populated and under quarantine

Iowa: Two new CWD positive herds
- Breeding herd of 23 WTD, HCP certified, depopulated with Federal indemnity
- Breeding herd of 13 WTD, HCP certified, depopulated with Federal indemnity

Minnesota: Two new CWD positive herds
- Breeding herd of 3 WTD, enrolled in HCP, not certified, depopulated by owner
- Breeding herd of 6 WTD, enrolled in HCP, not certified, depopulated with Federal indemnity

Colorado: Two new CWD positive herds
- Breeding herd/hunt preserve of 9 elk, HCP certified, depopulated by owner
- Breeding herd of 8 elk, HCP certified, populated and under quarantine

Utah: Two new CWD positive herds
- Breeding herd of 465 elk, not in HCP, partial depopulation with Federal indemnity-removed purchased animals, populated-quarantine
- Breeding herd of 103 elk, not in HCP, partial depopulation with Federal indemnity-removed purchased animals, populated-quarantine

Michigan: One new CWD positive herd
- Hunt preserve of >600 WTD, not in HCP, populated and under quarantine

Montana: One new CWD positive herd
- Breeding herd of 3 elk, not in HCP, populated and under quarantine

Texas: One new CWD positive herd
- Breeding herd of 59 WTD, not in HCP, depopulated with Federal indemnity

Kansas: One new CWD positive herd
FARMED CERVIDAE

- Breeding herd of 20 elk, HCP certified, depopulated with Federal indemnity

**Ohio:** Eight new CWD positive herd
- Breeding herd of 138 WTD, HCP certified, depopulated with Federal indemnity

**Research**
- Whole genome study investigating the association of genetics with CWD susceptibility has been published.
- Blinded validation of the genetic predicative model is almost complete.
- A standardized protocol has been developed, in partnership with Agricultural Research Service (ARS), United States Geological Survey (USGS), University of Wisconsin, and National Institutes of Health (NIH) for tissue sample testing using real-time quaking-induced conversion (RT-QuIC).
- A study is starting shortly to determine the sensitivity and specificity of RT-QuIC utilizing the standardized protocol.

**Cervid Tuberculosis**

**Tuberculosis (TB) Rule**
- The USDA assembled a State/Federal working group to develop the text of the proposed rule
- An initial draft was completed in July 2020
- The working group developed a new proposal to eliminate the current prevalence-based system and replace with State-consistent program
- Cattle health team is reviewing the draft
- Proposed rule will likely be submitted for the spring or fall of 2021

**DPP Test Kit Shortage**
- Shortages caused cervid testing delays
- Kits produced exclusively by a single company
- Kits were ordered in January with an expected arrival date of February, arrive in May
- National Veterinary Services Laboratories (NVSL) completed the backlog of 6,000 tests
- NVSL and Cervid Health are evaluating inventory control methods to avoid future shortages

**DPP Testing**
- In FY2020, 12,034 cervids were tested for bovine TB using the DPP® Vet TB Assay. Primary DPP serological testing identified 36 TB suspects; 16 of these animals had non-negative when retested.
Fifteen were necropsied and were negative on culture. 2,762 animals were tested with the Single Cervical Test. Forty-four were responders, 43 were negative on the CCT leaving one reactor.

**Mule Deer/Sika Deer DPP Pilot Project**
- The pilot project continues
- 101 Mule deer samples submitted in FY20
- 48 Sika deer samples submitted in FY20
- The project will require 306 samples from each species to conduct the evaluation for official use in these species

**Update on Hemorrhagic Disease Research in Florida**
Samantha M. Wisely, University of Florida

The University of Florida Cervidae Health Research Initiative (CHeRI) is a state funded partnership between the Florida cervid industry and the University of Florida. The purpose of the initiative is to assist cervid farmers to increase the health and production of their herds. Cervid farmers in Florida identified hemorrhagic disease as the major impediment to production. CHeRI assists farmers with disease diagnostic services. In 2019, Epizootic hemorrhagic disease virus (EHDV) was found in 37% of samples submitted (n=47 samples) and 9% (n=11) of the samples were diagnosed with bluetongue virus. All three serotypes of EHDV were found in Florida and thus far we have found 6 serotypes of BTV (serotype 1, 3, 10, 11, 17, 18; analyses ongoing). In addition to EHDV and BTV, we have found six additional orbiviruses in animals with clinical signs of hemorrhagic disease including Yunnan virus, Mobuck virus, Big Cypress virus and CHeRI orbivirus -1, -2, and -3. CHeRI also assists vaccine manufacturers in field trials of new and existing vaccines. The vaccine manufacturer, MedGene, conducted an efficacy study of an EHDV-2 virus-like particle vaccine in Florida in 2019. Fourteen farms with >700 animals were enrolled in the study. In conjunction with the efficacy study, CHeRI conducted a post study survey to assess the perceptions of deer farmers to the vaccine. From survey results we found that deer farmers struggled to vaccinate fawns because of timing of handling and the onset of EHDV season. Several farms had animals die that were vaccinated but animals were presenting clinical illness when vaccinated or were not given the second dose of the vaccine. CHeRI has created best management practices for vaccination based on this survey. In particular, vaccinating only healthy deer, ensuring that animals get both doses upon initial vaccination, and initiating vaccinations in spring are essential practices for maximizing the successful administration of the MedGene vaccine.

**Examining CWD Agent Transmission and Shedding in Rare Genotypes of Whitetail Deer That May Have Increased Resistance to CWD**
Justin Greenlee, Animal Disease Center USDA-ARS

The amino acid variations (polymorphisms) at sites in the protein sequence (codons) can affect incubation periods and possibly host
susceptibility to the chronic wasting disease (CWD) agent. The amino acid polymorphisms are usually discussed using a single letter abbreviation that corresponds with the amino acid that is encoded. The genotype of an animal can be predicted by extracting and sequencing DNA (typically from a blood sample). White tailed deer (WTD) have several polymorphic sites including codons 95, 96, and 226. Polymorphisms at codon 96 are the most common. In naturally infected CWD herds, there is a lower prevalence of positive tests from GS96 and SS96 deer. Deer that are SS96 still develop CWD. Less is known about polymorphisms at codon 95; although, it seems that H95 somehow affects how CWD accumulates in different parts of the body. The 226 polymorphism is rare. At the National Animal Disease Center (NADC) in Ames, Iowa, we recently started a study that investigates polymorphisms in the prion protein at codons 95, 96, and 226. Experimental groups include deer with H95G96K226 and Q95S96K226, and Q95G96K226. To imitate natural exposure, we inoculated a highly susceptible deer (wild type; GG96) to serve as the source of infection. Exposure of potentially resistant deer will occur through cohousing with infected deer. There are two main questions that we hope to address. (1) Are any deer resistant to CWD, and if not, (2) how long do these deer shed CWD prior to developing clinical disease? For the duration of the study, we are regularly collecting rectal biopsies, skin biopsies, feces, saliva, and blood from each deer.

USAHA 2020 Summary: Texas Updates on Chronic Wasting Disease (CWD) Genomics
Christopher M. Seabury, Texas A&M University
Mitchell A. Lockwood, Texas Parks and Wildlife Department
Tracy A. Nichols, USDA, Animal and Plant Health Inspection Service (APHIS)

In our previous investigation [1], we showed that differential susceptibility to Chronic Wasting Disease in U.S. farmed white-tailed deer is a polygenic trait with environment influence. Genomic relationship matrix (GRM) heritability estimates for differential susceptibility to CWD, and for natural variation in disease progression, were both high (i.e., > 0.50); with small standard errors [1]. Accurate genomic predictions observed via cross validation provided ample evidence for deploying a genome-assisted breeding program for genetic improvement of farmed white-tailed deer with respect to CWD [1]. Since the prior investigation [1], we have initiated a blind validation project involving genomic predictions for farmed U.S. white-tailed deer with masked postmortem CWD diagnostic data. To date, four batches of blind predictions have been performed and submitted to USDA-APHIS using several different methodologies, thus leading to average sensitivities > 0.83; but also underscoring the importance of using genome-wide data for genetic improvement of farmed U.S. white-tailed deer with respect to differential susceptibility to CWD.
REPORT OF THE COMMITTEE

References:

Committee Business:
Charly Seale called for resolutions. The first resolution was presented by Travis Lowe representing the North American Elk Breeders Association. The resolution called for the option to replace missed or poor-quality samples with ante-mortem samples from three animals of the same species that are 16 months of age or older. Travis made a motion to accept the resolution and Shawn Schafer seconded the motion. Discussion regarding the resolution included the following:
1. Should there be an upper limit to the ante-mortem testing?
2. Is a 3:1 ration adequate?
3. Criteria for testing needs to be better defined.
4. It is another tool to get more samples for CWD.
5. Need to wait on data analysis from Texas.
6. Premature resolution.
Motion failed on a voice vote. Dr. Nichols concluded the issue by informing the committee that there should be answers regarding the data analysis by April 21, 2021.
The second resolution was presented by Shawn Schafer requesting criteria to be developed for classifying bluetongue serotypes as endemic versus exotic and then to apply those criteria to the current list of classified bluetongue serotypes. Shawn made a motion to accept the resolution. It was seconded by Travis Lowe. There was no discussion. The resolution passed on a voice vote of 100% yay.
Shawn Schafer made a motion to adjourn the meeting. Dave Hunter seconded the motion. Motion passed with a voice vote of 100% yay.
USAHA/AAVLD COMMITTEE ON FOOD AND FEED SAFETY
Chair: Karyn Bischoff, NY
Vice Chair: John Sanders, WV

Chris Ashworth, AR; Karyn Bischoff, NY; Richard Breitmeyer, CA; Susan Bright-Ponte, MD; Roselle Busch, CA; Beverly Byrum, OH; Louise Calderwood, VA; Tarrie Crnic, KS; Ignacio dela Cruz, MP; Dubraska Diaz-Campos, WA; Brandon Doss, AR; Tracy DuVernoy, MD; Cheryl Eia, MN; Kathy Finnerty, NY; Heather Fowler, IA; Tam Garland, TX; Robert Gerlach, AK; Laura Goodman, NY; Erin Goodrich, NY; Scott Gustin, AR; Susanne Hinkley, NE; Donald Hoening, ME; Andrea Jackson, DE; Jarra Jagne, NY; Ghazala Jawad, NC; Eric Jensen, AL; Annette Jones, CA; Emily Kaleczyc, MT; Susan Keller, ND; Donna Kelly, PA; Todd Landt, IA; T.R. Lansford, TX; Dale Lauer, MN; Elizabeth Lautner, IA; Gene Lollis, FL; Karen Lopez, DE; David Luedeke, FL; Bret Marsh, IN; David Marshall, NC; Patrick McDonough, NY; Katherine McNamara, VT; David Meeker, VA; Nicole Neeser, MN; Elizabeth Parker, TX; Amar Patil, NJ; Toby Pinn-woodcock, NY; Dave Pyburn, IA; John Ragan, VA; Shelley Rankin, PA; Renate Reimschuessel, MD; Grant Rezabek, OK; Orhan Sahin, IA; John Sanders, WV; Joni Scheftel, MN; David Schmitt, IA; Sheryll Shaw, DC; Shelley Mehlenbacher, VT; Richard Sibbel, IA; Kathryn Simmons, DC; Caleb Smith, MN; Harry Snelson, IA; Shauna Voss, MN; Liz Wagstrom, DC; Doug Waltman, GA; Joseph Wang, TX; Kelli Werling, IN; Robert Wills, MS; Ross Wilson, TX; Nora Wineland, MI.

The Committee met on October 9, 2020 virtually, from 12:00 p.m. to 2:00 p.m. There were approximately 100 attendees present.

Time Specific Paper
Megin Nichols, Centers for Disease Control and Prevention (CDC) presented a time-specific paper on Outbreak of Multi-Drug Resistant Salmonella Infections Linked to Contact with Pig Ear Pet Treats. The paper, in its entirety, is included at the end of this report.

Vet-LIRN Update
Olga Ceric, Food and Drug Administration (FDA)

The Veterinary Laboratory Investigation and Response Network (Vet-LIRN) promotes human and animal health by collaborating with veterinary diagnostic laboratories to provide scientific information, build capacity for routine and emergency response testing, and promote professional development. The FDA Vet-LIRN Program Office has one director, four veterinarians, three consumer safety officers, one microbiologist, and one veterinarian liaison with Office of Surveillance and Compliance (OS&C). The Vet-LIRN laboratory network is composed of more than 40 state and university veterinary diagnostic laboratories in the U.S. and Canada.

Vet-LIRN investigates consumer complaints. Recent investigations have resulted in detecting excessive choline in cat food which resulted in a voluntary recall, excessive vitamin D in dog food products resulting and recalls, raw food recalls related to a variety of bacterial contaminants.
including *Listeria*, *Salmonella*, and Shiga toxin-producing *E. coli* (STEC) 0128, and continued investigation of dilated cardiomyopathy in dogs consuming “grain free” dog food products. Additionally, Vet-LIRN has organized several Proficiency Tests (PT) and Inter-Laboratory Comparative Exercises in 2020, including a liver aflatoxin International Collaborative Effort (ICE), campylobacter in dog feces ICE with polymerase chain reaction (PCR), an unknown toxicant PT, and SARs-COV2 ICE with PCR. Delays are expected for future ICE and PT programs due to COVID-19 response.

Risk and Response to Disease Introduction Through Feed: The use of feed additives
Scott Dee, Pipestone Veterinary Service

Feed ingredients for swine, in particular soy, are imported into the U.S. from countries including China and Ukraine. Viral nucleic acids have been detected in commercial feeds, including porcine epidemic diarrhea virus (PEDV) [U.S.], Senecavirus A (SVA) [Brazil], and African swine fever virus (ASFV) [China]. Additives have the potential to reduce viral pathogen contamination of feed. Products from a dozen manufacturers were tested. Mitigated versus non-mitigated feed were fed to swine during the experiment period. Feed samples and antemortem and postmortem samples of oral fluid, tonsils, serum, and rectal swabs were taken from animals and body condition, mortality, and average daily gain were recorded. Animals on mitigated feed had enhanced health and performance despite viral challenge, but FDA approval is needed.

Live Bird Markets and the Risk of Zoonoses
Jarra Jagne, Cornell University

The first human cases of highly pathogenic avian influenza (HPAI) H5N1 were detected in Hong Kong in 1997 in 18 patients and six of them died. Chickens on farms and live bird markets (LBMs) identified as the primary source of the virus were depopulated in large-scale exercises. In 2003, the virus resurfaced again in Asia and by 2006 had reached 62 countries around the world. To date, 455 deaths out of 861 cases have been confirmed, producing a high case fatality rate of over 50%. Humans are infected from direct contact with virus in secretions or from blood and feces during slaughter and processing. The disease in humans is characterized by bilateral pneumonia and severe respiratory distress. Many studies have shown that HPAI viruses are common both in avian species and in the environment of LBMs. The high density of poultry and a variety of avian hosts allow LBMs to support and maintain amplification and dissemination of avian influenza viruses. HPAI H5N1 virus is endemic in Indonesia, Vietnam and Egypt. These countries have high risk factors such as the presence of many LBMs, having high domestic duck populations, large numbers of small flock owners and a poultry sector with complex value chains. In addition, live bird markets are not well organized into distinct and separate areas based on function and chickens and other avian species are sourced from numerous
locations. Mixing of avian species in the same cage is common as is the lack of cleaning and disinfection. LBMs still pose a threat with the appearance of newer zoonotic viruses such as H7N9.

**CDC’s Food Systems Working Group: COVID-19 response, rolls, and resources**

Mary Pomeroy, Centers for Disease Control and Prevention (CDC)

The Food Systems Working Group (FSWG), a team within the Community Interventions and Critical Populations Task Force at CDC, describes their work within the COVID-19 response. The presenter discusses the FSWG’s mission and objectives and highlights activities the group has been engaged in to supported efforts in slowing the spread of COVID-19. A brief review of various food systems-related tools and resources are provided, including guidance for meat processing workers, facility assessment checklists, and links to key CDC webpages.

**Committee Business:**

The Committee discussed 2019 Resolution number 18 on valid sampling methods and protocols for feed and feed ingredients.

The Committee also discussed a future Salmonella symposia as part of the USAHA/AAVLD meeting, separate from the Committee on Food and Feed Safety.

Due to time considerations, the committee decided to continue business via email and future quarterly conference calls.
Outbreak of Multi-Drug Resistant Salmonella Infections Linked to Contact with Pig Ear Pet Treats
Megin Nichols, Centers for Disease Control and Prevention (CDC)

CDC, public health and regulatory officials in several states, and the U.S. Food and Drug Administration (FDA) Center for Veterinary Medicine investigated a multistate outbreak of multidrug-resistant human Salmonella infections linked to contact with pig ear pet treats. Salmonella strains included were Cerro, Derby, London, Infantis, Newport, Rissen, and I4,[5],12:i-.

Public health investigators used the PulseNet system to identify illnesses that may have been part of this outbreak. PulseNet is the national subtyping network of public health and food regulatory agency laboratories coordinated by CDC. Deoxyribonucleic acid (DNA) fingerprinting is performed on Salmonella bacteria isolated from ill people by using a standardized laboratory and data analysis method called whole genome sequencing (WGS). In this investigation, WGS showed that bacteria isolated from ill people were closely related genetically. This means that people in this outbreak were more likely to share a common source of infection.

A total of 154 people infected with the outbreak strains of Salmonella were reported from 34 states. Illnesses started on dates ranging from June 10, 2015 to September 13, 2019. Ill people ranged in age from less than one year to 90 years, with a median age of 40 years. Seventy (45%) ill people were female. Of 133 ill people with information available, 35 (26%) were hospitalized. No deaths were reported.

WGS was conducted to identify any predicted antibiotic resistance in 110 isolates from ill people and 102 isolates from pig ear treat samples. A total of 164 isolates had predicted antibiotic resistance or decreased susceptibility to one or more of the following antibiotics: amoxicillin-clavulanic acid (<1% of 164 isolates), ampicillin (53%), azithromycin (<1%), cefoxitin (<1%), ceftriaxone (<1%), chloramphenicol (33%), ciprofloxacin (50%), fosfomycin (2%), gentamicin (27%), kanamycin (2%), nalidixic acid (26%), streptomycin (33%), sulfisoxazole (30%), tetracycline (58%), and trimethoprim-sulfamethoxazole (27%). No antibiotic resistance was predicted for 48 (23%) isolates. Testing of 13 clinical isolates using standard antibiotic susceptibility testing methods by CDC’s National Antimicrobial Resistance Monitoring System (NARMS) laboratory provided comparable results (fosfomycin and kanamycin were not tested by this method). If antibiotics were needed, infections related to this outbreak may have been difficult to treat with some commonly recommended antibiotics and may have required a different antibiotic choice.
The Committee met on October 15, 2020, virtually from 1:30 to 4:30 p.m. Central Daylight Time (CDT). There were 334 meeting participants. Linda Logan, chair and vice chair Karyn Havas introduced themselves and welcome the audience. One resolution from 2019 was summarized and the response from Animal and Plant Health Inspection Service (APHIS) was reviewed and accepted.
Time Specific Paper

There was one time-specific presentation this year by Keith Sumption, our invited speaker. Dr Sumption was appointed in June 2020 as the new Chief Veterinary Officer of the United Nations (UN) Food and Agricultural Organization (FAO). A summary of his report is included at the end of this report.

FADDL-NAHLN Summary – USDA-APHIS-VS

Kim Dodd and Christie Loiacono, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Activities in the Foreign Animal Disease Diagnostic Laboratory (FADDL) and the National Animal Health Laboratory Network (NAHLN) were reviewed, including organizational updates. The NAHLN has 60 laboratories in 42 states and are working to have tier one and two able to message results as of January 1, 2021. Major achievements reported include an emergency validation process for transboundary animal diseases, increased African swine fever (ASF) testing capacity due to new pooling protocols, and the development of a stockpile of ASF controls and proficiency testing kits. In addition, five commercial ASF assays were evaluated and two identified to expand capacity during an outbreak. There has been ongoing evaluation of sample types to include oral fluids and work is ongoing to evaluate oral fluids. Currently, non-positive results are considered non-actionable. There is work to couple evaluation of oral fluids with mortality sampling to increase confidence in surveillance results. There is a collaboration with Romania to continue this work. The emergency validation process for use in the NAHLN allows for alternative samples to be used with submission of a deviation and duplicate testing by FADDL. The presentation also reviewed the ways in which preparedness is being enhanced via the National Animal Vaccine and Veterinary Countermeasures Bank (NAVVCB) and other activities. Further, the NAHLN Farm Bill funding was reviewed as well. Finally, COVID19 lessons learned were outlined, particularly lessons learned from the NAHLN network.

The National Bio and Agro-Defense Facility: Update

Alfonso Clavijo, NBAF

The National Bio and Agro-Defense Facility (NBAF) will be the premier center of scientific excellence for the study of transboundary, emerging, and zoonotic animal diseases that threaten U.S. agriculture economy, food supply, and public health. This state-of-the-art facility will be a national asset that helps protect our nation’s agriculture and its citizens against the threat and potential impact of serious animal diseases. NBAF will ultimately replace the existing Plum Island Animal Disease Center (PIADC) and all its essential functions, as well as provide additional capabilities for early development of veterinary medical countermeasures. NBAF will specifically facilitate transboundary animal disease research to provide solutions to problems associated with the control, eradication, and recovery of priority diseases.
FOREIGN AND EMERGING DISEASES

NBAF will maintain a portfolio of expertise that will allow it to rapidly respond to new and unforeseen disease threats. Since transboundary animal diseases and/or new emerging diseases cause disease outbreaks worldwide every year, priority setting requires a flexible and rapid system to ensure the scientific program at NBAF can effectively respond to any disease outbreak that may threaten the United States. NBAF will provide the first high-containment, biosafety level (BSL) 4 facility for livestock in the United States, enabling us to study particularly dangerous zoonotic agents in large animals. USDA is currently hiring the NBAF team, and the facility is scheduled to be fully operational in late 2023.

Dr. Clavijo highlighted partnerships with other federal agencies such as Department of Homeland Security (DHS) and Health and Human Services (HHS), as well as with at least a dozen universities. He discussed the ongoing recruitment programs and the training programs for graduate students and veterinary students.

USDA, Agricultural Research Service (ARS), Foreign Animal Disease Research Unit (FADRU)

Luis Rodriguez, Plum Island Animal Disease Center

The Foreign Animal Disease Research Unit (FADRU) continued to carry out research at Plum Island Animal Disease Center (PIADC) while also working on various important activities for the transition to National Bio and Agro-Defense Facility (NBAF). While it has been challenging due to the COVID pandemic, we have adapted and made a lot of progress in both fronts. In the transition to NBAF we are working hard on the transfer of the large biorepository at PIADC and have established a number of research collaboration agreements with Centers for Disease Control and Prevention (CDC), University of California-Davis, University of Texas Medical Branch, Kansas State University, Mississippi State, and others to advance the training of our future workforce at NBAF. We continue to work on three comprehensive and multidisciplinary research projects: 1) Intervention Strategies to Support the Global Control and Eradication of foot-and-mouth disease (FMD); 2) Countermeasures to Control and Eradicate Foreign Animal Diseases of Swine: classical swine fever (CSF)/African swine fever (ASF), and 3) Ecology of Vesicular Stomatitis Virus (VSV).

Our most important asset is our staff, and we are happy to report that for the first time in 12 years we are (almost) fully staffed with only one technical support vacancy. We have welcomed into our program Miranda Bertram in our pathogenesis and clinical studies program. Dr. Bertram joins the other seven senior scientists in our program. Additionally, thank to program increases realized in FY19 and FY20, we have increased our research resources for ASF vaccine development program and have been able to open five new senior scientist positions in support of the NBAF FADRU work, one candidate has been selected (TBA soon) and four in the hiring process.

FMD: The FMD research highlights include continued development of the FMDV3B3D (leaderless marker vaccine) inactivated antigen production
platform that with our cooperative research and development agreement (CRADA) collaborator (Zoetis). Although the vaccine is based on killed virus demonstrated to be safe and effective, the platform itself was demonstrated to be safe, unable to produce disease or be transmissible in animals as demonstrated in multiple studies both at PIADC and confirmed by an external laboratory in Germany. After select agent exclusion, the next step is to begin Research and development (R&D) in the U.S. mainland under the current approval obtained in 2018. This will be followed by the production, for the first time ever, of commercially available FMD vaccine in the U.S. In addition, through collaboration with industry partners, ARS scientists evaluated the efficacy of modified porcine interferon molecules for their capacity of providing long lasting bioavailability and efficacy in swine. This study highlighted the benefit of using a combination of this molecule with vaccines to provide immediate and long-term protection against FMD in swine.

Advances were also made in our knowledge about FMD pathogenesis from acute to persistent infection. In addition, advances in knowledge regarding direct and fomite mediated transmission were reported.

Field collaborative investigations were continued in Africa and Asia. Important output included a novel, modeled meta-analysis which provided systems to determine the duration of the carrier state under differing endemic conditions. This approach demonstrated that 12 months after an outbreak of FMD, up to 51% of carrier animals may remain infected.

All these studies are informing the parameters use for modelling FMD spread and control programs.

**CSF/ASF:** Rationally designed classical swine fever (CSF) live attenuated FlagT4G vaccine candidate was shown to be genetically stable and the accompanying differentiating infected from vaccinated animals (DIVA) test was developed. This DIVA test efficiently allows the serological differentiation of animals that has been vaccinated with FlagT4G from animals vaccinated or infected with any other strain of CSFV.

In FY2019, we reported a new vaccine that was very safe and effective (ASFV-G-delta I177L). We have now shown that this vaccine is effective at very low doses ($10^2$ HAD50 and is safe ever at high doses ($10^6$ HAD50). Furthermore, the new vaccine indices sterile immunity at a dose of $10^4$ HAD50), and it is not shed from vaccinated animals. This makes ASFV-deltaI177L the safest and most effective vaccine strain reported against ASFV Georgia. ARS is the process of licensing this technology to vaccine production companies in the U.S. and overseas.

The lack of a stable cell line to grow ASFV vaccine candidates limits large-scale production of ASF vaccines. Currently vaccine candidates rely on the growth in primary cultures of swine macrophages. Scientists in Foreign Animal Disease Research Unit (FADRU) solved by adapting some of the vaccine candidates to grow on an established cell line. Preliminary results demonstrated that the vaccine grown in the cell line was able to induce protection against virus challenge to the same level as the macrophage grown vaccine.
VSV: Vesicular stomatitis (VS) is a recurring emerging vector-borne viral disease with incursions into the western United States at 8-10 year intervals from endemic areas in Mexico. The most recent incursion started in 2019 and has continued in 2020. Predicting the drivers of disease incursion and expansion as part of early-warning strategies (EWS) is a major challenge for diseases where spread is mediated by climate and other environmental drivers. Under a “Grand Challenge Project”, ARS researchers from multiple locations (Manhattan, Kansas; Fort Collins, Colorado; Cheyenne, Wyoming; Las Cruces, New Mexico; and PIADC) applied a multi-scale big data-model integration approach using human-guided machine learning to evaluate the importance of over 400 environmental variables to develop EWS for VS. VS occurrence at the local scale of individual landowners was related to distance to running water, host density, vegetation, and environmental conditions (rainfall, temperatures, streamflow). Development of EWS allows predictions of conditions that favor VS incursion and expansion, thereby providing implementation of preventative measures at the local and regional levels. This big data approach, coupled with expert knowledge and machine learning, can be applied to other emerging diseases for improvement in understanding, prediction, and management of vector-borne diseases.

USDA-APHIS-VS Center for Epidemiology and Animal Health (CEAH) Annual Update
Amy Delgado and Dana Cole, USDA-APHIS-VS-CEAH
USDA Veterinary Services’ CEAH provides a variety of applied and innovative analyses to generate science-based information for decision making on complex national animal health issues. This presentation will provide a snapshot of CEAH outbreak preparedness and response activities over the last year.

SARS-CoV2 on Mink Farms
Dean Taylor, Utah Department of Agriculture and Food
An outbreak of SARS-CoV2 on mink farms in Utah was discussed. Human COVID19 cases were noted on a farm and this was followed by higher mortality of mink on the same farm that was diagnosed as SARS-CoV2. This spread to five farms in the area, all of which were depopulated and had wildlife surveyed. A second outbreak in the state emerged that was apparently unrelated to the initial outbreak. Challenges involved distrust of the State and Federal entities by this niche farming community and access to funding for farmers to allow terminal testing of mink. USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) collected samples from feral cats and wildlife species in the surrounding area to determine if the virus could be detected in these populations.

USDA-APHIS-WS Update
The introduction of a foreign animal disease is likely to cause substantial morbidity and mortality, production losses, and trade impacts. Many of the most detrimental foreign animal disease pathogens can also be maintained and transmitted in free-ranging wildlife and feral populations. National surveillance efforts have been underway and are currently ongoing for wild birds for avian influenza (AI) and feral swine for classical swine fever (CSF), African swine fever (ASF), and foot-and-mouth disease (FMD). In addition, Wildlife Services has been working with Veterinary Services, wildlife laboratories, and state wildlife agencies to track rabbit hemorrhagic disease in wild lagomorphs for APHIS’s World Organization for Animal Health (OIE) reporting and risk assessments for domestic rabbits.

**Producer Representatives Panel**
Denise Heard, U.S. Egg and Poultry Association
Kathy Simmons, National Beef Cattlemen’s Association
Jamie Jonker, National Milk Producer’s Federation
Mark Schwartz, Schwartz Swine Farms

The panel discussed COVID19’s impacts on their industry and how it informed their transboundary animal disease preparedness. Major themes that emerged included a disconnect between meat product prices and on-farm livestock and poultry prices, challenges in difference in product demand and a lack of interchangeability by retail and food service industries, need for greater flexibility in slaughterhouses and processing facilities, a lack of slaughter capacity, animal welfare and farm economic issues associated with shutdowns, and how addressing issues required multiple components from industry, academia, and government. The challenges for the milk industry and concerns relate to its just-in-time product nature. For the swine industry, the call for a 72 hour stop movement does not seem realistic and threatens animal welfare, the poultry industry’s concerns relate to slaughterhouse capacity and flexibility, and the beef industry spoke of breakdowns in supplies and a need to evaluate biosecurity. Other topics discussed include occupational health for slaughterhouse workers, misinformation around livestock coronaviruses and COVID19, and needed flexibility in supply chains as well as enhanced capacity.

**COVID19 Challenges the U.S. Dairy Industry, Meanwhile FMD Remains an Ever-Present Threat**
Jamie Jonker, National Milk Producers Federation (NMPF)

Coronavirus has been devastating to all of agriculture and the U.S. economy, and it’s brought particular damage to dairy. The collapse of food-service business overwhelmed the increased support dairy farmers received from consumers in grocery stores, creating a financial crisis for many dairies. The federal government has forcefully responded to dairy’s coronavirus crisis, offering payments to producers and purchases of dairy products, along
with replenished loan programs that will assist dairy businesses. Still, more work will be needed to help offset the economic damage of this pandemic. Continued relief for dairy farmers is critical for their businesses to get back on the road to recovery.

The National Milk Producers Federation (NMPF) has responded to the COVID-19 challenges with tools for dairy producers and processors – and a position of leadership across the entire food sector via its involvement in a private-sector collaboration with federal authorities. NMPF Senior Vice President of Regulatory Affairs and Staff Counsel, Clay Detlefsen, is the private-sector chair of the Food and Agricultural Sector Coordinating Council, developed after the September 11, 2001 terror attacks to maintain secure, functioning, resilient critical infrastructure in the United States. In that role Detlefsen has been working across agriculture to address supply-chain issues throughout the country, including initial runs on grocery items including milk in stores.

In his role with the council Detlefsen has been invaluable to supply chain coordination with the government, including the Department of Homeland Security’s recognition on March 19 of farm workers, food manufacturers, firms supporting food, feed and beverage distribution, animal agriculture workers, and others, as critical infrastructure employees. The reaffirmation of agriculture’s crucial economic role allows it to operate as normal while other sectors may be forced to suspend work. Complementing these efforts, NMPF developed an Essential Food and Agricultural Employee Work Permit Template to be used by food and agriculture employees to be granted permission to travel to and from work.

After concerns arose about potential plant closings should workers test positive for COVID-9, food industry professionals developed a document describing what should be done when an employee or customer tests positive for COVID-19. The Food and Drug Administration (FDA) and Centers for Disease Control and Prevention (CDC) reviewed the document before FDA linked it on their websites. The recommendations are focused on how to keep employees safe without having to shut down an entire plant given FDA has repeatedly stated that food safety is not a concern when it comes to COVID-19 transmission. Finally, NMPF has been in a leadership role with government and industry stakeholders looking for solutions to shortages of cleaners and disinfectants, hand sanitizers and personal protective equipment.

COVID-19 has also impacted the U.S. dairy industry’s on-farm social responsibility program, the National Dairy FARM Program: Farmers Assuring Responsible Management™. In order to comply with state and local health requirements, administrative adjustments for timing of on-farm animal care evaluations and program revision have been extended by one year. Most in-person activities have moved to a virtual format including second-party evaluator training. The Farmers Assuring Responsible Management (FARM) Program has also piloted virtual animal care evaluations and third-party
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audits. Several on-farm COVID19 resources have been developed for dairy farmers including:

- Dairy Farmer Handbook on Coronavirus Prevention and Management (English and Spanish)
- Recommended Protocols for Dairy Farms When an Employee Tests Positive for COVID-19
- Temporary Guidance for Veterinarians and Producers: Teledermicine and the Veterinarian-Client-Patient Relationship (VCPR)
- Maintaining Cattle Biosecurity in the Midst of COVID-19
- Summary of Information on Milk Reduction and Disposal

Foot and Mouth Disease (FMD) Preparedness

FMD remains the primary foreign animal disease concern for the U.S. dairy industry. In March 2014, the National Milk Producers Federation (NMPF) Animal Health and Wellbeing Committee Chair Karen Jordan, appointed an FMD Preparedness Task Force to assess the state of and future needs for FMD preparedness for the U.S. dairy industry. The Task Force conducted a series of webinars to inform the Animal Health and Wellbeing Committee about the state of FMD preparedness at that time. In November 2014, the National Milk Producers Federation Board of Directors formally endorsed five priorities for FMD preparedness on 1) vaccine use in a U.S. outbreak; 2) vaccine research and antigen bank capabilities; 3) laboratory and field diagnostics; 4) Secure Milk Supply; and 5) on-farm biosecurity and FMD educational.

In the intervening six years, much progress has been made on these priorities for the U.S. dairy industry through the collaborative efforts with other livestock groups, veterinary associations, the animal pharmaceutical industry, State and Federal animal health authorities, and Congress:

1. Vaccine use in a U.S. outbreak – The USDA Foot and Mouth Disease Response Plan (the Red Book) outlines potential vaccine use based on outbreak scope, including potential of vaccinate-to-live scenarios.
2. Vaccine research and antigen bank capabilities – The 2018 Farm Bill included dedicated funding to expand foreign animal disease vaccine bank. In July 2020, USDA announced an initial purchase of FMD antigen.
3. Laboratory and field diagnostics – The 2018 Farm Bill included additional funding to support the National Animal Health Laboratory Network (NAHLN). USDA administers these funds annually through a cooperative agreement process.
4. Secure Milk Supply – Development and implementation of the Secure Milk Supply (SMS) Plan for Continuity of Business continues with additional materials and an increase in State and regional projects.
5. On-farm biosecurity and FMD educational – Along with on-farm SMS Plan materials, The National Dairy FARM Program resource library for dairy farmers now includes a biosecurity plan template, biosecurity signage, and FMD posters.
Committee Business:

The Committee considered three resolutions that were brought to the Committee and Vice Chair. The resolutions were discussed, and some amendments were made to two of the resolutions. The resolution concerning blue tongue virus serotyping was passed by 50 votes and 0 against. The resolution concerning imported feed stuffs was passed by 28 votes and 0 against. The third resolution related to sustainable diagnostics was withdrawn and will be revised and brought forth at a later date. The meeting adjourned at 4:30 p.m. CDT.
Keith Sumption provided an update and global prospective of the threats of major transboundary animal disease including foot-and-mouth disease (FMD), African swine fever (ASF), African horse sickness (AHS), lumpy skin disease, high path avian influenza (HPAI), and peste des petits ruminants (PPR). The FMD discussion covered risk assessment tools, vaccine selection methods, the Progressive Control Pathway, and an update on the disease distributions. As for ASF, the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) objectives were reviewed which deal with control, cooperation, and business continuity. The PPR eradication was also discussed. The impact of COVID19 on livestock, agriculture and food security was also discussed. Global food insecurity has increased, field investigations are delayed and there are changes in access to grazing. This has prompted the Food and Agricultural Organization (FAO) towards its goals to prevent the next zoonotic pandemic, to better detect risks before they emerge and to bring other collaborators from outside the livestock arena to help address these problems.
Bobby Acord, NC; Gary Anderson, KS; Marianne Ash, IN; Rich Baca, CO; Bill Barton, ID; David Baum, IA; Mohit Baxi, ON; Carolynn Bissett, VA; Richard Breitmeyer, CA; Paul Brennan, IN; Becky Brewer-Walker, AR; Susan Bright-Ponte, MD; Charlie Broadus, VA; Charles Brown, WI; Julie Calvert, ON; Michael Carter, MD; Robert Cobb, GA; Karen Conyngham, TX; Maria Cooper, IN; Michael Costin, IL; Stephen Crawford, NH; Evelyn Crish, NJ; Angela Daniels, TX; Michael David, MD; Brad DeGroot, WY; Ignacio dela Cruz, MP; Barbara Determan, IA; Bud Dinges, TX; Brandon Doss, AR; Stéphie-Anne Dulièpre, NY; Tracy DuVernoy, MD; Anita Edmondson, CA; Cody Egner, AZ; Dee Ellis, TX; James England, ID; William Fales, IA; Peter Fernandez, NY; Kathy Finnerty, NY; John Fischer, GA; Allison Flinn, MD; Katie Flynn, KY; Tony Forshey, OH; Robert Fourdraine, WI; Tony Frazier, AL; Tam Garland, TX; Cyril Gay, MD; Robert Gerlach, AK; Linda Glaser, MN; Gail Golab, IL; Chelsea Good, KS; Tony Good, OH; Alicia Gorczyca-Southerland, OK; Scarlette Zirkle Gotwals, PA; Kristin Haas, VT; Keith Haffer, SD; Rod Hall, OK; Steven Halstead, MI; Nephi Harvey, UT; Charles Hatcher, TN; Karyn Havas, MN; Bill Hawks, DC; Burke L. Healey, CO; Carl Heckendorf, CO; Julie Helm, SC; Amy Hendrickson, CO; Bob Hillman, ID; Robert Hilsenroth, FL; Siddra Hines, WA; Donald Hoenig, ME; Joseph Huff, CO; Dennis Hughes, NE; Annette Jones, CA; Rebecca Jones, CO; Jamie Jonker, VA; Brian Joseph, WA; Anne Justice-Allen, AZ; Susan Keller, ND; Bradley Keough, KY; Naree Ketsusing, VA; Diane Kitchen, FL; Todd Landt, IA; T.R. Lansford, TX; Elizabeth Lautner, IA; Brad LeaMaster, OR; Scott Leibssle, ID; Randall Levings, IA; Mary Jane Lis, CT; Jim Logan, WY; Linda Logan, TX; Gene Lollis, FL; Travis Lowe, MN; Margie Lyness, GA; Kevin Maher, IA; Bret Marsh, IN; David Marshall, NC; Michael Martin, SC; Beatriz Martinez Lopez, CA; Jay Mattison, WI; Brittany McCauslin, Otago; Thomas McKenna, MD; Shirley McKenzie, NC; Tiffany McQueen, TX; Sara McReynolds, KS; Miranda Medrano, MN; David Meeker, VA; Antone Mickelson, WA; Cheryl Miller, IN; Gay Miller, IL; Mendel Miller, SD; Eric Mohlman, NE; Peter Mundschenk, AZ; Michael Neault, NC; Cheryl Nelson, KY; Susan Noh, WA; Dustin Oedekoven, SD; Greg Onstott, MO; Elizabeth Parker, TX; Steve Parker, GA; Boyd Parr, SC; Allison Phibbs, DC; William Pittenger, MO; John Ragan, VA; Valerie Ragan, VA; Jeanne Rankin, MT; Tim Richards, HI; Justin Roach, OK; Keith Roehr, CO; Susan Rollo, TX; Ron DeHaven, CA; James Roth, IA; Joan Dean Rowe, CA; Mo Salman, CO; Larry Samples, PA; John Sanders, WV; Shawn Schafer, OH; David Schmitt, IA; Stacey Schwabenlander, MN; Andy Schwartz, TX; Aaron Scott, CO; Charly Seale, TX; Laurie Seale, WI; Shelley Mehlenbacher, VT; Richard Sibbel, IA; Rosemary Sifford, NC; Kathryn Simmons, DC; Julie Sinclair, GA; Allison Siu, AL; David Smith, NY; Julie Smith, VT; Justin Smith, KS; Diane Stacy, LA; Susan Stehman, PA; Robert Stout, KY; Steve Strubberg, MO; Diane Sutton, MD; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Jane Teichner, FL; Beth Thompson, MN; Peter Timoney, KY; Tracy Tomascik, TX; Alberto Torres, AR; Alex Turner, CO; Kathleen Turner, FL; Charles Vail, CO; Bruce Wagner, CO;
The Committee met on October 8, 2020, virtually, from 12:00 p.m. to 2:00 p.m. Eastern Standard Time (EST). There were 218 participants at one point during the meeting. Dr. Salman initiated the meeting by introducing the agenda and then presented the theme of the panel discussion for this year COVID19 and its impact on trade of livestock commodities with a list of four questions that were shared with the invited panelists as presented below:

1. What are the economic and societal positive and negative impacts associated with COVID-19 in global trade of livestock commodities?
2. What is the supportive evidence to demonstrate the above positive and negative impacts (these can be direct or indirect) impacts?
3. Are we expecting changes in the normal operation of global trade of livestock commodities due to the COVID-19 and if so what type of modifications are expected? Both temporary and sustained changes.
4. Are we expecting modifications to the livestock operational systems in the USA due to the COVID-19 and its impact on the trade? If so, what are these modifications?

The speakers based their presentations on these questions in a 15-minute presentation with additional time for committee members to ask questions of the panelists either through the chatting option or verbally at the end of the presentation:

Erin Borror - Economist, U.S. Meat Export Federation
Dr. Josh Maples - Assistant Professor and Extension Economist, Department of Agricultural Economics, Mississippi State University
Ms. Callie McAdams - Senior Economist - Office of Chief Economist - USDA
Dr. Silvia Kreindel – USDA, APHIS, International Services (IS) - China Office

Dr. Elizabeth Parker introduced the four panelists with their bios with the following statements:

Erin Borror, U.S. Meat Export Federation (USMEF)

Erin joined USMEF in July 2006 after receiving her M.S. in Agricultural Economics at Texas A&M University. She received her B.S. in Agribusiness at California Polytechnic State University. As an economist, Erin is responsible for USMEF’s red meat export forecasts, trade policy related analysis, global market analysis for U.S. exporters, and U.S. market analysis for international customers. In 2014, Erin also became Chairman of the Economics Committee for the International Meat Secretariat.
Raised on a cow/calf operation in Colorado, Erin has a background in production agriculture and a passion for the red meat industry. Working remotely for USMEF, she and her husband, Bryce Borror, along with their boys Clayton and Nolan, raise purebred and commercial cattle at Tehama Angus Ranch in northern California.

Josh Maples, Mississippi State University

Dr. Maples’ primary extension and research area is livestock market analysis. He is a regular speaker on livestock markets to groups across the Southeast and on RFD-TV. He writes a weekly regional cattle marketing newsletter, and his work is often featured in national cattle media outlets. In the classroom, he teaches the undergraduate Agricultural Policy course at MSU which helps students understand the policy process and the impacts on agriculture. He was raised on a beef cattle farm in Elkmont, Alabama.

Callie McAdams, USDA

Callie McAdams works for USDA where she focuses on domestic policy, including livestock and nutrition policy. Prior to her current position, she was Deputy Chief Economist at the House Committee on Agriculture, where she handled agricultural economics, budget, and trade, as well as working on a range of agricultural, nutrition, and conservation policy issues. She was also previously a senior consultant at Informa Economics, focusing on strategic analysis for farm organizations and businesses on agriculture, transportation, and energy topics. Ms. McAdams received her Bachelor of Science in Animal Science and Agricultural Business Management from North Carolina State University and her Master of Science in Agricultural Economics from Texas A&M University.

Silvia Kreindel, USDA-APHIS

In this capacity, Dr. Kreindel manages one of the most important APHIS portfolios on agricultural and livestock market issues. Prior to China, Silvia was USDA’s expert on loan to Food and Agriculture Organization of the United Nations (FAO)’s Animal Health Division where she worked on risk analysis and epidemiology. In that capacity, she provided epidemiological analysis on suspect and confirmed outbreaks of transboundary animal diseases (TADs) and other high-impact diseases and their impact on food security and food safety. Dr. Kreindel has worked extensively throughout Latin America, different countries in Africa, Asia, and the Middle East. Prior to being detailed to FAO Rome, Silvia worked as a Senior Veterinarian for APHIS, Veterinary Services (VS), Regionalization and Evaluation Services (RESI), analyzing animal disease status of exporting regions/countries to determine the risk of introducing livestock diseases into the United States. In this role, she led many of the foot and mouth disease (FMD), bovine spongiform encephalopathy (BSE), poultry, and swine diseases evaluations conducted by APHIS. She received her Doctorate in Veterinary Medicine
from the University of Buenos Aires, Argentina and her Master of Public Health in epidemiology from the University of Massachusetts.

The presentations of the four panelists were shared with attendees of the committee. Statistics, trends, and predictions were presented during the responses by the panelists. Few questions were raised during the Q&A session with the ability for the panelists to respond.

Committee Business:
There were no resolutions offered. There were some brief comments in the chat and discussion requesting for the committee to include aquaculture and trade issues in the future.
Due to time constraints, in lieu of a presentation, USDA-APHIS provided a written summary report of the annual 88th OIE General Session meeting and was provided to all committee members.
The Committee met on October 13, 2020, virtually, starting at 2:32 p.m. EDT. There was a total of 159 attendees. Dr. Akey welcomed the attendees and introduced the agenda for the meeting.

Presentations and Reports

National Animal Health Laboratory Network (NAHLN) FY2021 Appropriations Update
Brad Mollet, Capitol Counsel

Mollett described the challenges with obtaining annual funding to support the NAHLN. Funding generally comes from two sources within the USDA budget: the National Institute of Food and Agriculture’s Food and Agriculture Defense Initiative and the Animal and Plant Health Inspection Service’s Veterinary Services Diagnostics line. Funding continues to fall short of the estimated $30 million annual budget needed to fully fund the NAHLN infrastructure. He noted that additional funding was included in the 2018 Farm Bill, but USDA has chosen to target competitive grants rather than focus on NAHLN operational support. Mollett continues to monitor potential
funding opportunities associated with COVID legislation, but nothing appears likely in the short-term.

**National Animal Health Laboratory Network (NAHLN) Laboratory Update**

Christina Loiacono, Beth Harris, John Bare, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary Services Laboratories (NVSL)

Members of the USDA NAHLN Program Office provided an update on the following issues:

1. **NAHLN laboratory update – Christina Loiacano**
   a. Currently 60 NAHLN laboratories nationally
      i. 25 Level 1 laboratories
      ii. 27 Level 2 laboratories
      iii. 6 Level 3 laboratories
      iv. 1 affiliate laboratory (federal laboratory in Wisconsin)
   b. USDA has nine staff members in the NAHLN Program Office with one open position which will be filled soon.
   c. 55 laboratories are now able to electronically message results
      i. All Level 1 laboratories can message results for their approved testing
      ii. All Level 2 laboratories will be able to message results for their approved testing by January 1, 2021
      iii. 47 laboratories are approved for African swine fever (ASF)/Classical swine fever (CSF) testing (44 can message results)
      iv. 45 laboratories can test for foot-and-mouth disease (FMD) [43 can message results]
      v. Challenges remain with decreasing the message error rate. Currently, 63% of the messages are error-free. To address this challenge, the Coordinating Council is recommending streamlining the data required in NAHLN messaging.
   d. **ASF response update**
      i. Approved samples now include: whole blood, spleen, tonsil, and lymph nodes
      ii. Approval has been granted to allow pooling of up to five samples
      iii. Current capacity = 40,000 polymerase chain reaction (PCR)/day. Pooling increases capacity to 200,000 samples/day.
      iv. The response plan is to activate regional laboratories initially with the remaining approved NAHLN laboratories on standby.
      v. The NAHLN has approved commercial kits for incorporation into the testing regime as needed.
vi. A strategy is being developed to implement oral fluids testing for positive detection.

vii. Exploring the use of blood and spleen swabs for sample submission.

viii. Emergency validation and evaluation process is available to quickly assess unapproved sample types for suitability during an outbreak.

e. COVID-19 impact
   i. 36 NAHLN laboratories participate in COVID testing
      a. 14 laboratories on animal samples only
      b. 17 laboratories on animal and human samples
      c. 5 laboratories on human samples only
   ii. To date, the NAHLN laboratories have tested at least 611,000 samples
   iii. COVID testing has reduced NAHLN animal capacity by ~10%. The committee was given assurance that those laboratories participating in COVID testing recognized their responsibilities to animal health diagnostics.
   iv. Participating laboratories have benefited from COVID testing by gaining access to additional equipment and increased experience with high throughput testing.

f. Private laboratories participation in the NAHLN as a specialty designation
   i. Considering developing an emergency approval process to utilize private laboratory capacity during an outbreak if the laboratories can meet the criteria set forward by NAHLN.

g. 2018 Farm Bill – Mandatory NAHLN Funding Projects
   i. In 2019, 26 projects were funded for a total of $5 million covering the topic areas of test development, emergency preparation, and electronic messaging.
   ii. In 2020, 59 proposals have been submitted for consideration covering the same issues as in 2019 with the addition of exercises and drills.

h. Coordinating Council activities
   i. Met virtually on August 24-26
   ii. Recommendations
      a. Adherence to NAHLN quality standards included in the annual laboratory assessment
      b. Recognition of COVID-related challenges will be given when evaluating the performance matrix
      c. Offered recognition of AAVLD efforts to address Farm Bill funding distribution
      d. Develop a focus group to evaluate point of care testing applications
      e. Streamlining data requirements for NAHLN messaging
   i. PRV PCR evaluations
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i. PRV PCR is not currently included within the NAHLN scope of work
ii. The Methods Technical Working Group has evaluated three protocols to include in testing. The results of the evaluation is due by the end of October 2020.
iii. Veterinary Services will then discuss the options regarding PRV in the NAHLN laboratories.

j. Methods Technical Working Group – Beth Harris
   i. Revised technical documents for:
      a. FMD/SVA multiplex PCR
      b. ASF/CSF multiplex PCR
      c. ASF sample pooling guidelines
   ii. Completed emergency validation process for bulk milk for FMD testing and oral fluids for ASF testing
   iii. Completed side by side thermocycler platform analysis to evaluate additional vendors
   iv. Developed process for sharing deviations between NAHLN laboratories
   v. Developed a process for NAHLN laboratories to suggest updates or changes to NAHLN SOPs

k. Antimicrobial Resistance pilot project update – Beth Harris
   i. 3 years old
   ii. 27 laboratories in 24 states participate
   iii. Paid out $480,000 since inception to participating laboratories

l. Exercises and Drills Working Group update – John Bare
   i. Have sponsored numerous webinars in 2020
   ii. Conducted ASF oral fluids exercise in May 2020 – provided oral fluid aliquots to four laboratories for comparison
   iii. Conducted an emergency validation exercise in September 2020 involving ASF oral fluids in 13 laboratories, vND in 13 laboratories, and FMD bulk tank milk samples in 7 laboratories.

National Bio and Agro-Defense Facility (NBAF) update
Kim Dodd, USDA-APHIS
- USDA will assume operations following the construction completion by DHS next year
- NBAF will employ ~ 400 members by 2023. Approximately one-half have already been hired.

Committee Business:
The committee voted to continue periodic calls. Committee leadership will consider a plan to address the frequency of these calls and implement regularly scheduled calls.

There were no resolutions presented for consideration.
Kim Abramo moved, and Lanny Pace seconded a motion to adjourn at 4:27pm EDT.
COMMITTEE ON NOMINATIONS AND RESOLUTIONS  
Chair: Kristin Haas, VT

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RESOLUTIONS

RESOLUTION NUMBER: 1 Combined with 10 and 18  APPROVED
SOURCE: COMMITTEE ON ANIMAL EMERGENCY MANAGEMENT; COMMITTEE ON SWINE; COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: NATIONAL VETERINARY STOCKPILE RESOURCES FOR MASS DEPOPULATION OF ANIMALS

BACKGROUND INFORMATION:
Management of mass animal depopulation is a significant challenge for animal agriculture. Recent events, such as highly pathogenic avian influenza outbreaks and the processing disruption due to the COVID-19 pandemic,
have highlighted gaps in resources available to deal with such events. Many different organizations, agencies, producers, veterinarians, and related animal industries have participated in exercises that highlight the challenges of mass depopulation of animals. Whether depopulation is for an animal health crisis, a natural disaster, or even a non-animal health related threat, as in the instance of COVID-19, methods and resources for acceptable and timely depopulation are scarce.

During the months since the identification of SARS-CoV-2 in the United States, a large-scale effort has been undertaken by state animal health officials, state pork associations, veterinarians, and producer organizations to identify areas of greatest need and to perform needed research in those areas. The outcomes of such research will provide further guidance regarding depopulation yet in 2020. Additional research focus in the area of depopulation and disposal is provided by funding from the United States Department of Agriculture, National Animal Disease Preparedness and Response Program for 2020; results and outcomes for projects initiated this year, however, will not be available until 2021 or later.

The United States Department of Agriculture National Veterinary Stockpile is designed to provide federal resources in the event of a national animal health crisis. Much of the resources available are relevant for management of poultry depopulation but do not adequately cover other farmed animal outbreak events. Resources that are available for use include personal protective equipment, limited animal handling equipment (gating, chutes etc.), and captive bolt guns. The amount and type of equipment needed to conduct depopulation of swine and other farmed animal species, however, is very limited in comparison to the greater need in the event of an outbreak or other disaster.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services to utilize the results of current and future research to critically review, increase, and update the available resources within the USDA National Veterinary Stockpile to support rapid response to mass depopulation crises involving swine and other farmed animal species. In addition, information gained from such studies should be incorporated into the USDA Foreign Animal Disease Preparedness and Response Plan (FAD PReP)/National Animal Health Emergency Management System (NAHEMS) guidance and Standard Operating Procedures.

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RESOLUTION NUMBER: 2 Combined with 5 and 15 APPROVED
SOURCE: COMMITTEE ON FOREIGN AND EMERGING ANIMAL DISEASES; COMMITTEE ON FARMED CERVIDAE; COMMITTEE ON PARASITIC AND VECTOR-BORNE DISEASES
SUBJECT MATTER: RE-EVALUATION OF ENDEMIC BLUETONGUE VIRUS SEROTYPES IN THE UNITED STATES

BACKGROUND INFORMATION:
There is significant interest in reconsideration of the exotic/endemic classifications of selected serotypes of bluetongue virus (BTV). This interest is shared by the United States Department of Agriculture (USDA), Agricultural Research Service (ARS), the livestock industry, farmed cervids industry, wildlife interests (cervids), and numerous research and diagnostic laboratories. The interest in this topic is based on the following observations:

- The BTV global range has been expanding since the 1990s.
- Bluetongue transmission continues to evolve due to climate change and animal management procedures.
- The United States (US) BTV endemic serotype list (2, 10, 11, 13, 17) has not been updated since the 1980s. Since 1999, 12 additional serotypes (BTV-1, 3-6, 9, 12, 14, 18, 19, 22, 24) have been introduced into the Southeastern US.
- Some of these viruses not currently on the endemic serotype list have spread beyond the Southeast and have been repeatedly confirmed in multiple states in the past 10 years (e.g., BTV-1, 3, 12, 18).
- BTV positive status for import/export considerations is not specific to serotype. An animal is positive or negative based on a commercial competitive enzyme linked immunosorbent assay intended to detect all serotypes.
- An increased number of serotypes acknowledged as endemic in the US, to reflect that actual prevalence data, will not change/impact trade restrictions.
- Continuing to classify newly endemic serotypes as ‘exotic’ does, however, require these circulating viruses to be considered as biosafety level three (BSL-3) agents. This higher level of biocontainment severely restricts research on pathogenesis, host range, vector competence, diagnostics, and vaccines for these additional US serotypes. This reclassification would enable research to develop better diagnostics for routine diagnostic and surveillance testing.

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) to utilize seroprevalence, molecular, and virological data from National Animal Health Laboratory Network laboratories, the Southeastern Cooperative Wildlife Disease Study and other relevant research and diagnostic laboratories to develop criteria for classifying bluetongue virus (BTV) serotypes as endemic versus exotic and then to apply those criteria to the current United States list of classified bluetongue serotypes. These criteria should be
REPORT OF THE COMMITTEE

reviewed by USDA-APHIS at a minimum of every five years to keep the United States endemic BTV serotype list current and relevant.

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RESOLUTION NUMBER: 3 Combined with 12 APPROVED
SOURCE: COMMITTEE ON FOREIGN AND EMERGING DISEASES;
COMMITTEE ON SWINE
SUBJECT MATTER: FEED IMPORT RESTRICTIONS TO PROTECT
AGAINST AFRICAN SWINE FEVER IMPORTATION IN FEED
BACKGROUND INFORMATION:

Numerous studies have emerged providing strong evidence that many viruses, including the African swine fever (ASF) virus, can survive and be transmissible from feed. There are also anecdotal reports that feed from foreign sources, particularly Asia, is produced in a manner that makes it susceptible to contamination. Not all United States (U.S.) feed mills pellet the feed they receive, nor are they equipped to do so.

The U.S. swine industry has now taken numerous steps to mitigate a viral threat from imported feed since the imported products have not been stopped by regulatory officials. Feed is often held for an extended period of time prior to use, and viral mitigants, to be used in feed, are being evaluated. A task force in collaboration with the US Food and Drug Administration, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services and Plant Protection and Quarantine was also convened but has not come to a consensus on how to protect the swine industry from viral threats associated with the import of feed ingredients. In February 2020, thirty states and the National Pork Producers Council sent a letter to USDA Secretary Perdue asking that organic soy imports be restricted from countries that are ASF positive. As of September 2020, there has been no response. Further, Canada has led with their initiative to protect swine farmers by using a national responsible imports program to mitigate the risk of contaminated feed ingredients imported from ASF positive countries. Such a program would be beneficial to US swine producers as well.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services, in collaboration with the USDA Trade and Foreign Agricultural Service and other pertinent government agencies such as the United States Food and Drug Administration and USDA-APHIS, Plant Protection and Quarantine, to restrict the import of feed and/or feed ingredients from countries that are positive for African swine fever and to create enforceable standards for those countries to reduce the contamination threat during harvest and processing of the feed and feed ingredients.
RESOLUTION NUMBER: 4 APPROVED
SOURCE: COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
SUBJECT MATTER: REAFFIRMATION OF COMMITMENT OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, CENTER FOR VETERINARY BIOLOGICS TO CONTINUE RISK-BASED POLICY DEVELOPMENT

BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Center for Veterinary Biologics (CVB) is tasked with regulating the production, labeling, distribution, and usage of a large multitude of veterinary biologicals used to protect animal and human health. USDA-APHIS-CVB’s guiding principles must balance effective regulation of the industry to ensure products are pure, potent, safe, and efficacious, with making certain the regulations are accomplished using risk-based decision making to ensure availability of critical and needed products.

Newly proposed regulations and guidance documents from USDA-APHIS-CVB appear to be based on a hazard-based or “precautionary principle” approach rather than the stated “risk-based” approach, which has been the traditional position of the USDA. This can adversely affect the availability and cost of products which could, in turn, have severe effects on the health of animals and humans. The apparent lack of a risk-based approach is resulting in a potential situation of lack of production materials and, therefore, lack of vaccine availability.

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture, Animal and Plant Health Inspection Service, Center for Veterinary Biologics to reaffirm their commitment to risk-based policy development and continue dialogue with industry throughout the policy development process.

RESOLUTION NUMBER: 6 APPROVED
SOURCE: COMMITTEE ON WILDLIFE
SUBJECT MATTER: FOOD AND DRUG ADMINISTRATION DRAFT GUIDANCE FOR INDUSTRY #256

BACKGROUND INFORMATION:
The United States Food and Drug Administration (FDA) recently provided Draft Guidance for Industry #256, “Compounding Animal Drugs from Bulk Drug Substances”. In this document, FDA describes situations in which action would not be taken for violations of the Food, Drug, and Cosmetic Act (FDCA), specifically as it relates to the compounding of animal drugs from bulk drug
substances. Under the Animal Medicinal Drug Use Clarification Act (AMDUCA), compounding of animal drugs, including for food animals, from approved human or animal drugs is explicitly permitted. Until this guidance document was released, it was understood that compounding drugs from bulk substances or active pharmaceutical ingredients was also permitted when no other approved drug formulation was available or effective.

According to this guidance document, the FDA will not seek enforcement action for compounding of drugs from bulk drug substances when they are prescribed for a specific patient or group of patients of non-food animal species, when they are maintained as office stock for use in non-food animal species to treat urgent conditions and to manage pain and suffering, or when they will be used as antidotes in food animal species. The guidance document also requires that any compound that will be used as office stock or as an antidote in food animals be provided to the FDA with supporting documentation for approval. It is not feasible for the wildlife veterinary community to provide the required information for the growing number of essential active pharmaceutical ingredients for each of the species in which they will be used.

At the same time, the FDA recognizes that there are situations in which an approved human or animal drug is not available to properly treat a patient’s condition. Wildlife veterinarians are concerned that many of the species treated are considered food animals and that the drugs compounded from bulk drug substances used in these species are essential to address public safety, as well as animal safety, health, and welfare. Furthermore, these drugs are most often compounded by regulated compounding pharmacies using certified ingredients and good manufacturing practices. If these drugs are not available, wildlife management activities, human and animal safety, animal health, and wildlife resources will be negatively affected.

RESOLUTION:

The United States Animal Health Association urges the United States Food and Drug Administration (FDA) to add the use of medications compounded from bulk drug substances by licensed compounding pharmacies for free-ranging and rehabilitated wildlife to the situations or conditions under which the FDA would not pursue enforcement action against the compounding pharmacy or prescribing veterinarian.

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RESOLUTION NUMBER: 7 APPROVED
SOURCE: USAHA/AAVLD COMMITTEE ON AQUACULTURE
SUBJECT MATTER: COMPREHENSIVE AQUACULTURE HEALTH PROGRAM STANDARDS
BACKGROUND INFORMATION:

The Comprehensive Aquaculture Health Program Standards (CAHPS) were initiated by the National Aquaculture Association and developed with the United States Department of Agriculture (USDA) in 2014. The standards
set forth a model framework for the health of farm raised aquatic animals. CAHPS recognized and built upon current activities and existing guidelines for health of aquatic animals by establishing uniform standards for United States farmed aquatic animal health and movement.

The United States Animal Health Association applauds the efforts of the USDA, Animal and Plant Health Inspection Service for working with the National Aquaculture Association to develop the CAHPS. The program must be implemented within a national framework to benefit all domestic aquaculture, especially with regard to national and international trade. The effectiveness and success of the program requires the cooperation of industry and state and federal entities.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to engage states to identify how the Comprehensive Aquaculture Health Program Standards (CAHPS) may be utilized in conjunction with existing aquaculture health inspections for animal movement. USAHA further urges USDA-APHIS-VS to engage states with well-established aquatic animal health policies, which could become a national model for the acceptance and integration of CAHPS to meet state regulatory requirements for aquatic animal health.

RESOLUTION NUMBER: 8 APPROVED

SOURCE: USAHA/AAVLD COMMITTEE ON AQUACULTURE

SUBJECT MATTER: UPDATE OF A NATIONAL PLAN FOR AQUACULTURE AND AQUATIC ANIMAL HEALTH

BACKGROUND INFORMATION:

The United States Animal Health Association applauds the efforts of the United States Department of Agriculture, Animal and Plant Health Inspection Service for working with a representative group from the National Aquaculture Association to develop a new national plan for aquaculture and aquatic animal health. A strong national plan that protects all aquatic animal health and provides a national framework for consistent inspection and testing of aquatic animals cultured in the United States will benefit all domestic aquaculture and protect natural resources. The effectiveness and success of the program requires the cooperation of industry and state, tribal and federal entities.

RESOLUTION:

The United States Animal Health Association (USAHA) supports the proposed update of the 2008 National Aquatic Animal Health Plan by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services. USAHA requests that
USDA-APHIS be the lead federal authority for aquatic animal health and implement a national plan that protects the health of United States aquaculture and natural resources.

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RESOLUTION NUMBER: 9 APPROVED  
SOURCE: USAHA/AAVLD COMMITTEE ON AQUACULTURE  
SUBJECT MATTER: NATIONAL LIST OF REPORTABLE ANIMAL DISEASES  

BACKGROUND INFORMATION:  
The United States Animal Health Association (USAHA) applauds the efforts of the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service for the proposed standards of the National List of Reportable Animal Diseases. Consistent and reliable reporting of listed and emerging pathogens is a critical component of national biosecurity, early detection, and rapid response. However, to be effective and equitable, all professionals conducting work in aquatic animal health must be held to the same standards; pertinent disease detections made in aquariums and research facilities must also be reported. While the risk from these environments may be lower by comparison, the impact of the detection is comparable. When a publication(s), scientific report(s), or lay information reveals any positive detection without prior notification to the USDA, trade and national health status may be negatively impacted. Further, we support that a detection(s) made in these settings must be confirmed by the USDA prior to publication.

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 implement the National List of Reportable Animal Diseases (NLRAD) and extend the reporting requirement to academic and corporate researchers and public and private aquariums who detect a NLRAD listed pathogen or an emerging pathogen that poses a serious threat to domestic aquaculture industry sectors or natural resources. All non-negative detections in research settings of a World Organization for Animal Health listed or emerging pathogen must be confirmed by USDA prior to publication. USAHA further encourages USDA, in collaboration with others, to develop a white paper for best professional practices of those working in the field of aquatic animal or aquaculture health.

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RESOLUTION NUMBER: 11 APPROVED  
SOURCE: COMMITTEE ON SWINE  
SUBJECT MATTER: RESOURCES FOR DISPOSAL OF ANIMAL CARCASSES DURING A MASS MORTALITY EVENT
BACKGROUND INFORMATION:
Recently, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services emergency managers made public a web-based resource, the Carcass Management Dashboard, which focuses on depopulation, disposal, and disinfection for animal agriculture. This resource has multiple levels of information to assist producers in planning, preparedness, and response in the event of a foreign animal disease outbreak, natural disaster or for other unexpected events such as the COVID-19 outbreak.

The resource is available at:

Producers face varying threats to their production, and to effectively respond to those threats, current and relevant information must be accessible. There are many different sources and sites for information regarding carcass disposal and management. The USDA Carcass Management Dashboard consolidates key information into one website, accessible to the public.

The information, including protocols for methods of carcass disposal, locations of landfills and carbon sourcing, and other equipment needs to support timely disposal efforts, is critical during a mass mortality event.

RESOLUTION:
The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services emergency managers to update the Carcass Management Dashboard in a timely manner to ensure the most accurate information is available to producers. The Dashboard should include updated information on carcass disposal methods from current and ongoing research specifically on carcass disposal to help ensure that all sectors of USDA are in agreement on approved methods for a mass mortality event and to provide these results in as near real-time as possible.

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RESOLUTION NUMBER: 13 APPROVED
SOURCE: COMMITTEE ON SWINE
SUBJECT MATTER: ASSESSMENT OF TRADE IMPLICATIONS FOR VIRAL FEED MITIGATION PRACTICES

BACKGROUND INFORMATION:
Numerous studies have emerged providing strong evidence that many viruses, including the African swine fever virus, can survive and be transmissible from feed. There are also anecdotal reports that feed from foreign sources, particularly Asia, is produced in a manner that makes it susceptible to contamination. Not all feed mills in the United States (US) pellet the feed they receive, nor are they equipped to do so.
REPORT OF THE COMMITTEE

The US swine industry has taken numerous steps to mitigate a viral threat from imported feed because the imported products have not been stopped by regulatory officials. The use of viral mitigants in feed is currently being investigated as well. These mitigants are not licensed for this purpose, and the impact of their use on the acceptability of pork products from swine that consumed mitigated feed needs to be considered.

RESOLUTION:

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Veterinary Services, Strategy and Policy unit, in collaboration with the United States Food and Drug Administration and the USDA Codex Office in the USDA Trade and Foreign Agricultural Service, to conduct a risk assessment(s) in accordance with Codex Alimentarius and World Organization for Animal Health (OIE) guidelines on the use of viral mitigants in feed and to determine the potential impact on swine and pork product trade capabilities when mitigants are used to prevent disease introduction.

RESOLUTION NUMBER: 14  APPROVED
SOURCE:  COMMITTEE ON SWINE
SUBJECT MATTER:  SUSTAINABLE DIAGNOSTIC SUPPLY CHAINS AND LESSONS LEARNED FROM THE COVID-19 PANDEMIC

BACKGROUND INFORMATION:

African swine fever has spread throughout Europe, Russia, and Asia since 2007 despite ongoing efforts by numerous countries to control the disease. Greater than 50% of the global swine population is at risk for this high morbidity/high mortality disease. The implications for food and economic security in the pork sector are severe. Fortunately, the Western hemisphere has yet to be impacted, but preparation for the emergence of the virus in this hemisphere should occur.

The COVID-19 pandemic has highlighted diagnostic and health system limitations. Lack of adequate testing capabilities and a shortage of sampling supplies interfered with the early response to the pandemic, but the United States Food and Drug Administration's ability to evaluate and approve novel diagnostics for emergency use allowed for rapid resolution of that deficit. A similar program for animal health may be needed for rapid evaluation of suspect premises to properly assess risk.

Diagnostic efforts to detect SARS-CoV-2 appear to demonstrate that mass testing can overcome lower sensitivity thresholds associated with some diagnostic tests and diagnostic samples. Surveillance that uses repeat testing of easily available samples may be more accurate than surveillance that limits itself to single individual tests that are difficult to obtain.

Outbreak readiness must include secondary options and logistic supply plans, particularly for sampling and diagnostic purposes. United States (US)
animal agriculture requires this to be a critical part of planning for catastrophic swine diseases as US commercial systems are highly integrated, have efficiency built on animal movement, and include millions of animals.

RESOLUTION:
The United States Animal Health Association urges the Strategy and Policy and Diagnostics and Biologics units of the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, to work through the National Animal Health Laboratory Network and its membership to support and advance the following efforts to ensure a sustainable supply of necessary diagnostics for use during an African swine fever outbreak:

- Review the lessons learned to date from the appropriate United States (US) public health entities (Centers for Disease Control, Food and Drug Administration, Clinical Laboratory Improvement Amendments (CLIA)-certified laboratories, public health groups) to identify issues of concern and apply novel approaches that would be beneficial for emergency preparedness in the animal agricultural arena.
- Develop a publicly available list of approved commercial diagnostic tools for use in control of an animal disease outbreak and provide guidance on how and when they should be used.
- Develop emergency use authorization guidelines to rapidly assess new diagnostic assays for World Organization for Animal Health (OIE) reportable transboundary animal diseases foreign to US herds and flocks.
- Evaluate the validity of realistic and sustainable surveillance scenarios using diagnostic assays on aggregate samples (oral fluids, processing fluids and other sample types) compared to individual animal sampling to ensure that on farm testing is implementable.

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RESOLUTION NUMBER: 16 APPROVED
SOURCE: COMMITTEE ON CATTLE AND BISON
SUBJECT MATTER: BACKUP IDENTIFICATION OF LIVESTOCK IN COMMERCES
BACKGROUND INFORMATION:
On March 11, 2013, the United States Department of Agriculture (USDA) Animal Disease Traceability (ADT) rule became effective. Unless specifically exempted, livestock moving interstate must be officially identified and accompanied by an interstate certificate of veterinary inspection or other approved documentation. Beef cattle less than 18 months of age and not for exhibition are exempted from official identification (ID) requirements. At this
time, States may issue USDA official National Uniform Eartagging System (NUES) tags or official 840 radio-frequency identification (RFID) tags to producers and veterinarians to identify livestock. The ADT rule prohibits the application of multiple official ID devices with few exceptions.

However, the use of multiple RFID tags of the same frequency in one animal can be problematic. Resources and technology are not currently available to use and read both low frequency and ultra high frequency tags within the management system typical of export facilities.

Despite the high retention rate of RFID tags, they are frequently lost during management of thousands of animals. Identifying the exact animal with a lost RFID in a small, closed herd may not be a problem. However, when dealing with large groups assembled from multiple herds, application of a second official ID would help ensure individual animal traceability.

Cattle and bison being exported undergo health testing, and the official ID is associated with the sample being tested at an approved laboratory. If an animal loses their single official ID between the time of health testing and final export inspection, it is impossible to demonstrate that the animal has undergone the required health testing. The loss of a single official ID tag can stop an entire shipment, because an unidentified animal with an unclear health status would jeopardize the status of the group.

This scenario was not envisioned with the proposed phasing out of NUES tags as official ID. The United States Animal Health Association supports RFID as the official ID for cattle and bison, but the use of a secondary official identification device is vital in cattle and bison in export channels. The use of a second official ID in cattle and bison exports will help maintain individual animal traceability and prevent stopped shipments.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA) and state animal health officials (SAHOs) to work with livestock exporters and producers to identify a secondary official identification option for animals being exported to account for the risk of losing the primary official identification. USAHA has supported use of the USDA approved RFID tag as the primary method of official ID with resolutions 34 and 35 in 2019. For cattle exporters, low frequency RFID tags have long been the international standard for cattle ID. The transition to RFID tags as the primary official ID tag is long overdue and an important step in protecting the health of our animals and the strength of our industry.

USAHA requests that, by the end of the first quarter of calendar year 2021, the USDA initiate this collaboration with SAHOs, livestock exporters, and producers who export to help identify a secondary official identification solution so that it is available prior to and in the event of National Uniform Eartagging System tags being phased out for all purposes.

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RESOLUTION NUMBER: 17 APPROVED  
SOURCE: COMMITTEE ON ONE HEALTH  
SUBJECT MATTER: INCREASED FISCAL YEAR 2022 FUNDING FOR THE UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, WILDLIFE SERVICES NATIONAL RABIES MANAGEMENT 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 that strategic implementation of cooperative oral rabies vaccination (ORV) programs targeting wildlife is cost-effective in reducing rabies transmission to protect human and animal health and reduces the cost of living with rabies. The World Organization for Animal Health (OIE) determined that the most effective strategy to control terrestrial rabies targets the sources of infection (i.e., wildlife vector populations) with landscape scale control efforts. ORV programs are designed to immunize target wildlife species to increase the percentage of rabies-immune animals within vaccination zones, resulting in the reduction of rabies cases, prevention of viral spread (Phase 1 goal of the NRMP), and eventual raccoon rabies variant elimination (Phase 2 goal of the NRMP).

A comprehensive raccoon rabies management strategy has been cooperatively developed with federal, state, provincial and local partners for the elimination of the raccoon rabies variant in the United States (US) and Canada. In 2020, the NRMP and cooperators distributed more than 9 million ORV baits, including more than 8.2 million in the eastern United States to combat raccoon rabies in 17 states and more than 1 million in Texas to prevent the reemergence of canine rabies in coyotes and grey foxes along the border with Mexico. The total area baited in 2020 exceeded 62,000 square miles. In 2019, 20 miles of the ORV zone, equating to 2,324 square miles, was removed along the border with Canada in northern New York, Vermont and New Hampshire. In 2020, an additional 20 miles of the ORV zone, equating to 496 square miles, was removed along the border with Canada and northern New York. Additionally, 4,012 square miles of ORV zone was removed from Ohio, West Virginia, Virginia and Kentucky because raccoon rabies was eliminated from those areas. As a result, baits were shifted into raccoon rabies enzootic areas of Maine, New York and Alabama and reclassified as 1,322 square miles of new area under management. To date, there have been no new NRMP initiated contingency actions in 2020.

A minimum annual appropriation of $33 million will allow USDA to accomplish the following:  
- Continue the enhanced rabies surveillance program, allowing USDA, APHIS, WS biologists to continue conducting between 5,000-7,000 field rabies test each year – 8% of all rabies testing in the US.  
- Implement contingency actions in response to rabid animals in sensitive areas.
REPORT OF THE COMMITTEE

- Continue Phase 1 of the NRMP, to maintain existing ORV programs to control rabies and prevent spread in wildlife populations.
- Continue the evaluation of novel and US-licensed rabies vaccines and baits.
- Continue studies related to rabies control in skunks, mongoose, and vampire bats
- Initiate and enhance the operations of Phase 2 of the NRMP to eliminate the raccoon rabies variant in the US.

RESOLUTION:

The United States Animal Health Association requests the 117th United States Congress to appropriate a minimum of $33 million for the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services, National Rabies Management Program.

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COMMITTEE ON ONE HEALTH
Chair: Liz Wagstrom, DC
Vice Chair: Joni Scheftel, MN

Gbenga Alade, ON; Gary Anderson, KS; Chris Ashworth, AR; Kay Backues, OK; Robert Bailey, TX; Sarah Bailey, ND; Maggie Baldwin, CO; Bill Barton, ID; Peter Belinsky, RI; Scott Bender, AZ; Pierce Bennett, MO; Nancy Boedeker, IN; Richard Breitmeyer, CA; Paul Brennan, IN; Susan Bright-Ponte, MD; Charles Brown, WI; Roselle Busch, CA; Louise Calderwood, VA; Cassidy Rist, VA; Maria Cooper, IN; Michael Costin, IL; Stephen Crawford, NH; Torrie Crnic, KS; Ignacio dela Cruz, MP; Thomas DeLiberto, CO; Barbara Determan, IA; Leah Dorman, OH; Brandon Doss, AR; Stéphie-Anne Dulièpre, NY; Tracey Dutcher, MN; Tracy DuVernois, MD; Sean Eastman, SC; Anita Edmondson, CA; Brigid Elchols, MS; Leonard Eldridge, WA; François Elvinger, NY; Jessica Emerson, FL; William Fales, IA; John Fischer, GA; Allison Flinn, MD; Katie Flynn, KY; Patricia Foley, IA; Larry Forgey, MO; Heather Fowler, IA; Tony Frazier, AL; Lindy Froebel, DC; Tam Garland, TX; Robert Gerlach, AK; Colin Gillin, OR; Eric Gingerich, IN; K. Fred Gingrich II, OH; Gail Golab, IL; Alicia Gorczyca-Southerland, OK; Michael Greenlee, WA; Jean Guard, GA; Scott Gustin, AR; Keith Haffer, SD; Rod Hall, OK; Steven Halstead, MI; Honorata Hansen, MD; Karyn Havas, MN; Bill Hawks, DC; Kate Hayes, AL; Denise Heard, GA; Fidelis Hegnig, MD; Julie Helm, SC; Janemarie Hennebelle, GA; Melinda Hertger, TX; Warren Hess, IL; Heather Hirst, DE; Donald Hoenig, ME; Noah Hull, WY; Russell Iselt, TX; Nancy Jackson, MS; Jarra Jagne, NY; Eric Jensen, AL; Annette Jones, CA; Brian Joseph, WA; Melissa Justice, IN; Anne Justice-Allen, AZ; Emily Kaleczycz, MT; Subhashinie Kariyawasam, FL; Donna Kelly, PA; Patrice Klein, DC; Darlene Konkle, WI; Michael Kopp, IN; Charlotte Krugler, SC; Todd Landt, IA; Dale Lauer, MN; Elizabeth Lautner, IA; Brad LeaMaster, OR; Jonathan Lebovitz, MD; Molly Jean Lee, IA; Donald Lein, NY; Rick Linscott, ME; Mary Jane Lis, CT; Gene Lollis, FL; Lindsey Long, WI; Karen Lopez, DE; David Luedke, FL; Margie Lyness, GA; Joanne Maki, GA; David Marshall, NC; Scott Marshall, RI; Beatriz Martinez Lopez, CA; James Maxwell, WV; Patrick McDonough, NY; Caitlin McKenzie, WI; Shirley McKenzie, NC; Katherine McNamara, VT; Tiffany McQueen, TX; Scott McVey, NE; David Meeker, VA; Gay Miller, IL; Eric Mohlman, NE; Peter Mundschenk, AZ; Lee Myers, GA; Michael Neault, NC; Cheryl Nelson, KY; Kayla Niel, IA; Leela Noronha, KS; Dustin Oedekoven, SD; Skip Oertli, TX; Kristy Pabilonia, CO; Elizabeth Parker, TX; Roger Parker, TX; Steve Parker, GA; Boyd Parr, SC; Elisabeth Patton, WI; Allison Phibbs, DC; William Pittenger, MO; Jenny Powers, CO; Dave Pyburn, IA; Lisa Quiroz, CA; Valerie Ragan, VA; Shelley Rankin, PA; G. Donald Ritter, DE; Susan Rollo, TX; Mark Ruder, GA; Margaret Rush, MD; Sherri Russell, MO; Larry Samples, PA; Will Sander, IL; John Sanders, WV; Yuko Sato, IA; Travis Schaal, IA; Joni Scheftel, MN; David Schmitt, IA; Stacey Schwabender, MN; Sheikh Selim, CA; Shelley Mehlenbacher, VT; Michael Short, FL; Richard Sibbel, IA; Kathryn Simmons, DC; Shri Singh, KY; Allison Siu, AL; Jonathan Sleeman, WI; David Smith, NY; Susan Stehman, PA; Kelly Straka, MI; Sandra Stileci, NJ; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Todd Tedrow, SD; Jane Teichner, FL; Belinda
REPORT OF THE COMMITTEE

Thompson, NY; Beth Thompson, MN; Alberto Torres, AR; Alex Turner, CO; Shauna Voss, MN; Bruce Wagner, CO; Liz Wagstrom, DC; Michele Walsh, ME; Doug Waltman, GA; Emily Walz, MN; Jessica Watson, MI; Courtney Wheeler, MN; Ben Wileman, MN; Melinda Wilkins, MI; Michelle Willette, MN; Carl Williams, NC; Sharon Williams, AR; Dennis Wilson, CA; Ross Wilson, TX; Nora Wineland, MI; Melissa Yates, MD; Alan Young, SD; Muhammad Usman Zaheer, CO; Marty Zaluski, MT; Ernest Zirkle, NJ.

The Committee met virtually on October 19, 2020, from 1:30-4:30 p.m. There were 258 members and guests on the Zoom call.

Presentations and Reports

Four presentations were given during the committee meeting focused on the theme of COVID-19 Impacts and Responses: Meatpacking and Primary Production

COVID-19 Impacts and Responses: Primary Production
Liz Wagstrom, National Pork Producers Council

Dr. Wagstrom presented an overview of the challenges faced by pork producers due to both the public health concerns for their workers and the marketing disruptions caused when work slowed or stopped in the plants to which they would market their animals.

COVID-19 Impacts: Meat Industry Association Actions
KateRose McCullough, North American Meat Institute

On March 13, 2020, the COVID-19 pandemic was declared a national emergency. Very quickly the meat and poultry industry arrived at the forefront of much of the discussion regarding worker safety. Meat and poultry plants across the nation implemented strict worker safety controls to assist in controlling the potential spread of the virus inside establishments. McCullough discussed the timeline of events, lessons learned from the pandemic, and plans moving forward. She also referenced a White Paper about the topic that can be found at https://www.meatinstitute.org/ht/a/GetDocumentAction/i/179846.

COVID-19 Impacts: State Public Health Veterinarian Interactions
Joni Scheftel, Minnesota Department of Health

Dr. Scheftel's presentation contrasted Minnesota COVID workplace clusters and outbreaks early in the pandemic, which occurred largely in meat packing plants and large distributors, with workplace COVID clusters in mid-summer and fall, which occurred in a wide variety of workplaces large and small throughout the state. She highlighted how lessons learned in the meatpacking industry could be applied successfully to other industries to prevent COVID transmission in the workplace.
COVID-19 Impacts: Individual Food Processor Actions to Protect Worker Safety
Michelle Kromm, Jennie-O Turkey Store.

Dr. Kromm discussed the many unique challenges the COVID-19 pandemic presented to food companies. Putting team member safety first required a nimble and flexible response. Implementation of mitigation strategies, adjusting as guidance evolved, and partnering with Public Health agencies were all critical factors in Hormel’s response to the pandemic.

Committee Business:

A resolution titled *Increased Fiscal Year 2022 Funding for the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services National Rabies Management Program* was presented from the Subcommittee on Rabies. The motion was accepted, seconded, and passed with a majority vote.
REPORT OF THE COMMITTEE

REPORT OF THE SUBCOMMITTEE ON PHARMACEUTICALS

Chair: Steve Crawford, NH
Vice Chair: Heather Fowler, IA

The Subcommittee met on Friday, October 9, 2020 via the Virtual Conference Platform powered by Zoom from 12:00-2:00 p.m. EST. There were 45 attendees in the session for the final presentation and business meeting. No old business or resolutions were discussed from the previous year. The Subcommittee agenda was built to provide a number of brief updates on existing federal programs with a Q&A following each talk.

Presentations and Reports

Supporting Antimicrobial Stewardship - FDA’s 5-Year AMR Plan
Susan Bright-Ponte, Food and Drug Administration (FDA), Center for Veterinary Medicine (CVM)

Dr. Bright-Ponte reviewed and provided an update on the numerous antimicrobial resistance (AMR) related stewardship activities FDA has been either working on or completed in the past year including but not limited to the OTC→Rx rule, duration of use research, as well as the proposed changes to the medically important antibiotic list (GFI 152 Appendix A). The concept paper describing the proposed changes to the medically important antibiotic list was released on Friday October 9, i.e., the morning of the Subcommittee on Pharmaceutical Issues meeting https://www.fda.gov/media/142846/download. A public meeting to discuss the proposal is scheduled for November 16.

Updates on USDA-APHIS Antimicrobial Use and Resistance Activities
Chelsey Shively, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Dr. Shively provided an update on activities planned by USDA-APHIS-VS including the 2021 National Animal Health Monitoring System (NAHSM) swine and feedlot studies, various cooperative agreements aimed at improving understanding around antimicrobial use and resistance in livestock and poultry, as well as efforts to share data in such a way that it is readily digestible by a variety of audiences via the use of extension services and the development of a new webpage using Tableau. Dr. Shively also mentioned that the updated National Action Plan, which takes a One Health approach and includes input from the USDA was released on October 9, i.e., the morning of the subcommittee meeting https://aspe.hhs.gov/pdf-report/carb-plan-2020-2025.

American Veterinary Medical Association (AVMA) Committee on Antimicrobials: Activities 2020
Michael Costin, AVMA
Megin Nichols, Center for Disease Control and Prevention (CDC)
Paul Plummer, National Institute of Antimicrobial Resistance Research and Education (NIAMRRE)

Drs. Michael Costin, Megin Nichols, and Paul Plummer provided an overview of 2019 and 2020 activities carried out by the AVMA and the AVMA’s committee on antimicrobials (CoA) with an emphasis on the published report and supporting materials describing the resistant pathogens in animal health in the United States completed this year. According to Dr. Plummer these materials will likely be updated every five years with the opportunity for expansion to include other animals such as cervids, pocket pets, etc. with each revision. AVMA Antimicrobials (AMR) resources: https://www.avma.org/resources-tools/one-health/antimicrobial-use-and-antimicrobial-resistance/antimicrobial-resistant-pathogens-affecting-animal-health

Subcommittee Business:

No resolutions

New business:

Members suggested topics for future meetings including 1) reviewing drug approvals in cooperation with other countries, for Anthelmintics specifically, e.g. Regulatory Cooperation Council (RCC) which is between Canada’s Veterinary Drugs Directorate (VDD) and the U.S. Food and Drug Administration (FDA) Center for Veterinary Medicine (CVM), 2) Discussing the impacts of (new) FDA compounding restrictions on nondomestic veterinary practice (e.g., immobilization compounds widely used in nondomestic ruminants), and 3) having the FDA provide updates on antiparasitic resistance in livestock and horses.

With no further business, the meeting adjourned at 1:42 p.m. EST.
The Rabies Subcommittee met virtually on October 15, 2020, from 12:00 p.m. until 2 p.m. EST. The number of attendees identified by Zoom was up to 125 persons at one point. The Chair and Vice Chair introduced themselves and Michele discussed how the vote on one resolution would use a yes/no electronic poll of subcommittee members. At the start of the meeting, 38 committee members were identified which provided a quorum for voting purposes. No other business was conducted due to the limited time allotted for the meeting session. The session contained four presentations by six speakers with a few questions asked by attendees, either by chat or on-line, following each presentation.

Presentations and Reports

Richard Chipman, USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS)

An abstract of this presentation is included at the end of this report.

Rabies Epi-cluster in Bath, ME – Challenges to Coordinating Response to a Rabies Outbreak at the State Level
Jesse Morris, USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS)
Michele Walsh, Maine Department of Agriculture, Conservation and Forestry

CDC’s Role in Domestic Rabies Surveillance
David Lowe and Jesse Bonwitt, Centers for Disease Control (CDC)

Oral Rabies Vaccination (ORV) Program in Anne Arundel County, Maryland
Tom Burja and Joseph Horman, Anne Arundel County Department of Health

Committee Business:
Dr. Walsh showed a copy the resolution to the attendees and asked for a vote. The resolution, provided by Dr. Don Lein, requested continuing the support by USAHA to recommend continued funding the USDA National Oral Rabies Vaccine Program at a level of $33 million/year. Two comments were received from attendees. One person asked to include the amount of funding requested in previous years so members would know if this amount was the same or an increase. The second person asked if more detail could be provided as to the items on which the funding would be spent. A short discussion addressed both comments, which led to decision to go ahead with
the vote. A motion was made and seconded. With no further business, the meeting was adjourned.
In 2020, the emergence of COVID-19 proved challenging throughout the U.S. and stretched the limits for nearly all aspects of our national public health system. Many of the same challenges faced by the pandemic (viruses and viral spread, surveillance and control, antigen versus antibody testing, vaccines and herd immunity) have been faced by the wildlife rabies management community for years. Our over-arching program goals remained the same in 2020 (stop the spread and eventually eliminate terrestrial rabies variants in the U.S.) through management with oral rabies vaccination (ORV) and post-bait monitoring. In March 2020, we recognized that if we chose not to distribute vaccine this year, we could jeopardize the significant progress made to date in stopping the spread of raccoon rabies. We committed to vaccine bait distribution in 2020 but were faced with how to safely bring >130 USDA and contractor employees from 22 states together at 19 airports for a >120-day time period to fly in small aircraft and helicopters and ride in vehicles while ground baiting during a global pandemic. We worked in a fluid planning environment that included trying to determine Federal versus State “essential worker” status, navigating State and local travel restrictions, managing local public perceptions and keeping our employees and the public safe throughout all of our projects. As a result, many mitigation strategies were put in place for ORV distribution beginning in May 2020. As a first step, annual ORV operations training was provided to each Wildlife Services (WS) employee through an online virtual format instead of at the airport in person. In the airport environment, where up to five aircraft were operating at one time, mitigation strategies included a no visitor policy, limited personnel access to the NRMP Command Post mobile trailer, appropriate Personal Protective Equipment (PPE) [masks and gloves] during flights, and aircraft disinfection between every flight. Crew were provided individual headsets and microphone covers for each project, along with their own packet of alcohol wipes, hand sanitizer and rubber gloves. Daily health checks were implemented (temperature check and symptom assessment). Extra hand-washing stations were available at all operational airports to promote frequent handwashing and data tablets used in-flight were disinfected between crews. WS employees were paired as a set crew team for the duration of each project to reduce exposure risks to multiple individuals. Employees riding in a vehicle together to/from the airport wore masks while in the vehicle. Whenever multiple employees were at the airport prior to or following flight completion, they practiced social distancing and wore a mask in any indoor environment. After hours (away from the airport), WS employees were prohibited from social gathering in parking lots or hotel rooms. In the end, WS and cooperators distributed >9.3 million oral rabies vaccination (ORV) baits over 151,000 km² (an area larger than the State of Illinois) in Alabama, Florida, Georgia, Maine, Maryland, Massachusetts, New
Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Texas, Vermont, Virginia, and West Virginia in 2020. Bait distribution included 67% RABORAL V-RG® and 33% ONRAB vaccines targeting raccoons and coyotes. More than 8.2 million baits were distributed to prevent raccoon rabies from spreading beyond the eastern U.S.; and >1.1 million to prevent canine (dog-coyote) rabies from reemerging in Texas along the Mexico Border. We continued to move ORV zones out of key areas where raccoon rabies has been eliminated and into new areas under management where raccoon rabies is enzootic. Additionally, research continued in 2020 by conducting field trials in North Carolina and Maine using a RABORAL V-RG® Special High Titer vaccine that showed promise in 2019, and planning for more urban/suburban research to compare different baiting strategies using ONRAB (hand baiting vs. bait stations).
The Subcommittee met virtually on Monday October 12, 2020, from 12:00 p.m. to 1:30 p.m. There were 29 members, and 69 guests present. There were no resolutions or recommendations to review. Rules of the virtual meeting were covered. There was one presentation cancellation.

Presentations and Reports

NVSL Salmonella Update January 1-December 31, 2019
Brenda Morningstar Shaw, National Veterinary Services Laboratory (NVSL)

The Bacterial Identification section within the Diagnostic Bacteriology and Pathobiology Laboratory of the NVSL routinely performs serotyping of *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 received at the NVSL from January 1 through December 31, 2019.

In 2019, 10,613 submissions were received for *Salmonella* serotyping. There were 237 serotypes identified from 48 states. *Salmonella* isolates were divided by clinical isolates (5,542), non-clinical isolates (3,511), and research and other isolates (1,560). Isolates were identified as clinical samples based on clinical or sub-clinical signs of salmonellosis from primary or secondary infection or as non-clinical samples when derived from herd and flock monitoring programs, environmental sources, food or other testing. Serotyping data from research samples were not included in this summary.

The NVSL provided a *Salmonella* Group D proficiency test to 100 individuals from 85 different laboratories. The purpose of the PT was to assess the ability of laboratories to detect or isolate *Salmonella* Group D and/or *Salmonella* Enteritidis from simulated environmental samples.

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

NPIP National Plan Status Report
Elena Behnke, National Poultry Improvement Plan (NPIP), USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Pullorum-Typhoid Status: There were no isolations of *Salmonella* Pullorum in commercial poultry in FY2016, FY2017, FY2018, FY2019 or FY2020. There were no isolations of *Salmonella* Pullorum in backyard birds in FY2017, FY2018, FY2019 or FY2020. There have been no isolations of *Salmonella* Gallinarum since 1987 in any type poultry in the U.S.

In FY2020 there was one *Salmonella* Enteritidis positive egg-type breeder flock in SC. The flock consisted of 3,187 birds.

The complete presentation is included at the end of this report.
FSIS Update
Sheryl Shaw, USDA, Food Safety Inspection Service (FSIS)

There have been several leadership changes at FSIS: Dr. Mindi Brashears, Under Secretary of Food Safety; Paul Kiecker, FSIS Administrator; Terri Nintemann, Deputy FSIS Administrator; Rachel Edelstein, Assistant Administrator of the Office of Policy and Program Development; and Robert Bane, Assistant Administrator of the Office of Investigation, Enforcement and Audit.

Interagency Food Safety Analytics Collaborations estimates 38% of foodborne Salmonella is from meat and products.

FSIS has a new Road Map to introducing Salmonella reduction released on September 18, 2020. The Road Map outlines how FSIS aggressively targets Salmonella reduction by science based, data driven policies and programs. The Road Map covers these key areas: Modernization of inspection stations systems, inspection tasks of modern health, FSIS laboratories in sampling, Salmonella performance standards, outreach and communication, data transparency and analytics, research and innovation, and collaboration with public health partners.

As food safety challenges evolve, the Agency will use these science and data (sampling methods and communications) to modernize the inspection systems to protect public health with the goal of improving the ability to predict, detect, and reduce pathogens while encouraging industry to adopt technology to produce safer products and empower the consumers with safe handling, safe cooking practices and safe food storage information.

The Swine Slaughter Inspection was modernized in 2019. In 2020, the Egg Products Inspection Methods were modernized. FSIS held its first virtual public meeting in September 2020, Salmonella: State of the Science, with FSIS leadership and subject matter experts from the Centers for Disease Control (CDC), Food and Drug Administration (FDA), Agricultural Research Service (ARS) and stakeholders.

A major component of the National Antimicrobial Resistance Monitoring System (NARMS) is Salmonella. From 2013-2019 25,000 cecal samples were tested for antimicrobial resistance in Salmonella, Campylobacter, Escherichia coli and Enterococcus. During the same period 21,700 isolates were tested from HACCP programs. NARMS will have a public meeting October 13-14, 2020. The NARMS Multi-year Report for 2014-2019 will be published in 2021 and will include susceptibility patterns from the sampling of the top five Salmonella serotypes with comparison changes over time.

Foodborne outbreak investigations for FY2020: S. Dublin 13 illnesses, eight states had a recall of 34,000 pounds of beef. The source was traced by Electronic Benefit Transfer (EBT) card usage and retail grinding records. S. Reading 358 cases, 48 states with one death 70% of patients report exposure to turkey meat/turkeys. Whole genome sequencing has clinical isolates closely related to FSIS isolates, however they did not cluster by establishment. S. Infantis 129 illnesses, 32 states, 82% patients reported
exposure to chicken meat/chicken. Found in raw chicken pet foods and in human chicken products.

Lessons learned from the outbreaks and after-action reviews showed that collaboration provides the best opportunities for improvement. The two major lessons learned were that future responses can be improved by surveillance, investigation and response and that in prevention, considering how did this outbreak occur and how can it be prevented, the Administrative Action Records System (AARS) need to be conducted for all outbreaks in a timely manner and that collaborations with partners and sharing lessons learned publicly with stakeholders is important.

**Salmonella Outbreaks Linked to Animals 2019-2020**

Shelley Rankin, University of Pennsylvania

Summaries of the 2019-2020 Salmonella outbreaks linked to animals were presented. Backyard poultry linked outbreaks occurred in 2019 and 2020. Forty-nine states and multiple serotypes were involved. There was one death related to this outbreak. Pet hedgehogs were involved in a S. Typhimurium outbreak in 2019-2020. At its height, 23 states were involved. No deaths were reported. Multiple sources were involved. Pig ear treats were linked to an outbreak in 2019 with multiple serovars and multiple sources. No deaths were reported. Pet turtles were linked to an S. Oranienburg outbreak in 2019 that involved 14 states. No deaths were reported. The outbreak strain was associated with the pet’s habitat. Pet turtles (small, less than four inches in size) were also involved with a 2020 outbreak of S. Typhimurium in nine states. There were no deaths reported. The last outbreak is ongoing. S. Meunster has been linked to bearded dragons in eight states. No deaths have been involved to date.

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

**CDC Salmonella Prevention Strategies**

Megin Nichols, Centers for Disease Control and Prevention (CDC)

Outbreak of Salmonella in ground beef showed that nothing had changed maybe a slight increase in consumer prevention practices due to labeling and packaging. CDC looked at levels at slaughter/processing and found high incoming load of Salmonella in live animals and some physical traits of the bacteria were the cause.

Now the Agency is looking at the Farm to Fork approach with collaborative efforts to work at the pre-harvest intervention. This method started with ground beef to decrease the levels of E. coli which is so commonly identified in the product.

**COVID-19 Effects Open Forum**

An open forum for the discussion of the effects of COVID-19 on Salmonella related business was held. Each speaker mentioned how COVID-19 had affected their business. The majority of the comments were that the monitoring didn’t stop, and sample numbers remained the same,
however there was half the staffing to deal with it. Some operations went to
every other day personnel and others used shift work. Minor delays
occurred. There was no real effect on the availability of reagents and
supplies. One comment was made on equipment platform repair delays
because COVID-19 designated equipment were getting priority over other
equipment. That delay is ongoing. The CDC Enteric Zoonoses Unit has been
increasingly busy due to the burden of the pandemic response being directed
at state and local public health agencies; therefore, the enteric disease
investigations are falling on them. There have been some delays in
interviewing patients.

Committee Business:

There were no resolutions or recommendations from the Subcommittee
for 2020.

Drs. Chris Ashworth and Lindy Froebel volunteered to replace Drs.
Donna Kelly and Shelley Rankin as co-Chairs of the Subcommittee. Drs.
Ashworth and Froebel will be recommended to the Executive Committee for
co-chair approval. The meeting closed at 1:37 p.m. with a motion to close
and seconded.
The Bacterial Identification section within the Diagnostic Bacteriology and Pathobiology Laboratory of the National Veterinary Services Laboratories (NVSL) routinely performs serotyping of *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 received at the NVSL from January 1 through December 31, 2019.

In 2019, 10,613 submissions were received for *Salmonella* serotyping. There were 237 serotypes identified from 48 states. *Salmonella* isolates were divided by clinical isolates (5,542), non-clinical isolates (3,511), and research and other isolates (1,560). Isolates were identified as clinical samples based on clinical or sub-clinical signs of salmonellosis from primary or secondary infection or as non-clinical samples when derived from herd and flock monitoring programs, environmental sources, food or other testing. Serotyping data from samples submitted for research purposes are not included in this summary. Table 1 provides information on the source of submissions to the NVSL.

Isolates were divided into the following animal source categories for analysis based on information provided by the submitter: bovine, chicken, equine, swine, turkey and all other. Table 1 lists the source of submissions for both clinical and non-clinical isolates for calendar year 2019. The ten most commonly identified serotypes from clinical and non-clinical isolates from all animal sources are shown in Table 2. These ten serotypes account for 60% of the total isolates submitted from clinical and 63% of non-clinical sources in 2019. The most common serotypes observed in chicken, turkey, bovine, equine and swine isolates are listed in Tables 3-7.

*Salmonella* serotyping at the NVSL is an ISO 17025 accredited test. Salmonellae are typed via classical serotyping using polyvalent and single factor antisera to determine the O and H antigens and/or via molecular typing using the xMAP *Salmonella* serotyping assay. 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.

The NVSL provided a *Salmonella* Group D proficiency test to 100 individuals from 85 different laboratories. The purpose of the PT was to assess the ability of laboratories to detect or isolate *Salmonella* Group D
and/or *Salmonella* Enteritidis from simulated environmental samples. The test consisted of ten lyophilized cultures containing various combinations of *Salmonella* and common contaminants typically found in environmental swabs. The 2019 test included *Salmonella* serotypes Anatum, Enteritidis, I 9,12: nonmotile, and Heidelberg. Contaminant bacteria included *Citrobacter amalonaticus*, *Citrobacter freundii*, *Enterobacter cloacae*, Enterobacter species, *Klebsiella pneumoniae*, *Providencia rettgeri* and *Pseudomonas aeruginosa*. Laboratories were instructed to test the samples according to the procedures used in their laboratories. The NVSL randomly retained approximately 10% of the test kits for QA purposes. All were tested blindly with no discrepancies. The results of the proficiency test are shown in Table 8.

Table 1: Sources of submissions to the NVSL for *Salmonella* serotyping in 2019

<table>
<thead>
<tr>
<th>Source</th>
<th>No. Clinical Submissions</th>
<th>No. Non-Clinical Submissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>1,616</td>
<td>85</td>
</tr>
<tr>
<td>Chicken</td>
<td>379</td>
<td>2,632</td>
</tr>
<tr>
<td>Equine</td>
<td>568</td>
<td>88</td>
</tr>
<tr>
<td>Swine</td>
<td>2,050</td>
<td>4</td>
</tr>
<tr>
<td>Turkey</td>
<td>264</td>
<td>524</td>
</tr>
<tr>
<td>All others</td>
<td>665</td>
<td>178</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,542</strong></td>
<td><strong>3,511</strong></td>
</tr>
</tbody>
</table>

Table 2: Most common serotypes in 2019: All sources

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>I 4,[5],12:i:-</td>
<td>778</td>
<td>Mbandaka</td>
<td>471</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>593</td>
<td>Senftenberg</td>
<td>345</td>
</tr>
<tr>
<td>Dublin</td>
<td>548</td>
<td>Kentucky</td>
<td>275</td>
</tr>
<tr>
<td>Enteritidis</td>
<td>226</td>
<td>Tennessee</td>
<td>232</td>
</tr>
<tr>
<td>Cerro</td>
<td>218</td>
<td>Enteritidis</td>
<td>219</td>
</tr>
<tr>
<td>Montevideo</td>
<td>213</td>
<td>Montevideo</td>
<td>166</td>
</tr>
<tr>
<td>Infantis</td>
<td>203</td>
<td>Anatum</td>
<td>147</td>
</tr>
<tr>
<td>Derby</td>
<td>200</td>
<td>Ouakam</td>
<td>133</td>
</tr>
<tr>
<td>Newport</td>
<td>169</td>
<td>Infantis</td>
<td>109</td>
</tr>
<tr>
<td>Anatum</td>
<td>158</td>
<td>Typhimurium</td>
<td>99</td>
</tr>
<tr>
<td>All others</td>
<td>2,236</td>
<td>All others</td>
<td>1,315</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,542</strong></td>
<td><strong>Total</strong></td>
<td><strong>3,511</strong></td>
</tr>
</tbody>
</table>

Table 3: Most common serotypes in 2019: Chicken

<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>1,315</td>
<td>Infantis</td>
<td>109</td>
</tr>
<tr>
<td>Anatum</td>
<td>99</td>
<td>Typhimurium</td>
<td>99</td>
</tr>
<tr>
<td>All others</td>
<td>1,315</td>
<td>All others</td>
<td>1,315</td>
</tr>
</tbody>
</table>
Table 4: Most common serotypes in 2019: Turkey

<table>
<thead>
<tr>
<th>Serotype</th>
<th>Clinical No. Isolates</th>
<th>Non-Clinical No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senftenberg</td>
<td>36</td>
<td>130</td>
</tr>
<tr>
<td>Ouakam</td>
<td>29</td>
<td>80</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>26</td>
<td>40</td>
</tr>
<tr>
<td>Albany</td>
<td>25</td>
<td>39</td>
</tr>
<tr>
<td>Infantis</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>All others</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>Total</td>
<td>264</td>
<td>Total 524</td>
</tr>
</tbody>
</table>

Table 5: Most common serotypes in 2019: Bovine

<table>
<thead>
<tr>
<th>Serotype</th>
<th>Clinical No. Isolates</th>
<th>Non-Clinical No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dublin</td>
<td>539</td>
<td>24</td>
</tr>
<tr>
<td>Cerro</td>
<td>201</td>
<td>8</td>
</tr>
<tr>
<td>Montevideo</td>
<td>157</td>
<td>5</td>
</tr>
<tr>
<td>Typhimurium / Muenster / Dublin / Bovismorbificans</td>
<td>135</td>
<td>56</td>
</tr>
<tr>
<td>Montevideo / Muenster / I4,[5],12:i:-</td>
<td>56</td>
<td>33</td>
</tr>
<tr>
<td>All others</td>
<td>472</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>1,616</td>
<td>Total 85</td>
</tr>
</tbody>
</table>

Table 6: Most common serotypes in 2019: Equine

<table>
<thead>
<tr>
<th>Serotype</th>
<th>Clinical No. Isolates</th>
<th>Non-Clinical No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium/Newport</td>
<td>81</td>
<td>Mbandaka 37</td>
</tr>
<tr>
<td>Anatum/Muenster</td>
<td>42</td>
<td>Typhimurium 14</td>
</tr>
<tr>
<td>I4,[5],12:i:-</td>
<td>38</td>
<td>Newport 13</td>
</tr>
<tr>
<td>Montevideo</td>
<td>31</td>
<td>Berta 7</td>
</tr>
<tr>
<td>Litchfield</td>
<td>30</td>
<td>Muenster 5</td>
</tr>
<tr>
<td>All others</td>
<td>223</td>
<td>All others 12</td>
</tr>
<tr>
<td>Total</td>
<td>568</td>
<td>Total 88</td>
</tr>
</tbody>
</table>
Table 7: Most common serotypes in 2019: Swine

<table>
<thead>
<tr>
<th>Serotype</th>
<th>No. Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,[5],12:i-</td>
<td>635</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>263</td>
</tr>
<tr>
<td>Derby</td>
<td>191</td>
</tr>
<tr>
<td>Infantis</td>
<td>114</td>
</tr>
<tr>
<td>Agona</td>
<td>107</td>
</tr>
<tr>
<td>All others</td>
<td>740</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,050</strong></td>
</tr>
</tbody>
</table>

Table 8: Summary of NVSL *Salmonella* Group D proficiency test

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participants</strong></td>
<td>80</td>
<td>94</td>
<td>98</td>
<td>101</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td><strong>Mean Score</strong></td>
<td>98%</td>
<td>98%</td>
<td>97%</td>
<td>95%</td>
<td>98%</td>
<td>97.8%</td>
</tr>
<tr>
<td><strong>Below Passing</strong></td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>


National Poultry Improvement Plan Status Report

Elena Behnke, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Accelerated Scrapie Eradication Program (ASEP)

**Pullorum-Typhoid Status:**

There were no isolations of *Salmonella* pullorum in commercial poultry in FY2016, FY2017, FY2018, FY2019 or FY2020. There were no isolations of *Salmonella* pullorum in backyard birds in FY2017, FY2018, FY2019 or FY2020. There have been no isolations of *Salmonella gallinarum* since 1987 in any type poultry in the U.S.

| Hatchery Participation in the National Poultry Improvement Plan Testing Year FY2020 |
|-----------------------------------------------------------------|-------------------|
| Egg and Meat-Type Chickens: Participating                       | 273               |
| Turkeys: Participating                                          | 49                |
| Waterfowl, Exhibition Poultry and Game Birds: Participating     | 833               |
### Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

<table>
<thead>
<tr>
<th>Testing Year FY2020</th>
<th>U.S. Pullorum-Typhoid Clean Flocks</th>
<th>Birds in Flocks</th>
<th>Birds Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>270</td>
<td>6,874,107</td>
<td>31,032</td>
</tr>
</tbody>
</table>

### Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

<table>
<thead>
<tr>
<th>Testing Year FY2020</th>
<th>U.S. Pullorum-Typhoid Clean Flocks</th>
<th>Birds in Flocks</th>
<th>Birds Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6,000</td>
<td>118,447,921</td>
<td>261,401</td>
</tr>
</tbody>
</table>

### Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

<table>
<thead>
<tr>
<th>Testing Year FY2020</th>
<th>U.S. Pullorum-Typhoid Clean Flocks:</th>
<th>Birds in Flocks</th>
<th>Birds Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>472</td>
<td>4,283,033</td>
<td>86,162</td>
</tr>
</tbody>
</table>

### Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

<table>
<thead>
<tr>
<th>Testing Year FY2020</th>
<th>U. S. Pullorum-Typhoid Clean Flocks</th>
<th>Birds in Flocks</th>
<th>Birds Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,854</td>
<td>2,170,070</td>
<td>305,765</td>
</tr>
</tbody>
</table>

### Meat Type Waterfowl Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary

<table>
<thead>
<tr>
<th>Testing Year FY2020</th>
<th>U. S. Pullorum-Typhoid Clean Flocks</th>
<th>Birds in Flocks</th>
<th>Birds Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>115</td>
<td>343,202</td>
<td>8,460</td>
</tr>
</tbody>
</table>

### U.S. *Salmonella* enteritidis Clean Egg-Type Breeding Chickens

<table>
<thead>
<tr>
<th></th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flocks</td>
<td>75</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>Birds in flocks</td>
<td>786871</td>
<td>77,179</td>
<td>214,529</td>
</tr>
</tbody>
</table>
In FY2020 there was one SE positive egg-type breeder flock in SC. The flock consisted of 3,187 birds.

Salmonella Outbreaks Linked to Animals 2019-2020
Shelley Rankin, Zoetis

2019 Backyard Poultry
- As of October 22, 2019, the outbreak investigations are over.
- CDC and public health officials in 49 states investigated 13 multistate outbreaks of Salmonella infections with serotypes Agona, Alachua, Altona, Anatum, Braenderup, Enteritidis, Infantis, Manhattan, Montevideo, Muenchen, Newport, and Oranienburg.
- Epidemiologic, laboratory, and traceback evidence indicated that contact with backyard poultry, such as chicks and ducklings, from multiple hatcheries was the likely source of these outbreaks.


2020 Backyard Poultry
- This investigation is ongoing.
- As of September 22, 2020, a total of 1,346 people infected with one of the outbreak strains of Salmonella have been reported from 49 states.
  - 229 people hospitalized.
  - One death in Oklahoma.
  - 23% of ill people are children younger than five years of age.
  - Epidemiologic and laboratory evidence shows that contact with backyard poultry (such as chicks and ducklings) is the likely source of these outbreaks.
  - 416 (68%) of the 613 ill people interviewed reported contact with chicks and ducklings.
  - People reported obtaining chicks and ducklings from several sources, including agricultural stores, websites, and hatcheries.
  - Testing of backyard poultry and their environments (such as backyard coops) in Kentucky and Oregon found three of the outbreak strains.


2019 Pet Hedgehogs - Typhimurium
- As of October 2, 2019, this investigation is over. Available information indicates the outbreak strain of Salmonella Typhimurium is present in hedgehogs.
  - A total of 54 people infected with the outbreak strain of Salmonella Typhimurium were reported from 23 states.
  - Eight people were hospitalized. No deaths were reported.
REPORT OF THE COMMITTEE

- Epidemiologic and laboratory evidence indicated that contact with pet hedgehogs was the likely source of this outbreak.
- In interviews, 31 (84%) of 37 ill people reported contact with a hedgehog.
- A single, common supplier of hedgehogs was not identified.


2020 Pet Hedgehogs - Typhimurium
- Illnesses started on dates from April 12, 2020 to August 11, 2020. Outbreak is ongoing.
- Outbreak strain is the same as outbreak strains linked to hedgehogs in 2012 and in 2019.
- As of September 22, 2020, a total of 32 people infected reported from 17 states.
- Five people were hospitalized. No deaths have been reported.
- In interviews, 16 (70%) of 23 ill people reported contact with a hedgehog.
- Ill people reported buying hedgehogs from various sources, including pet stores, breeders, or online stores. A common source of hedgehogs has not been identified.


2019 Pig Ear Pet Treats – various serovars
- As of October 30, 2019, CDC and FDA dropped their warning to avoid buying or feeding any pig ear pet treats, except for treats that have already been recalled.
- Salmonella serovars included were Cerro, Derby, London, Infantis, Newport, Rissen, and 1, 4,[5],12:i:-.
- 154 people infected with the outbreak strains of Salmonella were reported from 34 states.
- Of 133 ill people with available information, 35 (26%) were hospitalized. No deaths were reported.
- 27 illnesses (19%) were among children younger than five years.
- Epidemiologic, laboratory, and traceback evidence indicated that contact with pig ear pet treats from many different suppliers was the likely source of this outbreak.


2019 Pet Turtles - Oranienburg
- As of January 9, 2020, this outbreak investigation is over.
- 26 people infected with the outbreak strain of Salmonella Oranienburg reported from 14 states.
- Eight hospitalizations were reported. No deaths
- Epidemiologic, laboratory, and traceback evidence indicate that contact with pet turtles was the likely source of this outbreak.
- In interviews, 16 (73%) of 22 ill people reported contact with a turtle.
• The outbreak strain was identified in samples collected from a pet turtle’s habitat.


2020 Pet Turtles - Typhimurium
• As of March 13, 2020, this outbreak investigation is over.
• 35 people infected with the outbreak strain of Salmonella Typhimurium reported from 9 states.
• 11 hospitalizations were reported. No deaths.
• Children younger than 12 accounted for two-thirds of the illnesses.
• Epidemiologic and laboratory evidence indicated that contact with small pet turtles was the likely source of this outbreak.
• People reported contact with turtles with shells less than four inches long.


2020 Bearded Dragons - Muenster
• This investigation is ongoing, and CDC will provide updates when more information becomes available.
• Thirteen people infected with the outbreak strain of Salmonella Muenster have been reported from eight states.
• Seven hospitalizations. No deaths
• Five ill people are children under five years of age.
• Epidemiologic and laboratory evidence shows that contact with pet bearded dragons is the likely source of this outbreak.
• In interviews, ten (77%) of 13 ill people reported contact with a bearded dragon.
• Ill people reported purchasing bearded dragons from pet stores in multiple states. A common supplier has not been identified.
• The outbreak strain making people sick was identified in samples collected from a bearded dragon and its environment from the home of an ill person in Virginia.

Gbenga Alade, ON; Gary Anderson, KS; Chris Ashworth, AR; Kay Backues, OK; Robert Bailey, TX; Sarah Bailey, ND; Maggie Baldwin, CO; Bill Barton, ID; Peter Belinsky, RI; Scott Bender, AZ; Pierce Bennett, MO; Nancy Boedeker, IN; Richard Breitmeyer, CA; Paul Brennan, IN; Susan Bright-Ponte, MD; Charles Brown, WI; Roselle Busch, CA; Louise Calderwood, VA; Cassidy Rist, VA; Maria Cooper, IN; Michael Costin, IL; Stephen Crawford, NH; Tarrie Crnic, KS; Ignacio dela Cruz, MP; Thomas DelLiberto, CO; Barbara Determan, IA; Leah Dorman, OH; Brandon Doss, AR; Stéphie-Anne Dulièpre, NY; Tracey Dutcher, MN; Tracy DuVernoy, MD; Sean Eastman, SC; Anita Edmondson, CA; Brigid Elchis, MS; Leonard Eldridge, WA; François Elvinger, NY; Jessica Emerson, FL; William Fales, IA; John Fischer, GA; Allison Flinn, MD; Katie Flynn, KY; Patricia Foley, IA; Larry Forgety, MO; Heather Fowler, IA; Tony Frazier, AL; Lindy Froebel, DC; Tam Garland, TX; Robert Gerlach, AK; Colin Gillin, OR; Eric Gingerich, IN; K. Fred Gingrich II, OH; Gail Golab, IL; Alicia Gorczyca-Southerland, OK; Michael Greenlee, WA; Jean Guard, GA; Scott Gustin, AR; Keith Haffer, SD; Rod Hall, OK; Steven Halstead, MI; Honorata Hansen, MD; Karyn Havas, MN; Bill Hawks, DC; Kate Hayes, AL; Denise Heard, GA; Fidelis Hegnig, MD; Julie Helm, SC; Janemarie Hennebelle, GA; Melinda Hergert, TX; Warren Hess, IL; Heather Hirst, DE; Donald Hoenig, ME; Noah Hull, WV; Russell Iselt, TX; Nancy Jackson, MS; Jarra Jagne, NY; Eric Jensen, AL; Annette Jones, CA; Brian Joseph, WA; Melissa Justice, IN; Anne Justice-Allen, AZ; Emily Kaleczyc, MT; Subhashininie Kariyawasam, FL; Donna Kelly, PA; Patrice Klein, DC; Darlene Konkle, WI; Michael Kopp, IN; Charlotte Krugler, SC; Todd Landt, IA; Dale Lauer, MN; Elizabeth Lautner, IA; Brad LeaMaster, OR; Jonathan Lebovitz, MD; Molly Jean Lee, IA; Donald Lein, NY; Rick Linscott, ME; Mary Jane Lis, CT; Gene Lollis, FL; Lindsey Long, WI; Karen Lopez, DE; David Luedeke, FL; Margie Lyness, GA; Joanne Maki, GA; David Marshall, NC; Scott Marshall, RI; Beatriz Martinez Lopez, CA; James Maxwell, WV; Patrick McDonough, NY; Caittin McKenzie, WI; Shirley McKenzie, NC; Katherine McNamara, VT; Tiffany McQueen, TX; Scott McVey, NE; David Meeker, VA; Gay Miller, IL; Eric Mohlman, NE; Peter Mundschken, AZ; Lee Myers, GA; Michael Neault, NC; Cheryl Nelson, KY; Kayla Niel, IA; Leela Noronha, KS; Dustin Oedekoven, SD; Skip Oertli, TX; Kristy Pabolonia, CO; Elizabeth Parker, TX; Roger Parker, TX; Steve Parker, GA; Boyd Parr, SC; Elisabeth Patton, WI; Allison Phibbs, DC; William Pittenger, MO; Jenny Powers, CO; Dave Pyburn, IA; Lisa Quiroz, CA; Valerie Ragan, VA; Shelley Rankin, PA; G. Donald Ritter, DE; Susan Rollo, TX; Mark Ruder, GA; Margaret Rush, MD; Sherri Russell, MO; Larry Samples, PA; Will Sander, IL; John Sanders, WV; Yuko Sato, IA; Travis Schaal, IA; Joni Scheftel, MN; David Schmitt, IA; Stacey Schwabenlander, MN; Sheikh Selim, CA; Shelley Mehlenbacher, VT; Michael Short, FL; Richard Sibbel, IA; Kathryn Simmons, DC; Shri Singh, KY; Allison Siu, AL; Jonathan Sleeman, WI; David Smith, NY; Susan Stehman, PA; Kelly Straka, MI; Sandra Strilec, NJ; Tahnee Szymanski, MT; Manoel Tamassia, NJ; Todd Tedrow, SD; Jane Teichner, FL; Belinda
The Committee met on October 16, 2020, virtually, from 2:30-4:40 p.m.

Presentations and Reports

Addressing the Challenges of Emerging Vector-Borne Diseases in the United States
C. Ben Beard, Center for Disease Control and Prevention (CDC)

This presentation addresses four primary topics: 1) the burden and trends for vector-borne diseases (VBDs) in the U.S., 2) factors that are influencing VBD emergence, 3) the challenges for effective prevention and control, and 4) CDC’s plans for addressing VBD concerns in the U.S.

Between 2004 and 2018, more than 760,000 cases of VBDs were reported in the U.S. The number of annual reported cases of disease from mosquito, tick, and flea bites has doubled. Tick-borne diseases accounted for over 75% of reported VBD cases, and mosquito-borne disease epidemics happen more frequently. The reported data substantially underestimate actual disease occurrence (8 to 70-fold depending on the disease).

Vector-borne disease emergence in the U.S. has been influenced by a number of factors including 1) global travel [i.e. frequency and range of movement of infected humans], 2) poverty, living conditions, and crowding, 3) a large human population that is susceptible to exotic disease agents, 4) limited public health resources at all levels for detecting and responding to local disease outbreaks, and 5) a changing climate and ecosystem, which can alter the incidence and distribution of disease pathogens and vectors. These factors collectively contribute to the emergence and re-emergence of disease agents carried by mosquitoes and ticks.

Local and state health departments and vector control organizations face increasing demands to respond to these threats. More than 80% of vector control organizations report needing improvement in one or more of five core competencies, such as testing for pesticide resistance. More proven and publicly accepted mosquito and tick control methods are needed to prevent and control these diseases.

In summary and conclusion, VBDs are increasing in the U.S., both in incidence and in distribution. The factors that are driving VBD introduction and emergence vary among diseases but are not likely to cease, indicating that current trends will continue and likely worsen. There are a number of challenges to preventing VBDs, including the lack of vaccines and effective vector control tools, insecticide resistance, and eroding technical capacities.
in public health entomology at federal, state and local levels. CDC is working with other U.S. federal agencies to develop a national strategy to address VBD threats and to reverse the alarming trend in morbidity and mortality associated with these diseases.

USDA-APHIS-VS Dun & Bradstreet (D&B), National Veterinary Services Laboratories (NVSL)  
Bluetongue Virus (BTV) and Epizootic Hemorrhagic Disease Virus (EHDV) Isolations/PCR Positives—Calendar year 2019  
Albert van Geelen, USDA-APHIS-NVSL

During calendar year 2019, BTV or Ribonucleic acid (RNA) was detected and typed in 29 samples or collected from four states, while EHDV or RNA was detected and typed in 21 samples from seven states. Individual results are listed in tables 1 and 2.

Table 1. Bluetongue virus (BTV) polymerase chain reaction (PCR) positives, calendar year 2019

<table>
<thead>
<tr>
<th>State</th>
<th>Serotype</th>
<th>Species</th>
<th>Number</th>
<th>Virus Isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>BTV-1</td>
<td>cattle</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>FL</td>
<td>BTV-6</td>
<td>goat</td>
<td>1</td>
<td>Y</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-13</td>
<td>cattle</td>
<td>6</td>
<td>N</td>
</tr>
<tr>
<td>FL</td>
<td>BTV-15</td>
<td>Cattle1</td>
<td>1</td>
<td>Y</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>White tail deer</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>Sheep</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>cattle</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>sheep</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>TX</td>
<td>BTV-17</td>
<td>Cattle2</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>IA</td>
<td>BTV-17</td>
<td>cattle</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>CA</td>
<td>BTV-17</td>
<td>sheep</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>FL</td>
<td>BTV-18</td>
<td>white tail deer3</td>
<td>1</td>
<td>Y</td>
</tr>
<tr>
<td>FL</td>
<td>BTV-18</td>
<td>cattle</td>
<td>3</td>
<td>Y</td>
</tr>
<tr>
<td>FL</td>
<td>BTV-19</td>
<td>Cattle4</td>
<td>2</td>
<td>Y</td>
</tr>
<tr>
<td>FL</td>
<td>BTV-24</td>
<td>white tail deer5</td>
<td>1</td>
<td>Y</td>
</tr>
</tbody>
</table>

1) Co-infected in herd with BTV-19, first time detected in U.S.  
2) Co-infected with Epizootic hemorrhagic disease virus [EHDV] (not typed)  
3) Isolated and submitted by Dr. Stallknecht from University of Georgia (UGA)  
4) Co-infection in herd with BTV-15  
5) Isolated and submitted by Dr. Stallknecht from UGA.
Table 2. EHDV: Epizootic Hemorrhagic Disease virus (EHDV) PCR positives, calendar year 2019

<table>
<thead>
<tr>
<th>State</th>
<th>Serotype</th>
<th>Species</th>
<th>number</th>
<th>Isolate</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>EHDV-2</td>
<td>cattle</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>IA</td>
<td>EHDV-2</td>
<td>White tail deer</td>
<td>12</td>
<td>N</td>
</tr>
<tr>
<td>MN</td>
<td>EHDV-2</td>
<td>White tail deer</td>
<td>13</td>
<td>N</td>
</tr>
<tr>
<td>NE</td>
<td>EHDV-2</td>
<td>sheep</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>OR</td>
<td>EHDV-2</td>
<td>White tail deer</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>IA</td>
<td>EHDV-6</td>
<td>cattle</td>
<td>1</td>
<td>N</td>
</tr>
</tbody>
</table>

Partial-year 2020 data for NVSL Orbivirus identifications is shown in Tables 3 and 4. As of October 1, 2020, BTV has been identified and typed in six samples from three states; EHDV has been identified in three samples from one state.

Table 3. Bluetongue virus (BTV) PCR positives during Calendar year 2020 (January 1 through September)

<table>
<thead>
<tr>
<th>State</th>
<th>Serotype</th>
<th>Species</th>
<th>Number</th>
<th>Virus Isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>BTV-11</td>
<td>cattle</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>TX</td>
<td>BTV-11</td>
<td>cattle</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>TX</td>
<td>BTV-13</td>
<td>Cattle¹</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>TX</td>
<td>BTV-17</td>
<td>Cattle²</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>TX</td>
<td>BTV-11</td>
<td>White tail deer</td>
<td>1</td>
<td>N</td>
</tr>
<tr>
<td>WI</td>
<td>BTV-11</td>
<td>cattle</td>
<td>1</td>
<td>Y</td>
</tr>
</tbody>
</table>

1) Co-infected with BTV-17  
2) Co-infected with BTV-13 and EHDV (not typed)

Table 4. EHDV PCR positives during Calendar year 2020 (January 1 through September)

<table>
<thead>
<tr>
<th>State</th>
<th>Serotype</th>
<th>Species</th>
<th>Number</th>
<th>Virus Isolation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN</td>
<td>EHDV-6</td>
<td>reindeer (zoo)</td>
<td>3</td>
<td>Y</td>
</tr>
</tbody>
</table>

Vesicular Stomatitis/Equine Infectious Anemia/Equine Piroplasmosis  
Angela Pelzel-McCluskey, USDA-APHIS-Veterinary Services (VS)
2019 and 2020 Vesicular Stomatitis Outbreaks

The 2019 vesicular stomatitis virus (VSV) outbreak in the United States was the largest in the past 40+ years of recorded history. The outbreak was entirely VSV-Indiana serotype, which hadn't been isolated in the U.S. since 1997-1998, it lasted from June 21 to December 27, 2019, and included 1,144 affected premises in eight states (Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas, Utah, and Wyoming). Of the total affected premises, 1,128 premises had only equine species clinically affected, 15 premises had only clinically affected cattle, and one premises had both equids and cattle with clinical signs. Given the size and scope of the 2019 outbreak, it was expected that overwintering of the virus would occur and that new cases were likely to appear in the historically affected southwestern and Rocky Mountain region states beginning in the spring of 2020.

On April 13, 2020, the National Veterinary Services Laboratories in Ames, Iowa, confirmed a finding of VSV infection (Indiana serotype) on an equine premises in Dona Ana County, New Mexico. This was the index case of VSV for the 2020 outbreak and for the state of New Mexico. As the outbreak progressed, seven additional states became confirmed as VSV-affected: Arizona on April 22, Texas on April 23, Kansas on June 16, Nebraska on June 24, Oklahoma on July 7, Missouri on July 13, and Arkansas on July 27, 2020. A total of 325 premises in these eight states have been either suspected or confirmed as VSV-infected during the outbreak to date and placed under state quarantine. Quarantines remain for a period of 14 days from the onset of lesions in the last affected animal on the premises and vector mitigation strategies and enhanced biosecurity procedures are recommended on quarantined premises to reduce within-herd spread of the disease.

The breakdown of the number of quarantined premises and affected counties by state for the VSV 2020 outbreak are shown in Table 1 below and the distribution of affected premises is shown in Figure 1.

Table 1. Total number of VSV-affected premises by state as of September 24, 2020

<table>
<thead>
<tr>
<th>State</th>
<th># Counties Positive</th>
<th># Confirmed Positive Premises</th>
<th># Suspect Premises</th>
<th>Total # Premises Quarantined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>7</td>
<td>18</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>Arkansas</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Kansas</td>
<td>26</td>
<td>101</td>
<td>95</td>
<td>196</td>
</tr>
<tr>
<td>Missouri</td>
<td>11</td>
<td>36</td>
<td>17</td>
<td>53</td>
</tr>
<tr>
<td>Nebraska</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>
PARASITIC AND VECTOR BORNE DISEASES

<table>
<thead>
<tr>
<th>State</th>
<th>VSV</th>
<th>Equine</th>
<th>Cattle</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Mexico</td>
<td>6</td>
<td>13</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>9</td>
<td>18</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Texas</td>
<td>6</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td>69</td>
<td>205</td>
<td>120</td>
<td>325</td>
</tr>
</tbody>
</table>

Figure 1. Cumulative map of VSV-affected counties: April 13 – Sept 24, 2020

Of the 325 VSV-affected premises identified, 312 premises have had only equine species clinically affected, 12 premises have had only cattle clinically affected, and one premises has had both equine and cattle clinically affected. At the time of this writing, all 325 VSV-affected premises have completed the quarantine period and been released. Surveillance for additional cases potentially associated with this outbreak are ongoing.

While the overwintering event and identification of new VSV-Indiana positive cases were expected in 2020, there were several unusual occurrences associated with this outbreak that were not predicted. Firstly, in addition to the VSV-Indiana cases that occurred in New Mexico, Arizona, and far west Texas in April/May 2020, a new incursion of VSV-New Jersey virus from Mexico simultaneously appeared in south Texas and continued...
northward as far as south-central Texas affecting seven premises in four counties. An outbreak involving both VSV-Indiana and VSV-New Jersey serotypes concurrently had not been seen in the U.S. since 1997-1998. Secondly, the expected continuation of the VSV-Indiana outbreak from 2019 in the Rocky Mountain region (Colorado, Utah, and Wyoming) never materialized in 2020. There were some severe drought indicators that presented in this region in late spring and early summer which may have had a significantly negative impact on the VSV-competent vector populations, but further study is needed to evaluate the climate variables that may have played a role. Finally, the appearance of an outbreak cluster in the Kansas, Missouri, Oklahoma, and Arkansas region was not expected and VSV cases this far east had not been seen since the 1930s.

Analysis of these abnormalities along with other variables involved in the 2020 outbreak are planned by the VSV Grand Challenge Team, a multidisciplinary group sponsored by USDA-Agricultural Research Service (ARS) and involving four different ARS research hubs and APHIS-VS. This team, established in 2015, explores climatic, ecological, hydrological, virus, vector, host, and epidemiological variables that drive VSV incursion and expansion in the U.S. with the goal of establishing reliable predictive information on disease transmission and outbreak scope to support the state/federal field response. The team is currently producing several peer-reviewed publications per year that capture and share the research results.

Complete situation reports for the 2019 and 2020 VSV outbreaks can be accessed on the USDA-APHIS website at the following link: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/cattle-disease-information/vesicular-stomatitis-info

Update on Equine Piroplasmosis (EP) and Equine Infectious Anemia (EIA)

In calendar year 2019, there were 31,391 domestic U.S. horses tested for equine piroplasmosis (EP) as part of active ongoing surveillance with much of the testing focused on the previously identified high-risk groups of sanctioned and unsanctioned Quarter Horse racehorses where iatrogenic transmission of the disease is well recognized. A total of 72 horses were found to be infected with *Theileria equi* during this time period in seven states. All 72 horses were Quarter Horse racehorses with iatrogenic transmission either confirmed or suspected to have been the cause of spread and 14 of these horses were co-infected with equine infectious anemia (EIA). Eleven (11) of the 14 co-infected EP/EIA horses were epidemiologically linked to a single racehorse trainer whose unhygienic practices of needle, syringe, and IV set re-use were determined to have caused spread within the group.

More than 17,000 U.S. horses have been tested for EP so far during the 2020 calendar year (testing numbers current through June 2020) with 19 *T. equi*-positive horses found in six states as of September 30, 2020. Eighteen (18) of the EP-positives are current or former Quarter Horse racehorses with iatrogenic transmission of the disease either suspected or confirmed. One (1)
positive horse was an Arabian stallion with a life-long history of ownership by several unsanctioned racing participants in two states and it is suspected the stallion may have been used previously in this population as a blood donor horse for blood doping the racehorses. The common practice in this population of reusing a single IV blood set for blood doping often leads to blood-borne disease spread not only to the blood recipient horses but also back to the donor horse. Two (2) of these 19 EP-positive horses were found to be co-infected with EIA. The horses that were co-infected with both EP and EIA have been euthanized and many of the remaining EP-positive horses have been enrolled in the USDA-APHIS EP Treatment Program. All EP-positive horses will remain quarantined until permanent clearance of *T. equi* through high-dose imidocarb dipropionate treatment is achieved and the horse maintains *T. equi*-negative status on all diagnostic testing. To date, there have been 365 horses treated in the U.S. for EP with 320 horses having met the clearance and test negative criteria for quarantine release.

In calendar year 2019, a total of 1,151,584 EIA tests were conducted in the U.S. with 89 horses confirmed as EIA-positive in 17 states. At least 75 of the 89 EIA cases occurred in Quarter Horse racehorses with iatrogenic transmission either suspected or confirmed to have been the source of spread in those cases. So far in 2020, there have been at least 853,000 EIA tests performed in the U.S. (January-July 2020 reported test data) with 22 EIA cases confirmed in five states as of September 30, 2020. Nineteen (19) of the 22 EIA positives occurred in Quarter Horse racehorses with iatrogenic transmission of the disease either suspected or confirmed. Many of the EIA-positive horses were found to be participating in unsanctioned racing. The EIA cases identified in 2019 and 2020 further highlight our recognition of a recent shift in the epidemiology of EIA in the U.S. While prior to 2017, many of the EIA cases were found to be in untested or under-tested equine populations where natural vector-borne transmission of the disease had occurred over time, since 2017 the majority of the EIA cases are now being found in Quarter Horse racehorses with iatrogenic transmission involved. Iatrogenic transmission of EIA is a preventable occurrence and targeted educational outreach is needed in these high-risk populations to reduce the incidence of EIA.

**West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE)**

Equine case counts for WNV and EEE are sourced from the CDC’s ArboNET database and summarized by APHIS-VS in consultation with state animal health officials. Annual reports for each disease are compiled by calendar year and more current case counts during the active vector season are posted bi-weekly to the APHIS website. This information can be accessed at the following links:

For WNV information:

In calendar year 2019, there were 90 equine WNV cases identified in 25 states. So far in 2020, there have been only 20 equine WNV cases identified in four states as of September 9, 2020. For EEE, there were 184 equine cases reported in 24 states in calendar year 2019 and in 2020 a total of 77 cases in ten states have been reported as of September 9, 2020. Delays in reporting equine arboviral cases in ArboNET are routinely recognized and may be magnified this year due to the public health community’s necessary prioritization of response to COVID-19.

The 2019 EEE case count in equids, while elevated, did not set any historic high records, however there were several observations surrounding EEE infections in 2019 that raised concerns both in the veterinary and human medical communities. Firstly, there were a record-setting number of human EEE infections reported in 2019; a total of 38 human cases in ten states with 15 fatalities. The number of human EEE cases across the years 2009-2018 had an average of seven cases per year recorded with the highest case count in a single year being 15 cases in 2012. Another unexplained observation was that for the first time in history, the ratio of equine WNV cases to equine EEE cases was inverted. In previous years, equine WNV cases usually outnumber equine EEE cases 2:1. In 2019, the number of EEE cases was double that of WNV in equids. Finally, the number of EEE cases confirmed in alternate and wildlife species had not been recognized at such a high level and with so many species of animals represented as were reported in 2019. These anomalies for EEE in 2019 have yet to be explained and there is concern that 2020 could also be an unusually active year for EEE infection in all species.

Cattle Fever and Asian Longhorned Ticks in the U.S. 2020
Denise L. Bonilla, USDA-APHIS-VS

Cattle Fever Ticks (Rhipicephalus (Boophilus) microplus and R. b. annulatus)(CFT) in 2020

Cattle Fever Tick Eradication Program (CFTEP) Workforce: increase of 31% = two Veterinary Medical Officers, one Epidemiologist, one Field Operations Supervisor, three Supervisory Mounted Patrol Inspectors, six Mounted Patrol Inspectors, one Administrative Officer, ten Program Assistants

Infestations: Total premises needing to be checked is up in 2020 (3,360) compared to 2019 (2,835). New infested premises are about the same as last year. Notably this year, the program saw a 200% increase in native exposures in the free area. In the free area, Cameron County went from 40 to 57 premises and Zapata (47) and Webb (27) are slightly down from last year. Willacy County is high (25) holding steady from last year.

Research: Through omnibus and other funding over the past few years, we have been able to help fund 17 projects with Agricultural Research
Service (ARS) (NP 103 and 104) as primary cooperators and then ten other projects with non-ARS primary cooperators. These span general categories of treatment, wildlife, prevention, population genetics, surveillance, and detection with many projects spanning multiple categories. In 2020, CFTEP was able to help start projects that 1) examine animal/tick feces chemistry for CFT detection; 2) using weather stations for CFT outbreak predictions; 3) efficacy of BM86 vaccine in cattle in Texas and 4) lavender oil as a repellent/treatment for horses.

Asian Longhorned Ticks (*Haemaphysalis longicornis*) (ALHT)

New states positive in 2020: Ohio, Rhode Island and South Carolina. New hosts are black bear, gray squirrel, brown booby, great horned owl, and Peromyscus mice.

*Theileria orientalis* Ikeda: Has been shown to be vectored by ALHT in other parts of the world. Researchers at Virginia Veterinary Medicine School report at least 25 Virginia and four West Virginia counties with *T. orientalis* Ikeda. In Virginia, there is a site that has positive ALHT in the environment and sick cows but there was no direct link. ARS Pullman was recently able to show that our U.S. ALHT vectors a U.S. strain of *T. orientalis* Ikeda here in the U.S.

Red Sheep Tick (*Haemaphysalis punctata*)

Through our ALHT network, Columbia University and USDA, NVSL were able to detect another exotic tick, *Haemaphysalis punctata*, the red sheep tick from Block Island, Washington County, Rhode Island. After going through their archives, Columbia found several environmental samples back to 2010. This tick can vector Babesia, Rickettsia, and *Theileria* in its native range. Unlike ALHT, it is non pathogenetic. It is a three-host tick that as an adult likes feeding on cattle, horses, goats, sheep and medium size mammals. As an immature it likes to feed on birds, rodents, and lizards. It’s not been detected off of the island of this time and VS will continue work with Colombia University and others to monitor the situation.

Cattle Fever Ticks: Rio Bravo Buffer Zone

Andy Schwartz, Texas Animal Health Commission

Since 1893, the U.S. has fought to eradicate and then prevent re-incursion of cattle fever ticks (CFT), vectors of Bovine babesiosis. By 1943, CFT were pushed back to the Texas-Mexico border, and a 500-mile-long buffer zone was established in Texas. Considerable industry, state, and federal resources are expended annually in detecting and subsequently eradicating CFT that are introduced from Mexico largely by stray cattle and horses, and wildlife species that include white-tailed deer and nilgai antelope. The concept of the Rio Bravo Buffer Zone (RBBZ) was developed to address these CFT incursions by establishing a buffer zone in Mexico that mirrors the longstanding buffer zone in Texas. Establishing the RBBZ is a cooperative effort supported by industry, state, and federal representatives in both the United States and Mexico. A steering committee was established in March
2020, with representatives from Texas Animal Health Commission (TAHC), Animal and Plant Health Inspection Service (APHIS), Development, Fisheries and Food (SENASICA), National Confederation of Livestock Unions, Mexico (CNOG), Coahuila, Nuevo Leon, and Tamaulipas. Upon request, the states of Tamaulipas, Nuevo Leon, and Coahuila prepared budget proposals for establishing buffer zones in their respective states. APHIS did not support these proposals but did indicate support for pilot projects in these states. Efforts are now focused on establishing two cooperatively funded CFT eradication pilot projects, one in Tamaulipas and one in Coahuila. The pilot projects will be supported through Texas state funds and are scheduled to be conducted March 1-July 31, 2021.

ABADRU – Vector-Borne Disease Research

Research Updates from the Arthropod-Borne Animal Diseases Research Unit

Barbara S. Drolet, Lee Cohnstaedt, Bethany McGregor, Dana Mitzel, Dana Nayduch, Leela Noronha, William Wilson, USDA, Agricultural Research Service (ARS)

The Arthropod-Borne Animal Diseases Research Unit (ABADRU) has an interdisciplinary group of researchers working on a variety of viruses and vectors. Our research mission is to explore ways to detect and prevent emerging, transboundary arthropod-transmitted diseases of livestock. With expertise in microbiology, entomology, and veterinary science, we attack these arthropod-borne diseases on all three fronts. Specific diseases include Japanese encephalitis virus (JEV), Rift Valley fever virus (RVFV); epizootic hemorrhagic disease virus (EHDV), bluetongue virus (BTV), vesicular stomatitis virus (VSV), bacterial pathogens carried by house flies, and many aspects of vectors including vector biology, field ecology, surveillance, and pest management for mosquitoes and midges.

ABADRU’s JEV research is led by Drs. Leela Noronha and Dana Mitzel. Endemic to Asia and Oceana, the Flavivirus, JEV, is closely related to West Nile virus and Saint Louis encephalitis virus and is transmitted by *Culex* mosquitoes. Mosquitoes can transmit JEV to humans causing almost 70,000 cases of encephalitis every year with fifty percent of those cases having significant lifelong neurological problems. In swine it results in abortion, still births, and birth defects. Infection in horses results in neurological disease. It is a foreign animal disease threat to the U.S., as we have susceptible animals and competent mosquito vectors. The virus is maintained in a cycle between mosquitoes and vertebrate hosts, primarily wading shore birds, and in pigs which greatly amplify the virus. Humans, cattle, and horses are incidental or dead-end hosts, because they usually do not develop high enough concentrations of JEV in their bloodstreams to infect feeding mosquitoes. Very little is known about how JEV is maintained in mosquitoes. This is key to understanding competence of U.S. mosquito species and the potential JEV could become established as West Nile virus did, once introduced. In most of Asia, the primary vector is *Culex tritaeniorhynchus*. 
Two U.S. mosquito species that have been shown to be competent for JEV are *Culex quinquefasciatus* and *Culex tarsalis*. We need to better understand differential infectivity of various mosquito species and determine strain selectivity and dominance in regions of new virus introductions with stable transmission. Toward those goals, a *Culex tarsalis* continuous cell line has been developed. These cells were shown to be susceptible to JEV infection by immunofluorescence and growth kinetics studies have been conducted. This new cell line will be instrumental helping to identify factors that affect JEV infection in mosquitoes.

The JEV team are also doing research to identify factors associated with JEV maintenance in swine. The overarching goals are to characterize susceptibility, pathogenesis, and disease dynamics in domestic and feral swine. Additionally, vector-host interactions associated with JEV transmission will be characterized. In the near-term, research is being conducted to identify and characterize a surrogate system to study JEV at a BSL-2 level, and to test target tissue cell lines and macrophage-like cell lines for susceptibility. The relative susceptibility and viral growth of various porcine target tissue cell lines has been compared to baby hamster kidney (BHK) cells. BHK cells are typically used to grow JEV, but hamsters are not a relevant host species. Establishing infection kinetics in cultured pig cells will help refine the questions to pursue in vivo studies in pigs. Peripheral macrophages and dendritic cells of pigs also support JEV replication. This ability plays an important role in viremia and the ability of this virus to breach the blood brain barrier by transcellular transport into the central nervous system. A porcine macrophage-like cell line has been tested for susceptibility and viral growth compared to BHK cells. These cells are species and tissue relevant and will be extremely helpful in understanding the infection characteristics of JEV and the innate immune responses of pigs to infection.

ABADRU’s RVFV research is led by Dr. William Wilson. Endemic to Africa, Rift Valley fever is mosquito-borne disease of domestic and wild ruminants, causing high mortality in newborn calves, lambs, and goats, and high abortion rates in sheep. Zoonotic transmission to humans is typically through blood, tissues, or raw milk of infected animals. There are limited vaccines available in Africa and there are no fully licensed vaccines or commercial diagnostics in the U.S. It is a foreign animal disease threat to U.S., as we have susceptible animals and competent mosquito vectors. Rift Valley fever’s tripartite segmented genome can reassort to generate novel reassortant viruses. This has the potential to produce viruses that are more pathogenic, more transmissible, or that have wider vector or host range. This is especially concerning because widespread use of live attenuated vaccine strains in endemic countries allows the potential replication of vaccine and wildtype strains simultaneously within the same mosquito or animal. Identifying these reassortants is important for optimum specificity and sensitivity of diagnostic tests, and for epidemiology and predictive risk modeling. Collaborative studies with Kansas State University (KSU) were conducted using a novel genotyping assay to detect and characterize
reassortants. Co-infections with three different RVFV strains are in progress in both sheep and mosquitoes. For RVFV diagnostics, in collaboration with KSU, an enzyme-linked immunoassay (ELISA) has been developed utilizing a baculovirus-expressed nucleoprotein antigen. This assay showed high specificity and sensitivity in both sheep and calves for two different viral strains. Using baculovirus-expressed antigens instead of whole virus antigens decreases the biosafety and biosecurity risks of detecting RVFV-exposed animals.

Recently, in collaboration with KSU, a subunit EHDV vaccine was developed using a baculovirus-expressed VP-2 protein for EHDV serotypes 2 and 6. Mice and cattle showed neutralizing antibody in response to vaccination. Vaccinated white-tailed deer were protected from clinical disease after challenge with wild type virus and no viral RNA was detected in blood or tissues. This subunit vaccine technology has been licensed to a commercial partner.

ABADRU’s VSV research program is led by Dr. Barbara Drolet. Vesicular stomatitis (VS) is an insect-transmitted disease of cattle, horses and swine. It is endemic from northern South America to northern Mexico. Sporadically, an incursion will occur where virus from an endemic region will move north into the U.S. causing an outbreak that spreads across a large geographic area encompassing many states from south to north throughout the insect vector season. These incursive viruses can cause single year outbreaks, but more recently, multi-year outbreaks from an overwintering virus genotype are common. Vesicular lesions and saliva contain large amounts of virus, enabling animal to animal contact transmission within the herd. These shedding animals can also infect people resulting in a flu-like illness. Additionally, three insect species are known to transmit VSV: *Culicoides* midges, *Simuliidae* black flies, and *Phlebotomus* sand flies. These insects require blood in order to go through a gonotrophic cycle to lay eggs. If feeding on an infected animal, insects ingest the virus and after an extrinsic incubation period they become infected and are able to transmit VSV to naive animals during subsequent blood feedings. This blood feeding/egg laying cycle can be expected to occur three to four times over the life of an insect. Virus is cleared in animals by seven days, but premises are quarantined, restricting all animal movement, for fourteen days after the onset of lesions.

With no wildlife reservoir found, it is believed that the only source of virus for insects is infected quarantined livestock. To account for the expansive geographic spread of the virus, far from quarantined animals by insects that only feed three to four times over their lifetime and only fly up to 2 km a day, we hypothesized that the blood feeding transmission cycle between infected animals and *Culicoides* midges, was not the only mechanism by which virus was being maintained and spread among midge populations. Experimental studies showed that female *Culicoides* midges are able to transmit VSV to male midges venereally during mating at a rate of 15.2% after two gonotrophic cycles and 76.3% after three cycles. Those infected males were
able to venereally transmit VSV to naïve females at a 9.5% transmission rate. This is the first evidence for venereal transmission of any of the arboviruses transmitted by Culicoides biting midges and the first evidence for venereal transmission of VSV in any of the three primary competent VSV vector species (midges, black flies, sand flies). Venereal transmission potentially increases the number of VSV-positive midges within a breeding population beyond an initial blood feeding. This may account for further geographic virus spread by midges away from quarantined premises with available VSV infected animal reservoirs. Maintenance of virus in the insect populations may also play a role in overwintering viral genotypes, the cause of multi-year outbreaks. This research shows the importance of males in VSV transmission dynamics, never considered previously, and in the maintenance of VSV in nature. Drolet’s team will be doing further studies to determine the effects of venereal transmission on oviposition, fertility, and mating behavior, but these results highlight the need to incorporate alternative routes of transmission in understanding arbovirus outbreaks.

Arthropods transmit numerous viral, parasitic, and bacterial diseases, but the potential role of arthropods in SARS Coronavirus 2 (SARS-CoV-2) transmission is not fully understood. Previous work showed that SARS-CoV-2 replication is not supported in certain cultured mosquito cells and that some mosquito species did not support virus replication following intrathoracic inoculation, a very artificial route of exposure. ABADRU researchers expanded on those studies with a natural route of exposure, that being ingestion of an infectious blood meal, using Culex tarsalis and Culex quinquefasciatus mosquitoes and Culicoides sonorensis biting midges, all known biological vectors for numerous RNA viruses in the U.S. Fed insects were held, sorted into pools, and tested for viral RNA and infectious virus. Ten days after ingesting the infectious blood meal, qRT-PCR showed all three insect species were still positive for viral RNA, especially Culicoides midges at 85%. But no infectious virus was detected in any of the insects. Thus, although SARS-CoV-2 RNA persists, the virus does not replicate within these vector species and therefore they will not transmit it.

ABADRU’s house fly research is led by Dr. Dana Nayduch. Her team has shown that the environmental niche impacts microbial communities carried by female house flies. Flies were collected from agricultural, urban, and mixed environments over a 3-month period and genetic analyses of bacteria in female fly gastrointestinal tracts were conducted. Numerous microbial species were identified with species diversity and richness being greatest in agricultural flies. The gut microbial communities of all flies were complex and contained pathogens, irrespective of collection site. The bacterial community composition was strongly influenced by the environment, which implies that flies access bacteria, including potential pathogens, from local sources. Thus, limiting fly access to bacterial sources, and/or controlling house fly populations, can result in reduced risk of flies harboring and transmitting bacteria that impact human and animal health. Gut bacterial communities also were analyzed from house flies that were collected at cattle operations
(dairy or beef) in Nebraska, Kansas, and Oklahoma. Bacterial communities carried by flies were diverse and abundant. Community composition and species richness varied across both farm type (whether beef or dairy) and across geographic location. Flies carried numerous taxa of bacteria of significant medical and veterinary interest. Flies from feedlots in all three states carried *Moraxella*, associated with pinkeye. Flies from all states and farm types carried *Staphylococcus* and *Streptococcus* species associated with mastitis and other cutaneous infections. Flies also carried the foodborne pathogens *Campylobacter* and *E. coli*. Taken together, these results show that not all flies from all cattle facilities carry the same bacterial populations, but instead likely represent the microbial communities of the animals present on the site. Therefore, flies serve as significant reservoirs for bacteria at cattle operations and also pose the risk of disseminating and transmitting bacteria, including pathogens, among animals and their environment.

The Nayduch group also uses culture-based approaches to characterize bacteria carried by house flies. In 2019 they collected male and female house flies from beef cattle operations in three Kansas counties and cultured both total aerobic bacteria and coliforms, then tested a subset of coliforms for tetracycline (Tet) resistance. Overall, females carried both more total bacteria and more coliforms than males. Antimicrobial susceptibility testing showed 61% of the coliforms carried by flies were resistant to Tet. Up to 90% of males and 88% of females carried at least one Tet-resistant species. Up to 80% of males and 76% of females carried two or more Tet-resistant species. Although both male and females harbor antimicrobial resistant coliforms, females tend to harbor more coliforms overall and therefore may pose a greater risk in dissemination. Determining the role that management practices, climate factors, operation size, and other variables play in risk of bacterial transmission by flies is ongoing. This will identify key intervention points of fly control in order to reduce overall bacterial transmission, and specifically, anti-microbial resistant dissemination and persistence in cattle operations.

ABADRU’s *Culicoides* biting midge field ecology research is led by Dr. Bethany McGregor. *Culicoides* are competent vectors for many arboviruses and they are important agricultural pests. With over 100 *Culicoides* species in the U.S., McGregor’s team is studying the phenology of these important vectors. Specifically, the periodic lifecycle events and how they are influenced by seasonal and interannual variations in climate and habitat. *Culicoides* adults and larval mud samples are being collected on diverse agricultural wildland sites in northeast KS. Understanding the seasonality of midge species allows researchers to determine which species are present at certain times of the year, how these communities overlap, and how population sizes change throughout the year. Potentially, this can implicate lesser known *Culicoides* vector species that are challenging to study in a laboratory environment. During this past summer a VSV outbreak occurred in eastern Kansas including sites where collections were being made for the phenology research. Very few *Culicoides sonorensis*, the confirmed VSV
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vector species, were found in the collections. However, *Culicoides haematopotus*, *C. crepuscularis*, and *C. stellifer* were abundant. Approximately 1300 midges were collected, identified to species and pooled by date, site, species and physiological status. These pools will be tested for VSV by realtime qRT-PCR. If any positive pools are found for new *Culicoides* vector species, it will fulfill two of the four World Health Organization vector incrimination criteria.

Sugar feeding is done by both male and female *Culicoides*, even blood feeding females, but very little is known about their sugar feeding ecology. It is not known what plants they are using, whether they feed opportunistically on whatever is available, or preferentially seek specific colors and odors, whether they use flowers only or if they also use extrafloral nectaries, which are specialized nectar secreting plant glands. McGregor’s team are conducting a series of laboratory, field, and behavioral studies to learn more about this understudied phenomenon. This research will generate valuable ecological data that can be leveraged to develop targeted control strategies specific to midges, decreasing pesticide impacts on non-target species.

ABADRU’s *Culicoides* management strategy efforts are led by Dr. Lee Cohnstaedt. Extensive testing of mosquito larval products for their effectiveness on midge larvae is ongoing. Insect growth regulators and monomolecular films were highly effective in killing *Culicoides* larvae. Follow up studies are in progress for the chitinase inhibitors Diflubenzuron and Novaluron.

Most recently, in collaboration with KSU, Colorado State University, and Texas A&M, Cohnstaedt’s team looked at the return on investment from the boom/bust funding that occurs when a new arbovirus emerges in the U.S. Emergence of mosquito-borne viruses will continue and the reactionary responses increase attention, funding, publications, innovations, and preventive measures for public health. Long-term impacts, or returns on investment, are seen in scientific advancements, such as publications, and in innovations, such as traps. It was determined that a more sustainable, economical, and effective approach is needed to minimize the boom and bust in funding and capacity. The U.S. should strive to optimize the cost-effectiveness of budgetary spending by securing resources for biosecurity threats. This would maximize benefits while minimizing the total costs of anticipated expenditures incurred during mosquito-borne viral outbreaks.

SCWDS Update on 2020 Hemorrhagic Disease Activity and Tick Surveillance
Mark G. Ruder, Southeastern Cooperative Wildlife Disease Study (SCWDS), University of Georgia
(Other authors) Alec Thompson, Stacey Vigil, Seth White, Emily Doub, Michael Yabsley, Natalie Stilwell, Rebecca Poulson, and David Stallknecht, SCWDS, University of Georgia

In collaboration with the USDA-APHIS-VS and SCWDS member state wildlife agencies, SCWDS conducts surveys for exotic arthropods across the
United States. Here we provide an update on ongoing surveillance and related to the Asian longhorned tick (*Haemaphysalis longicornis*). Since the fall/winter of 2017, SCWDS has worked with numerous state, federal and private groups to conduct surveys of wildlife for *H. longicornis*. Methods have included 1) live animal trapping and environmental sampling in localized areas where *H. longicornis* has been documented, 2) passive regional surveillance of white-tailed deer and other wildlife, and 3) tick collections from wildlife presented to wildlife rehabilitation facilities in areas where *H. longicornis* has been documented. As of October 2020, we have examined ticks from ~2000 individuals representing 53 species from 22 states resulting in numerous new state, county, and host records. Although the situation is dynamic, to date, we have detected *H. longicornis* in seven states (New Jersey, Maryland, West Virginia, Virginia, North Carolina, Kentucky, and Pennsylvania) on black bear, brown booby, coyote, domestic dog, eastern cottontail, elk, gray fox, great-horned owl, raccoon, red fox, red-tailed hawk, Virginia opossum, white-tailed deer, and woodchuck.

Since 2019, SCWDS has screened host-seeking *H. longicornis* and other native tick species collected from a cattle farm in Albemarle County, Virginia where an outbreak of theileriosis (caused by *Theileria orientalis* Ikeda genotype) in cattle previously occurred. *Theileria orientalis* Ikeda genotype was detected in 13% (15/113) of *H. longicornis* nymphs, providing evidence this tick may serve as a vector for this parasite in the U.S. Native tick species collected from this site were all negative for *T. orientalis*, but related native protozoan parasites were detected. SCWDS also screened white-tailed deer from the region to investigate their potential role in the epidemiology of exotic *T. orientalis* Ikeda. No deer sampled (n=350) were positive for *T. orientalis*.

Since spring 2019, SCWDS has conducted surveys on this same cattle farm (Albemarle County, Virginia) to investigate *H. longicornis* phenology, host associations, and habitat associations. Results indicate seasonal variation of *H. longicornis* is consistent with previous studies where nymph life stages are present across seasons but most active in the spring, followed by a peak in adult activity in the summer and larval activity in the fall. Among three habitat types (forest, edge, pasture) included in the study, we observed *H. longicornis* in all habitats but observed a lower probability of detecting *H. longicornis* in pasture habitat. In addition, we detect *H. longicornis* on various wildlife hosts including coyote, eastern cottontail, raccoon, Virginia opossum, white-tailed deer, and woodchuck. Further, we recovered a single *H. longicornis* larva from *Peromyscus* sp. (n=1). However, the tick was not attached and the importance of this detection, if any, remains unclear.

Annually, SCWDS processes tissue samples from throughout the United States from wild ruminants with suspected orbiviral hemorrhagic disease. Submissions are initially tested for epizootic hemorrhagic disease virus (EHDV) and bluetongue virus (BTV) by molecular methods (e.g., conventional and quantitative reverse transcription PCR). For samples that test positive by RT-PCR, virus isolation is attempted, and isolates are
identified to serotype. Samples with no virus isolate are not further typed. Findings from the 2019 and 2020 transmission seasons are reported here.

### 2019 SCWDS EHDV & BTV Diagnostics

<table>
<thead>
<tr>
<th>STATE</th>
<th>SPECIES</th>
<th>VIRUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Arkansas</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Florida</td>
<td>white-tailed deer</td>
<td>BTV-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BTV-13</td>
</tr>
<tr>
<td>Georgia</td>
<td>white-tailed deer</td>
<td>EHDV-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BTV-2</td>
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<tr>
<td>Idaho</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td>pronghorn</td>
<td></td>
</tr>
<tr>
<td>Indiana</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Kansas</td>
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<td>EHDV-2</td>
</tr>
<tr>
<td>Kentucky</td>
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</tr>
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</tr>
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</tr>
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</tr>
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</tr>
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<td>Virginia</td>
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<td>Wisconsin</td>
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<td>West Virginia</td>
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<td>EHDV-2</td>
</tr>
<tr>
<td></td>
<td>cattle</td>
<td></td>
</tr>
</tbody>
</table>

### 2020 SCWDS EHDV & BTV Diagnostics

Virus Serotypes Detected as of 10/13/20

<table>
<thead>
<tr>
<th>STATE</th>
<th>SPECIES</th>
<th>VIRUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delaware</td>
<td>white-tailed deer</td>
<td>EHDV-6</td>
</tr>
<tr>
<td>Indiana</td>
<td>white-tailed deer</td>
<td>EHDV-6</td>
</tr>
<tr>
<td>Kentucky</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Maryland</td>
<td>white-tailed deer</td>
<td>EHDV-6</td>
</tr>
<tr>
<td>Missouri</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Montana</td>
<td>white-tailed deer, pronghorn</td>
<td>EHDV-2 EHDV-2</td>
</tr>
<tr>
<td>North Carolina</td>
<td>white-tailed deer</td>
<td>EHDV-2 EHDV-6</td>
</tr>
<tr>
<td>North Dakota</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Nebraska</td>
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<td>New York</td>
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</tr>
<tr>
<td>Tennessee</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
<tr>
<td>Virginia</td>
<td>white-tailed deer</td>
<td>EHDV-2</td>
</tr>
</tbody>
</table>
During 2019, 219 viruses were detected from 402 tissue samples, representing five species (369 white-tailed deer, 16 elk, ten mule deer, four pronghorn, and 3 cattle) from 26 states. Isolations of EHDV-1 (1), EHDV-2 (137), BTV-2 (1), BTV-3 (1), and BTV-13 (1) were made from white-tailed deer or pronghorn (see Table). An additional 21 untyped BTVs were detected in white-tailed deer (AR, FL, GA, IN, KY, NC, NE, PA, and WV), and 58 untyped EHDVs were detected in white-tailed deer, mule deer, elk, and cattle (AR, FL, GA, ID, KS, KY, MI, MO, NC, WI, and WV). During the 2020 transmission season (as of October 13, 2020) 100 viruses have been detected from 164 tissue samples, representing 23 states and five species (143 white-tailed deer, 12 pronghorn, 7 mule deer, 1 elk, and 1 moose). Isolations of EHDV-2 (31) and EHDV-6 (14) were made from white-tailed deer or pronghorn (see Table). An additional 13 untyped BTVs have been detected in white-tailed deer, mule deer, or pronghorn (FL, GA, IN, KS, LA, and NE) and 42 untyped EHDVs have been detected in white-tailed deer, mule deer, pronghorn, or elk (FL, GA, ID, IN, KY, MI, MO, MT, NC, ND, NE, NY, PA, SC, TN, and WV).

**LAPRU Research Update**
Kimberly Lohmeyer, USDA-APHIS, Agricultural Research Service (ARS)

The Livestock Arthropod Pest Research Unit (LAPRU) is composed of three separate research facilities: The Knipling Bushland U.S. Livestock Insects Research Laboratory (KBUSLIRL), Kerrville, Texas, conducts research on biting fly and tick pests of cattle and wildlife, the Cattle Fever Tick Research Laboratory (CFTRL), Edinburg, Texas, focuses on research to develop novel control methods for cattle fever ticks, and the Sterile Screwworm Production Facility, Pecora, Panama, conducts research to improve screwworm mass rearing techniques.

Significant changes are planned for both the KBUSLIRL and CFTRL facilities for FY21. At the KBUSLIRL, the vacant geneticist and laboratory director positions are slated to be filled. Additionally, the long-planned facility modernization project is slated to break ground in early 2021. This project includes the construction of a large new administrative and laboratory structure that will house the scientific staff in one building as well as a new fly and tick rearing facility and a large research stanchion barn. At the CFTRL, the vacant entomologist and toxicologist positions are slated to be filled in FY21. Additionally, thanks to new funding that has been appropriated for the cattle fever tick research program, six new scientist positions will be created and filled over the next three years. These positions include an epidemiologist and an immunologist position that will be filled in FY21, a wildlife biologist and a computational biologist position that will be filled in FY22, and a physical geographer and an agricultural engineer position that will be filled in FY23. The significant increase in funds will also be used to
build new laboratory and administrative spaces, two new research stanchion barns, and a wildlife handling facility. The additional barn and laboratory research space, the wildlife handling facility, and the new scientific staff positions will greatly enhance the cattle fever tick research program and will allow for more studies to be conducted on site with both cattle and wildlife hosts of cattle fever ticks.

Ongoing research efforts of the LAPRU continue to include applied and genomic research on ticks, biting flies, and screwworms. Scientists at all three locations are involved in research to find novel control techniques for tick and fly pests as well as techniques to improve lures and mass rearing techniques for screwworms. Alternative treatments for cattle and wildlife to traditional acaricide treatments such as CoRal and Dectomax are being investigated as well as the efficacy of novel antigen vaccines. Additionally, research is being conducted to help combat insecticide and acaricide resistance and to find longer acting cattle fever tick treatments that allow a reduction in the frequency, and thus the cost, of rounding up cattle for treatment. Basic tick and fly biology studies are also underway, in particular studies to evaluate what larval ticks are doing while off host and to determine if this vulnerable life stage can be manipulated to enhance control. Novel control strategies for ticks and flies such as desiccant dusts and essential oils are being evaluated. Modeling studies as well as field studies that incorporate "big data" collection from cattle and the environment are being conducted that will help further refine cattle fever tick life cycle models as well as models for treatment scenarios. If larval tick refugia or consistent patterns in how hosts like cattle and wildlife utilize the south Texas landscape can be identified, then control techniques can be targeted at these areas to increase the efficiency and efficacy of tick treatments. Genomic studies continue to provide information about the source of cattle fever ticks collected from new infestations along the border. This information can used to compare the genetic signature of ticks within and between counties and help trace their origin. Continued efforts to improve the genomes of cattle fever ticks, biting flies, and screwworm flies will lead to increased information about potential targets or vulnerabilities that can be exploited to develop new control tactics.

Committee Business:

The Committee called the business meeting to order at 2:35PM EDT. The mission statement was reviewed, and a quorum was established.

New Business:

The response to 2019 Resolution #38: Equine Infectious Anemia and Equine Piroplasmosis Control Strategies was discussed. It was decided that Response is sufficient for the current time; however additional follow-up will be needed. Recommend timeframe for follow-up: request timeline of Spring/Summer 2021 for completion of Uniform Standards was agreed upon by majority vote.
REPORT OF THE COMMITTEE

A new resolution titled Re-evaluation of endemic bluetongue virus serotypes in the United States was brought forward and the background was discussed. The resolution was also brought up in two other committees. Motion to adopt was moved and seconded. Vote carried unanimously.

With no further business, there was a motion to adjourn and seconded. Meeting concluded at 4:40 p.m. EDT.
COMMITTEE ON POULTRY AND OTHER AVIAN SPECIES  
Chair: Yuko Sato, IA  
Vice Chair: Melissa Yates, MD

Bruce Akey, TX; Erika Alt, WV; Nicole Andre, NY; Sarah Bailey, ND; Carolynn Bissett, VA; Richard Breitmeyer, CA; Paul Brennan, IN; Becky Brewer-Walker, AR; Charlie Broaddus, VA; Michael Carter, MD; Randolph Chick, AR; Steven Clark, NC; John Clifford, GA; Robert Cobb, GA; Stephen Crawford, NH; Tarrie Crnic, KS; Marie Culhane, MN; Michael David, MD; Amy Delgado, CO; Thomas DeLiberto, CO; Brandon Doss, AR; Roger Dudley, NE; Tracey Dutcher, MN; Anita Edmondson, CA; Brigid Elchos, MS; Joseph Essler, TX; Larry Forgey, MO; Tony Forshey, OH; Nancy Frank, MI; Tony Frazier, AL; Lindy Froebel, DC; Joseph Garvin, VA; Samantha Gibbs, FL; Michael Gilsdorf, MD; Eric Gingerich, IN; Eric Gonder, NC; James Grimm, ; Scott Gustin, AR; Rod Hall, OK; Steven Halstead, MI; Charles Hatcher, TN; Kate Hayes, AL; Burke L. Healey, CO; Denise Heard, GA; Fidelis Hegngi, MD; Julie Helm, SC; Janemarie Hennebelle, GA; Michael Herrin, OK; Heather Hirst, DE; Donald Hoenig, ME; Dennis Hughes, NE; Carolyn Hurwitz, ME; Mark Jackwood, GA; Jarra Jagne, NY; Eric Jensen, AL; Annette Jones, CA; Rebecca Jones, CO; Brian Joseph, WA; Calvin Keeler, DE; Donna Kelly, PA; Bradley Keough, KY; Patrice Klein, DC; Michael Kopp, IN; Dale Lauer, MN; Elizabeth Lautner, IA; John Lawrence, ME; Chang-Won Lee, OH; Molly Jean Lee, IA; Julianna Lenoch, CO; Randall Levings, IA; Mary Jane Lis, CT; Karen Lopez, DE; Gita Malik-Dahiya, ON; David Marshall, NC; Michael Martin, NC; James Maxwell, WV; Patrick McDonough, NY; Sara McReynolds, KS; Gay Miller, IL; Lee Myers, GA; Cheryl Nelson, KY; Kayla Niel, IA; Kristy Pabilonia, CO; Boyd Parr, SC; William Pittenger, MO; Lisa Quiroz, CA; Willie Reed, IN; Heather Reider, CO; Byron Rippke, IA; G. Donald Ritter, DE; Jonathan Roberts, LA; Keith Roehr, CO; Susan Rollo, TX; James Roth, IA; Mo Saif, OH; John Sanders, WV; Yuko Sato, IA; Travis Schaal, IA; Joni Scheftel, MN; David Schmitt, IA; Andy Schwartz, TX; Sheryl Shaw, DC; Shelley Mehlenbacher, VT; Staci Slager, IL; Diane Stacy, LA; Philip Stayer, MS; Darrel Styles, MD; Gregory Suskovic, MN; David Swayne, GA; Manoel Tamassia, NJ; Todd Tedrow, SD; Mia Kim Torchetti, IA; Alberto Torres, AR; Shauna Voss, MN; Michele Walsh, ME; Doug Waltman, GA; Emily Walz, MN; Elizabeth Warren, DE; James Watson, MS; Rodney White, MD; Ben Wileman, MN; Melissa Yates, MD; Ernest Zirkle, NJ.

The Committee met on October 14, 2020 virtually, from 12:00 p.m. to 4:28 p.m., Eastern Standard Time (EST). There were 200 attendees in the morning session and 180 attendees in the afternoon session. Chair Yuko Sato presided, assisted by Melissa Yates, Vice Chair. Sato welcomed the Committee on Poultry and Other Avian Species (CPAS) members and summarized housekeeping items.

2019 Resolutions:
Two resolutions were brought forward during the business meeting and passed:
1. The United States Animal Health Association requests that the 116th United States Congress appropriate new, no-year, mandatory fiscal appropriations dedicated for low pathogenic avian influenza (LPAI) indemnity and compensation to ensure continued participation in National Poultry Improvement Plan H5/H7 LPAI programs. This new appropriation will support the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services’ effort to provide a stable indemnity and compensation program for H5/H7 LPAI flocks.

2. The United States Animal Health Association requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services expedite the process to hire the best qualified Compartmentalization Veterinary Medical Officer and the National Poultry Improvement Plan (NPIP) Authorized Laboratory Coordinator for the positions located at the NPIP office.

Presentations and Reports

American Board of Veterinary Practitioners (AVBP) Current Diseases of Concern was given by Steve McCarter, Tyson Foods. A summary of the report is included in these proceedings.

Table Egg Layer Industry Report was given by Eric Gingerich, Diamond V. A summary of the report is included in these proceedings.

Turkey Industry Report was given by Lindy Froebel, National Turkey Federation. A summary of the report is included in these proceedings.

National Veterinary Services Laboratories (NVSL) Avian Influenza and Newcastle Disease Report was given by Mia Kim Torchetti, USDA-APHIS-VS-NVSL. A summary of the report is included in these proceedings.

NVSL Bacteriology Diagnostics Report was given by Brenda Morningstar-Shaw, USDA-APHIS-VS-NVSL. A summary of the report is included in these proceedings.

National Poultry Improvement Plan (NPIP) Update was presented by Elena Behnke, USDA-APHIS-VS-NPIP. A summary of the report is included in these proceedings.

Avian Influenza (AI) and Newcastle Disease Virus (NDV) Disease Subcommittee Report was given by David Suarez, USDA-ARS-SEPRL. A summary of the report is included in these proceedings.

North Carolina/South Carolina (NC/SC) Low Pathogenicity Avian Influenza - Highly Pathogenic Avian Influenza (LPAI-HPAI) H7N3 Event Overview was given by Julie Helm and Mike Martin, Clemson University and North Carolina Department of Agriculture and Consumer Services. A summary of the report is included in these proceedings.

Assessment of the Risk Associated with the Movement of Pullets Out of the Pullet Barn in a Control Area During an HPAI Outbreak in the United States was presented by Carol Cardona and Marie Culhane,
University of Minnesota. A summary of the report is included in these proceedings.

**American Association of Avian Pathologist (AAAP) Research Priorities Survey Update** was given by Eric Gingerich, Diamond V. A summary of the report is included in these proceedings.

**Live Bird Market System Report** was given by Fidelis Hegngi, USDA-APHIS-VS. A summary of the report is included in these proceedings.

**Committee Business:**

**Sub-Committee Report:** The Subcommittee on Avian Influenza/Newcastle Disease Report as presented by David Suarez was approved unanimously by the Committee.

**Old Committee Business:** None

**New Committee Business:** None

**Committee Recommendations:** None

**Committee Resolutions:** None

A motion to adjourn the meeting was initiated and seconded. There being no further business the Committee on Poultry and Other Avian Species (CPAS) adjourned at 4:28 p.m.

**American Board of Veterinary Practitioners (AVBP) Current Diseases of Concern**

Steve McCarter, Tyson Foods

Percent in 2019 to 0.313 percent in 2020. The movement of many processing plants to New Poultry Inspection System (NPIS) is the most likely explanation for the decline.

**Key Broiler Disease Issues (see below):** Among the major disease-related issues that broiler production veterinarians are concerned with, coccidiosis (specifically *E. maxima*) ranked first, and necrotic enteritis ranked second. These two diseases typically operate in tandem, and it’s likely that restricted-use antibiotic programs (ranked first on SPECIFIC disease importance chart below) have only exacerbated their impact on the broiler industry. As of July 2019, over fifty percent of U.S. broilers were raised without a shared-class antibiotic or ionophore\(^1\). In addition, ionophore feed inclusion continues to decline each year since 2014\(^2\). “Chemical” coccidiostat and coccidiosis vaccine usage has doubled over the same period\(^2\). Marketing strategies and customer pressure are likely driving the move toward these methods of coccidiosis control. At the same time, the inclusion of a preventative antibiotic to control necrotic enteritis continues to decline. Seventy seven percent of broiler feed does not contain any growth promoting antibiotic compounds\(^2\).

**Key Non-Disease Broiler Issues (see below):** Every year since 2016, the survey indicated the highest ranked major non-disease issue among broiler veterinarians was restricted antibiotic-use programs. For the last two years, Poultry Welfare-Activists Threats ranked second in this category.
Food safety regulations and lack of alternatives to antibiotics were also ranked highly.

1 Agristats report, 2019.  

<table>
<thead>
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<tbody>
<tr>
<td><strong>Average Age</strong></td>
<td>46.81</td>
<td>47.27</td>
<td>47.82</td>
<td>47.13</td>
<td>47.04</td>
<td>47.16</td>
<td>47.02</td>
<td>47.39</td>
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<tr>
<td><strong>Average Broiler Weight</strong></td>
<td>6.01</td>
<td>6.12</td>
<td>6.24</td>
<td>6.22</td>
<td>6.27</td>
<td>6.27</td>
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<tr>
<td><strong>Feed Ingredient Cost/Ton</strong></td>
<td>342.55</td>
<td>287.69</td>
<td>249.90</td>
<td>235.69</td>
<td>228.90</td>
<td>239.37</td>
<td>235.18</td>
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<td><strong>First Week Mortality</strong></td>
<td>1.15</td>
<td>1.28</td>
<td>1.39</td>
<td>1.41</td>
<td>1.41</td>
<td>1.55</td>
<td>1.55</td>
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<tr>
<td><strong>Total Mortality</strong></td>
<td>3.86</td>
<td>4.31</td>
<td>4.79</td>
<td>4.53</td>
<td>4.56</td>
<td>4.99</td>
<td>4.96</td>
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<tr>
<td><strong>Mortality (3.6-4.4 lbs)</strong></td>
<td>3.32</td>
<td>3.64</td>
<td>3.90</td>
<td>3.65</td>
<td>3.53</td>
<td>4.06</td>
<td>4.09</td>
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<td><strong>Mortality (4.4-5.2 lbs)</strong></td>
<td>3.22</td>
<td>3.55</td>
<td>3.54</td>
<td>3.55</td>
<td>3.83</td>
<td>4.24</td>
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<td><strong>Mortality (5.2-6.0 lbs)</strong></td>
<td>4.59</td>
<td>4.40</td>
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<td><strong>Mortality (6.0-6.8 lbs)</strong></td>
<td>3.62</td>
<td>4.92</td>
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<td>4.31</td>
<td>4.56</td>
<td>4.92</td>
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<td><strong>Mortality (6.8-7.5 lbs)</strong></td>
<td>4.24</td>
<td>4.31</td>
<td>5.03</td>
<td>4.68</td>
<td>4.86</td>
<td>5.72</td>
<td>5.72</td>
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## 2020 Disease and Non-Disease Rankings

As in previous years, the Association of Veterinarians in Broiler Production (AVBP) membership was polled concerning disease and non-disease issues. Major issues were ranked for both areas, and a further breakdown of specific disease and non-disease issues is included below.

AVBP is comprised exclusively of veterinarians employed full-time by U.S. broiler companies. The veterinarians responding to the 2020 survey included most of the broilers in the United States.
### 2020 Major DISEASE Categories

<table>
<thead>
<tr>
<th>RANKING</th>
<th>Disease Category</th>
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<tr>
<td>1</td>
<td>Coccidiosis</td>
</tr>
<tr>
<td>2</td>
<td>Necrotic Enteritis</td>
</tr>
<tr>
<td>3</td>
<td>Chick Quality and Early Mortality</td>
</tr>
<tr>
<td>4</td>
<td>Infectious Bronchitis</td>
</tr>
<tr>
<td>5</td>
<td>Gangrenous Dermatitis</td>
</tr>
<tr>
<td>6</td>
<td>Novel Reovirus</td>
</tr>
<tr>
<td>7</td>
<td>Bacterial osteomyelitis of the legs</td>
</tr>
<tr>
<td>8</td>
<td>General Polyserositis-E. coli</td>
</tr>
<tr>
<td>9</td>
<td>Infectious Laryngotracheitis</td>
</tr>
<tr>
<td>10</td>
<td>Infectious Bursal Disease</td>
</tr>
<tr>
<td>11</td>
<td>Vertebral Osteomyelitis/Kinkyback</td>
</tr>
<tr>
<td>12</td>
<td>Infectious Bronchitis (Kidney form)</td>
</tr>
<tr>
<td>13</td>
<td>Histomoniasis</td>
</tr>
<tr>
<td>14</td>
<td>Avian Influenza</td>
</tr>
<tr>
<td>15</td>
<td>Mycoplasma</td>
</tr>
<tr>
<td>16</td>
<td>Cholera</td>
</tr>
<tr>
<td>17</td>
<td>Newcastle Disease</td>
</tr>
</tbody>
</table>

### 2020 NON-DISEASE Categories

<table>
<thead>
<tr>
<th>RANKING</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Restricted Antibiotic Usage-Customer Related</td>
</tr>
<tr>
<td>2</td>
<td>Poultry Welfare-Activist Threats</td>
</tr>
<tr>
<td>3</td>
<td>Increased Food Safety Regulations</td>
</tr>
<tr>
<td>4</td>
<td>Biosecurity Risks</td>
</tr>
<tr>
<td>5</td>
<td>FDA-Drug Availability</td>
</tr>
<tr>
<td>6</td>
<td>Lack of Efficacious Alternatives to Antibiotics</td>
</tr>
<tr>
<td>7</td>
<td>Vaccine Availability</td>
</tr>
<tr>
<td>8</td>
<td>Meat Quality</td>
</tr>
<tr>
<td>9</td>
<td>Exportation issues</td>
</tr>
<tr>
<td>10</td>
<td>Increased Environmental Regulation</td>
</tr>
</tbody>
</table>
Please rank these DISEASE issues in order of significance to you/your company?

Answered: 17  Skipped: 0

- Coccidiosis
- Neosporosis
- Laminar Enteritis
- Chick Quality and Early...
- Infectious Bronchitis...
- Newcastle Disease
- Gangrenous Dermatitis
- Infectious Laryngotracheitis
- Bacterial Osteomyelitis
- General Polyarthritis
- Histomoniasis
- Infection
- Renal Disease
- Vertebral Osteomyelitis
- Avian Influenza
- Infectious Bronchitis...
- Cholera
- Mycoplasmoidosis
- Coryza
- Newcastle Disease
- Marek's Disease
In summary, overall layer health is good due to several factors as follows:

- Continued good supply of high-quality biologics.
- Readily available veterinary technical assistance from primary breeder, vaccine company, diagnostic laboratory, feed additive suppliers, and consulting veterinarians.
- Flock supervision by professional, well-trained flock service technicians.
- High quality nutrition provided by professional nutritionists.
- Housing is of good quality in general supplying feed, lights, air quality, water, and space in the needed quantities and quality.
- 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.

2020 AVEP Disease Survey:
A poll of the Association of Veterinarians in Egg Production (AVEP) was conducted within the last month. The members were asked to categorize a list of common diseases of caged and cage-free pullets (20+ conditions listed) and caged and cage-free layers (30+ conditions listed) as to their importance in their area of service on a scale of 0 to 4 with the following categories:

- 0 = Little or no importance to flock health or profitability. Very little effort to control.
- 1 = Some importance to flock health or profitability. Moderate effort to control on some farms.
- 2 = Moderate importance to flock health or profitability. Moderate effort needed to control on most farms.
- 3 = High importance to flock health or profitability. Significant effort to control on some farms.
- 4 = Very high importance to flock health or profitability. Significant effort to control on most farms.

Twenty-seven out of thirty-nine (69%) targeted AVEP members answered the survey. Starveouts and yolk infections of chicks during the first week continue to be of moderate importance indicating there is still work to be done in breeder hatch egg sanitation, hatchery, and brooding management.

<table>
<thead>
<tr>
<th></th>
<th>Caged Pullets</th>
<th>Cagefree Pullets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starveouts</td>
<td>1.89</td>
<td>1.92</td>
</tr>
<tr>
<td>Yolk infections</td>
<td>1.96</td>
<td>1.65</td>
</tr>
</tbody>
</table>

The results showing the top ten diseases and conditions for the different classes of egg layers with their average ranking are shown below:

<table>
<thead>
<tr>
<th>Caged Pullets</th>
<th>Cagefree Pullets</th>
<th>Caged Layers</th>
<th>Cagefree Layers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Coccidiosis 2.51</td>
<td>1 – Piling 2.36</td>
<td>1 – E coli 2.42</td>
<td>1 – Cannibalism 3.08</td>
</tr>
<tr>
<td>2 tie - Inf bronchitis (IB) and Post Bacterin Hepatitis (PBH) 1.81</td>
<td>2 – Cocci 2.23</td>
<td>2 – Cannibalism 2.33</td>
<td>2 – E coli 2.73</td>
</tr>
<tr>
<td>3 – IB 1.73</td>
<td>3 – IB 2.27</td>
<td>3 – Piling 2.35</td>
<td></td>
</tr>
<tr>
<td>4 – viLT (vaccinal infectious laryngotracheitis) 1.74</td>
<td>3 – NE 1.73</td>
<td>4 – Calcium Depletion 2.19</td>
<td>4 – IB 2.04</td>
</tr>
<tr>
<td>5 – Inf Bursal Disease (IBD) 1.59</td>
<td>5 – viLT 1.58</td>
<td>5 – Cocci 1.96</td>
<td>5 – Ascarids 1.96</td>
</tr>
<tr>
<td>6 - Necrotic enteritis (NE) 1.56</td>
<td>6 – IBD 1.50</td>
<td>6 – Focal Duodenal</td>
<td>6 – Cocci 1.81</td>
</tr>
</tbody>
</table>
Coccidiosis and necrotic enteritis continue to be high on the lists of all classes of layers due to the hardy nature of coccidial oocysts once they are established in a house. Vaccination of caged pullets is a challenge due to difficulty in cycling sporulated vaccinal oocysts. Cagefree pullets and layers outbreaks are usually due to breakdowns in litter management which override coccidiostat and gut health medication programs. The lack of routine antibiotic medication usage in early lay leads to an increase in necrotic enteritis should coccidiosis be a problem.

Infectious bronchitis (IB) continues in the top ten for layers but False Layer Syndrome due to exposure to variant strain IB in very young pullets in the first two weeks has dropped off the top ten list. Early vaccination with the Ma5 Mass or GA 08 vaccines have greatly prevented the problem. Infections with variant IBVs during grow or lay results in reduced feed consumption, higher mortality due to secondary bacterial infections, and loss of shell quality.

Colibacillosis in layer flocks continues as highly important. The live E coli vaccine does a very good job of preventing the problem of early lay onset but immunity is short-lived and does not provide sufficient protection for the late lay onset problems. Some producers are beginning to administer the live vaccine in mid-lay as a booster vaccination. An increase in the usage of killed vaccines during grow is also foreseen as new products come into the market.

Piling of cagefree flocks continues to be a major problem involving environment management. Help on controlling this problem is sorely needed. Peckout mortality of cagefree layers continues as well as an important issue. Genetic predilection, lighting, and behavioral management is often at the root of the problem. Some pressure is on to move to intact beaks for some cagefree programs which may be a real challenge in some operations.

Infectious coryza caused by *Avibacterium paragallinarum* spread through Pennsylvania flocks like wildfire between late December through May 2019 affecting over 12 million layers, pullets, and broilers. Also, an outbreak in Arizona in multiple complexes which previously were coryza-free, occurred in

<table>
<thead>
<tr>
<th></th>
<th>Necrosis (FDN)</th>
<th>7 – E coli 1.33</th>
<th>7 – E coli 1.40</th>
<th>7 tie – Inf coryza (IC), Mg, and NE 1.63</th>
<th>7 – IC 1.65</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 – Marek’s (MD)</td>
<td>1.11</td>
<td>8 – PBH 1.35</td>
<td></td>
<td></td>
<td>8 – Cal Dep 1.62</td>
</tr>
<tr>
<td>9 – Mycoplasma</td>
<td>1.04</td>
<td>9 – Ascarids 1.31</td>
<td></td>
<td></td>
<td>9 – Fowl Cholera 1.58</td>
</tr>
<tr>
<td>gallisepticum (Mg)</td>
<td>1.04</td>
<td>10 tie – MD, Mg, Pox tie 0.92</td>
<td>10 – Calcium tetany 1.59</td>
<td>10 tie – NE, FDN 1.54</td>
<td></td>
</tr>
<tr>
<td>10 – Pox 0.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
early January 2019. In December 2019 and into January 2020, a large complex in Ohio experienced a serious outbreak. The ease of spread of this supposedly environmentally fragile organism in winter is troubling. Studies at the University of Pennsylvania shows the causative bacteria can survive in 43F and 77F water for up to seven days. Heat and drying need to be utilized on equipment to reduce its presence.

Post salmonella enteritidis (SE) Bacterin Hepatitis continues to be as an important cause of pullet mortality, especially in certain white egg strains. The problem is seen very little in brown egg strain pullets. Vaccine companies are continuing to work to determine why this syndrome exists. Preventing overheating of vaccine prior to use may be a key to prevention.

The high ranking of infectious bursal disease in pullets is due to the subclinical form resulting in poor growth rate, body (weight uniformity, and response to vaccines not the acute mortality form.

The control of roundworms in egg layers got a boost as the product AquaSol (fenbendazole) was cleared for use in egg layers in production in 2018. Organic layers continue to be without a highly effective product to use for this condition.

Survey of Food Safety, Foreign Animal Diseases, and Other Issues of Concern:
The AVEP members were asked to rate their concerns on various topics according to the following scale:

- 0 = little importance, concern, or effort to prevent
- 1 = some importance, concern, or effort to prevent
- 2 = moderate importance, concern, or effort to prevent
- 3 = high importance, concern, or effort to prevent
- 4 = very high importance, concern, or effort to prevent

The results are summarized as follows:

<table>
<thead>
<tr>
<th>Disease or Issue</th>
<th>Ave. Rating</th>
<th>Level of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian influenza</td>
<td>2.46</td>
<td>Moderate</td>
</tr>
<tr>
<td>Virulent Newcastle Disease</td>
<td>1.62</td>
<td>Some</td>
</tr>
<tr>
<td>Lack of approved, effective treatments/antibiotics</td>
<td>3.07</td>
<td>High</td>
</tr>
<tr>
<td>Salmonella enteritidis (SE)/FDA Egg Safety Rule compliance</td>
<td>1.96</td>
<td>Moderate</td>
</tr>
<tr>
<td>Group C or other non-SE serotypes resulting in egg recalls</td>
<td>1.96</td>
<td>Moderate</td>
</tr>
<tr>
<td>Lack of effective vaccines</td>
<td>2.04</td>
<td>Moderate</td>
</tr>
<tr>
<td>Lack of effective diagnostics</td>
<td>1.46</td>
<td>Low/Moderate</td>
</tr>
<tr>
<td>Welfare Issues</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Concerns and comments from AVEP members (a summary):

- **Avian Influenza (AI) risk**
  - Most companies are still expending much effort and resources into prevention of AI. There are some however who have not made much effort.

- **Salmonella serotypes other than SE:**
  - The FDA SE plan inhibits surveillance of other serotypes hence little effort in controlling them is made as the risk is not known.
  - Clear guidance from FDA is lacking in this area

- **Lack of approved treatments:**
  - The availability of useful, economic treatments is sorely lacking.
  - Treatments for organic layers are expensive and often lack effectiveness.
  - The increase in bacterial problems such as infectious coryza, Spotty Liver Disease, fowl cholera, erysipelas, E coli, etc. makes the lack of effective treatments an increasingly important issue.
  - The ability to use chlortetracycline in the water by veterinary prescription should be allowed with no hesitancy.

- **Emergency depopulation procedures:**
  - We are not prepared for the next outbreak
  - I am still concerned there is not a satisfactory way to depopulate a large complex.

- **Cagefree management issues:**
  - I have real concerns with the rapid expansion into cagefree production and inadequate staffing with people with inadequate cagefree production knowledge.
  - End-of-lay excessive mortality is becoming an issue
  - Piling and peckout problems need to be solved

---

<table>
<thead>
<tr>
<th>Concern</th>
<th>Score</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possibility of banning beak trimming</td>
<td>2.22</td>
<td>Moderate</td>
</tr>
<tr>
<td>Inability to use maceration for of male chicks after hatched</td>
<td>2.19</td>
<td>Moderate</td>
</tr>
<tr>
<td>Continued misuse of MAK carts for on-farm euthanasia of spent fowl</td>
<td>2.59</td>
<td>Moderate/High</td>
</tr>
<tr>
<td>Lack of guidance regarding emergency depopulation of layers</td>
<td>2.70</td>
<td>High</td>
</tr>
<tr>
<td>Cagefree management challenges</td>
<td>2.56</td>
<td>Moderate/High</td>
</tr>
</tbody>
</table>
POULTRY AND OTHER AVIAN SPECIES

- **Use of Modified Atmosphere Killing (MAK) carts for euthanasia of spent fowl:**
  - A large effort is needed to standardize standard operating procedure (SOPs) for using MAK carts.
  - This is our weakest part of our industry
  - I think this is our greatest weakness in welfare.
  - I am looking forward to new technology in this area.
  - The biosecurity risk of using MAK carts is a concern.

- **Lack of appropriate vaccines:**
  - The vaccine companies are struggling to keep up with changes in providing effective infectious bronchitis vaccines due to changes in the virus in the field.

- **Prohibition of the use of maceration for male chick euthanasia:**
  - Until an acceptable, commercially viable, economic means of euthanizing male chicks is developed, maceration continues to give a humane means of male chick euthanasia in my opinion.
  - In-ovo sexing prior to nine days of incubation is not likely on a commercial basis.

- **Banning of beak trimming:**
  - At this point in the U.S., with the size and management ability of egg producers, banning of beak trimming would be a welfare disaster.
  - Many management changes will be needed to be able to successfully control mortality and feather losses if we do not beak trim flocks.
  - There has been little complaint from animal rights organizations on this issue since the implementation of infrared beak treatment.
  - Not beak trimming is not a welfare-friendly practice.

- **Avian influenza:**
  - Much more discussion is needed in how to detect low pathogenic avian influenza and how to control it if found.
  - The ability of infectious coryza to spread so easily in Pennsylvania does not give one much confidence in our biosecurity programs to deal with high or low path Al.

- **Other concerns:**
  - Spread of Egg Drop Syndrome outside of Pennsylvania
  - Focal Duodenal Necrosis
  - Controlling infectious bronchitis
  - False Layer Syndrome is still a problem in Canada
  - Poorly designed aviary and cagefree houses and equipment
  - Lack of qualified applicants for work on crews, in poultry houses, as flock supervisors, or as complex managers.
Emerging Diseases:
Regional or emerging diseases, those that are serious but only seen in a small region or number of flocks, are being seen mostly in cagefree, outdoor access/pastured layers. They are as follows:

- **Spotty Liver Disease (SLD)** – Flocks with this condition experience a five to 20% drop in egg production over a three to four-week period and have 0.5 to 5% mortality. Missouri and Arkansas have most of the cases although breaks have been seen in other high density cagefree, outdoor access areas. This is also a major problem in pastured flocks in Australia where the cause was determined to be due to *Campylobacter hepaticus*.

- **Egg Drop Syndrome (EDS)** – A fourth premise broke with this disease in Pennsylvania this past year resulting in 50% loss of production due to shell-less and poor shell quality eggs. This premise is associated with #3 positive premise as they use the same egg processor to pick up their eggs.

- **Erysipelas** – Several cases of high mortality have been seen in the last year in pastured layers (Pennsylvania and Georgia) with some flocks losing as much as 10% in a week. A case was also seen in two flocks in a multi-age, complex in caged layers. Attempts to treat the disease with either chlortetracycline or live vaccine in has had mixed results.

- **Fowl Cholera** – Appears to be on the increase as breaks have been seen this past year in areas where the disease has not been seen previously. One break occurred in a multi-age, caged complex. Treatment with vaccination in the face of the outbreak with the live vaccine by wingweb has met with success in some organic flocks. Antibiotic therapy in conventional flocks has also been successful in the short term but chronic mortality and suppression of production returns. Increasing the frequency of vaccination during grow and lay is being used preventatively. Hopefully, the release of a new SRP technology killed vaccine will aid our efforts in prevention by vaccination.

- **Focal Ulcerative Dermatitis Syndrome (FUDS)** – This syndrome continues to cause losses in not only brown cagefree flocks but also in white egg cagefree flocks in western Ohio. The causative agent that results in an ever-growing ulcer in the middle of the back is not known. The open wound leads to bacterial infections and very high mortality rates from 0.5 to 4% per week. The problem will persist in a flock for 5 to 20 weeks. There has been no association found with scratches, nervous birds, rodent activity, insect activity,

- **Feed Refusal Syndrome** – This problem is less serious this year compared to past years partially due more feed mills screening incoming ingredients for mycotoxins.

- **Bedbugs** – Cagefree operations that are infested with bedbugs in the Northeast and Midwest U.S. have been reported and concerns for
house worker, bird movement, and other persons transfer of bedbugs to their dwellings is high. Some egg producers have been rejected by crews for consideration for moving their birds that have bedbugs.

**Egg Industry Economic Conditions:**

The egg industry has had a breakeven year compared to the past two years; profitable for the shell egg businesses but a loss for the breaking egg businesses.

**Graphs from the Egg Industry Center, September 2020**

With a farm cost of approximately 60 cents per dozen, 2020 has been profitable for the shell egg sector. The COVID-19 pandemic caused an upset in switching from foodservice and broken egg business to more shell egg demand by households. This led to profitability in the shell egg sector but high losses in the broken egg sector. Early selloff of layers occurred in Iowa in complexes producing for the broken egg business and has resulted in a return to profits for them.

As can be seen in the graph below, Iowa lost a significant number of layers due to early selloff during the very low breaking egg prices. The other top states layer numbers have been relatively stable. As of August 2020, #1 Iowa (45.09 million layers) continues to hold the top spot of states in egg production by far over #2 Ohio (32.56 million), #3 Indiana (32.55 million), #4 Pennsylvania (26.14 million), and #6 California (12.58 million). Texas (#5) numbers are not reported by USDA starting this year as one company owns a vast majority of the flocks. Source: USDA National Agricultural Statistics Service (NASS) Chickens and Eggs.
As can be seen from this graph below, the number of caged layers declined with additional capacity in the cagefree sector. The industry will be hard pressed to meet the target of reaching 50% cagefree production by 2025 due to poor profits and lack of ability to invest in new or renovated facilities.

Turkey Industry Report
Lindy Froebel, National Turkey Federation
Prepared by: Steven R. Clark, Huvepharma, Inc.
POULTRY AND OTHER AVIAN SPECIES

In preparation for this report to the USAHA Committee on Poultry and Other Avian Species, the subcommittee chairman, Dr. Clark, surveyed turkey industry professionals and veterinarians representing (n=26) the U.S. turkey production regarding the health status of turkeys produced in August 2019 through August 2020. 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 2020 are issues with lack of efficacious drugs, colibacillosis, clostridial dermatitis, ornithobacterium rhinotracheale (ORT), salmonella, leg problems, Bordetella, and coccidiosis. The top-10 list for 2020 was near identical to 2019 with notable exception coccidiosis jump in rank to #5 from #8. Blackhead ranking also increased to #11 from #18 the prior year, and the number of reported cases decreased by 15%. Cases of Turkey Reovirus increased 12+% and dropped in rank to #19 from #9.

The “lack of approved efficacious drugs” continues to be the top health issue (Table 1). The withdrawal of the New Animal Drug Application (NADA) for enrofloxacin in 2005 for use in poultry leaves the industry with no adequate therapeutic response to colibacillosis (has ranked #2 since 2016), or fowl cholera (ranked #12 from #14). 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. Nitarsone (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 4.0 (from 3.7 in prior year) and stayed at #3 rank (from #5 in 2018, #4 in 2017, #3 in 2016 and #2, 2008-2015). 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 CD include: early recognition; removal of mortality 2-3 times per day; medicating affected flocks with appropriate antimicrobials; promptly managing all water spills, wet litter, feed outages and do not compost litter.
within 200 feet of poultry barn. Vaccinating at-risk flocks with autogenous bacterins and toxoids has not proved as a viable option for the industry.

*Ornithobacterium rhinotracheale* (ORT) stayed at #4 ranking in 2020 and 2019 and 2016 (#3, 2017, 2018; #7, 2015), 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. No commercial vaccine is approved. Limited application of controlled exposure efforts on individual flocks have shown value. ORT in turkeys is an identified critical research need.

Coccidiosis increased to #5 from #8 ranking in 2019 (#4, #6, #13 in 2018 – 2016, respectively) most likely reflects the industry increasing raised without antibiotics (RWA) and no antibiotics ever (NAE) market. RWA and NAE programs do not permit the use of ionophore anticoccidials and some programs prohibit FDA approved chemical anticoccidials, so anticoccidial programs consist of alternative phytogens or vaccination. An effective coccidiosis control program in turkeys involves the use of anticoccidial medications and/or phytonutrients and/or live vaccines and the subsequent development of immunity. Table 4 summarizes the U.S. turkey production coccidia control products (n=260.0 million head, survey total) and ionophores represent the majority, 60% (62%, 2019; 44%, 2018; 55%, 2017) of heads for an average use of 7.0 (7.3, 7.7 and 7.5, 2019 - 2017) months during the 12-month survey period. Chemical anticoccidials account for 28% (29%, 30% and 33%, 2019 - 2017) head and 5.5 (5.5, 4.6 and 4.5, 2019 - 2017) months. Coccidia vaccination was limited to 11% (10%, 10% and 7%, 2019 - 2017) head; the low incidence might be in part due to the limited availability of the only USDA approved commercial turkey coccidiosis live vaccine. Also, several colleagues are utilizing autogenous coccidiosis vaccination. Nutritional dietary supplementation with phytonutrients, reported at 23% (27%, 28% and 14%, 2019 - 2017) head, either via in-feed application or drinking water administration. Programs may utilize phytonutrients in addition to the current anticoccidial program, to potentiate the possible benefits, or as the sole supplement for coccidia control. Some phytonutrients have purported activity against coccidia. Phytonutrients consist of ‘alternative’ products including organic acids, yeast, phytonutrients from plant extracts.
(saponin, yucca, etc.) and essential oils (oregano, carvacrol, thymol, cinnamaldehyde, capsicum oleoresin, turmeric oleoresin). Essential oils may be natural extracts or synthetic nature-identical compounds.

Leg problems are ranked #7 in 2020 (#6, 9, 6, 6, 10 in 2018 – 2015, respectively) 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. The year 2017 - 2019 was particularly noted increased incidence of valgus and varus leg deformities across much of the U.S. industry due to undetermined etiology; the issue contributed to increased mortality in affected flocks. Issues were less prevalent in 2018. Bacterial chondronecrosis with osteomyelitis (BCO)-associated lameness, as described by Dr. Wideman, has been diagnosed in some cases. Leg problems can represent substantial production losses and welfare issues of turkeys.

*Bordetella avium* continues as a significant respiratory disease challenge in several geographic regions; bordetellosis ranked #8 and fluctuates between #5 and #8 the prior year 5-years. Bordetellosis, otherwise known as Turkey Coryza, is a highly infectious, acute upper respiratory tract disease of turkeys characterized by high morbidity and usually low mortality. *Bordetella avium* (BA) is a small, gram-negative, nonfermentative, motile, strictly aerobic bacillus. Other birds and older turkeys can be carriers but may not show clinical signs. Commercial vaccines are available but are not routinely used. Water sanitation and biosecurity are emphasized to control Bordetella.

Turkey arthritis reovirus (TARV) also called, 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 dropped to #19 rank from #9 in 2019 and #17 in 2018 (Table 1) with >548 “definitive” and “suspect” cases or flocks (Table 2). In 2019 the NTF Reovirus Subcommittee released three documents to the industry, including the case definitions and nomenclature. Second, the Reovirus Diagnostic and Testing Reference Sheet listing contacts of 6 TARV researchers and the tests available. The third document was the results of an industry survey titled, Economic Impact of Turkey Arthritis Reovirus, reporting
an average of 5.6 cent increased cost per pound for flocks affected by TARV compared to the companies’ surveyed production costs for unaffected flocks. TARV 2019 Survey reports approximately 2% incidence of all turkeys produced annually and primarily affects toms (approximately 5% incidence of toms produced annually). The severity of impact on the industry could be as high as $33.7 million with highly pathogenic strains of TARV.

Turkey Arthritis Reovirus (TARV) is a progressive condition that appears as early as 10-12 weeks of age in male, and sometimes female, commercial turkeys. Younger birds are occasionally affected. The disease does not appear to be transmitted from chickens. Signs are most severe when the birds reach 15-16 weeks of age. Clinical signs are characterized by reluctance to move, recumbency and limping on one or both legs. There is often uni- or bilateral swelling of the hock (intertarsal) joint. Morbidity can be as high as 40% and mortality is usually a result of culling or aortic rupture. Lesions observed in acutely affected birds at necropsy are uni- or bilateral enlargement (subcutaneous edema) of the hock joints, which contain increased volume of clear yellow to serosanguinous synovial fluid. Similar fluid can expand the sheath of the gastrocnemius and digital flexor tendons. In chronic cases there is bruising of the skin of the hock, with prominent periarticular fibrosis, edema and occasional large flecks of fibrin within the subcutis and tendon sheaths. In a small percentage of cases one can observe partial or complete rupture of the proximal gastrocnemius tendon or a digital flexor tendon with hemorrhage at the level of the rupture. Histological sections of gastrocnemius tendon and sheath reveal lymphocytic infiltrates in the subsynovium in acute cases, progressing to prominent subsynovial and peritendon fibrosis in chronic cases. Secondary bacterial infections (e.g., Staphylococcus) occasionally occur and are accompanied by heterophilic inflammation. Affected breeder companies have implemented an autogenous reovirus vaccination program to induce the maximum production of antibodies and resulting transfer of maternal antibodies. Historic results originally showed a significant reduction in associated clinical signs in those poult placers 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 once appeared to be controlling this disease. TR-DFTR is an identified critical research need.

Blackhead\textsuperscript{1,2}, also known as histomoniasis, increased to position #11 from #18 (#11, 8, 9, 13 in 2018 -2015, respectively). There were 82 reported cases of blackhead in 2020, down from 96 in 2019, and (Table 2) a decrease from the peak of 127 in 2018. 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. Nitarsonone FDA approval was withdrawn December 31, 2015, leaving the industry with no drugs approved with indications against histomoniasis. Nitarsonone was approved for the prevention of histomoniasis (blackhead disease) in turkeys and chickens and was the only approved animal drug for this indication. Table 2a list some additional blackhead responses, including a two-question survey as to inciting factors that might be associated with a blackhead break. Of those 16 respondents reporting 82 blackhead cases in 2020, 23% (n=19) reported a coccidiosis diagnosis and 23% (n=19) reported a colibacillosis (E. coli) diagnosis prior to the blackhead break. Sixteen respondents equal to 62% of survey reported one or more cases of blackhead (54%, 63%, 2019; 74%, 2017). Of the 82 reported cases at least 11% (n=9) were destroyed to alleviate animal suffering and due to excess morbidity and mortality. Without efficacious approved pharmaceuticals, early diagnosis and start of interventions is considered part of controlling Histomonas meleagridis in field conditions; for this reason, a sound monitoring system using diagnostic tools, such as, polymerase chain reaction (PCR) and serology is needed, in particular on problem farms.

The turkey industry continues to work to reduce Salmonella colonization in birds. Poult enteritis of unknown etiologies has changed in importance, to position #10 (#12, 8, 10, 14 from 2019 – 2016). Turkey Coronavirus (TCV), as a defined cause of enteritis, was ranked #29 (#29, 30, 30, 31 from 2019 – 2016), with 27 reported cases, from 95 (2019) and 185 (2018) previous years (Table 2).

Protozoal Enteritis, attributed to flagellated protozoa, Cochlosoma, Tetratrichomonas and Hexamita, ranked #15, changed from #16; protozoal enteritis remained relatively unchanged over past years until 2016 and associated with the loss of nitarsonone. 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.

Late mortality ranked #9 health issue and changed from #10 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.

Round Worms (*Ascaridia dissimilis*) ranked #14 and has positioned between #14 - #19 since 2015. The industry is concerned that reduced sensitivity to anthelmintics is an issue. High worm burdens can be associated with necrotic enteritis (#16) and the cause of high mortality in flocks.

Turkey Hepatitis Reovirus (THRV) is a new disease issue added to this survey in 2020 and ranking #18. THRV affected flocks ranged in age from 7 to 46 days with a median age of 15.5 days. Mortality peaks and subsides in a week and the cumulative mortality is 3-8%. Dr. M. Lighty (2019, personal communication) describes THRV as “over the past two years, turkey companies in the United States have reported an increased incidence of viral hepatitis in pouls caused by reovirus. This appears to be an emerging disease caused by a previously recognized pathogen. Gross lesions range from subtle mottling to multifocal white/gray/tan foci in the livers; mild hepatomegaly has also been noted in some cases. Histopathology on these livers shows severe multifocal hepatocellular necrosis with infiltration by macrophages, lymphocytes, plasma cells, and/or heterophils. Necrotic hepatocytes may fuse to form multinucleated syncytial cells and there is often marked fibrin accumulation in necrotic areas. Morbidity and mortality due to reoviral hepatitis can be highly variable. Risk factors for development of the disease and the economic significance of this disease on the turkey industry are not fully understood at this time.” There are indications from the field that flocks developing hepatitis as pouls can go on to develop turkey reoviral arthritis during grow out.

Heat stress ranked #22 in 2019 compared to #20 prior year. Tunnel ventilated barns allow growers to manage heat stress better than in years past. Poult Enteritis Mortality Syndrome (PEMS) ranked #30 versus #32 previously. Avian Metapneumovirus (AmPV) ranked #34 since 2017.

*Mycoplasma synoviae* (MS, infectious synovitis) infections, ranked #31 (#24, 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 21 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 31 cases of MG reported (Table 2).

The health of turkeys is a top priority of industry members, and the National Turkey Federation (NTF) works to support the industry in endeavors

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to promote advancements in turkey health. NTF’s Turkey Health Task Force, established in 2017, along with NTF staff, has continued working to find innovative solutions for the top disease challenges facing the turkey industry. The task force has continued to focus its efforts on accelerating the development and approval of turkey health products and support research to improve turkey health. The actions of the task force aim to address disease challenges that have the greatest impact on the turkey industry. As part of this effort, NTF has previously worked to develop economic impact models for turkey-specific diseases with the help of the NTF Turkey Health and Welfare Committee and industry members throughout the production process along with APHIS Veterinary Services staff. NTF plans to continue these efforts and surveys are underway to better understand the impact of issues frequently identified in industry-wide surveys, including Clostridial Dermatitis and Ornithobacterium rhinotracheale. Currently, limited options for effective disease management are available to the turkey industry. NTF supports reduced regulatory barriers for new turkey health product approvals to assist the turkey industry in raising healthy turkeys to produce safe and nutritious turkey products.

The impact of SARS-CoV-2 (COVID-19) was felt throughout the country in 2020, and the turkey industry, like most industries, faced unprecedented situations. Because COVID-19 was a new virus first observed in humans in 2019, substantial knowledge gaps needed immediate attention to better understand the virus, including the susceptibility of animals to COVID-19, whether COVID-19 could be transmitted by food products and the ability of the virus to persist in the environment. While the virus is still not well understood, several research groups have worked to address concerns of COVID-19 in poultry products and further the understand the transmission of the virus. Initial research conducted by USDA, Agricultural Research Service (ARS) and the Food and Agriculture Organization (FAO) has indicated chickens, turkeys, ducks, quail and geese are not able to become infected with COVID-19. In addition, chicken eggs, commonly used to grow viruses for vaccine antigen, were unable to grow the virus. Further, current research suggests that contact with poultry and other livestock and consumption of meat and poultry productions are unlikely sources of COVID-19 transmission to humans.

Blackhead continues to be a top disease of concern for the turkey industry, as it results in significant mortality, and the pursuit to find efficacious preventative and control options for blackhead remain top priorities for the industry. In 2019, FDA provided the Turkey Health Task Force with a Minor Use in Major Species (MUMS) designation for control in the incidence of mortality in turkeys at high risk of developing blackhead associated with Histomonas meleagradis in flocks of turkeys where blackhead has been diagnosed. Although a product has not yet been identified to be submitted under the MUMS designation, NTF remains optimistic that benefits of MUMS status can incentivize the prioritization of the development of new molecules to mitigate blackhead.
Turkey Arthritis Reovirus (TARV) and other related leg issues continue to be an industry-wide concern. In December, NTF published the results of an industry-wide survey on the economic impact of TARV. Though the average increase in production cost per pound for flocks affected by TARV reported was 5.6 cents in comparison to unaffected flocks, the virus increased costs as high as 15 cents per pound for TARV affected flocks. The report indicated the impact could be as high as $33.7 million dollars with highly pathogenic strains of TARV. Approximately 226 million pounds were affected with five percent of toms produced annually diagnosed with TARV. It is important to note that while the economic impact of TARV to the turkey industry is considerable, the impact of TARV on an individual turkey producer that may only have two flocks per year can be especially burdensome.

There is currently no treatment for TARV and the industry lacks reliable and cost-effective diagnostic tools to identify TARV in turkey flocks. Therefore, research and advancement for prevention and treatment options for TARV are of significant interest to the turkey industry. NTF hosted two meetings this year to facilitate conversations between members in live production, veterinarians, members of the allied industry and researchers to discuss opportunities to increase coordination efforts to mitigate TARV. As part of this effort, the group developed case definitions to improve consistency of reporting and an isolate nomenclature to streamline the naming of isolates and reduce on duplication of sequencing detailed below.

National Turkey Federation Turkey Arthritis Reovirus Case Definitions:

- **Definitive diagnosis** requires the veterinarian to fulfill these three criteria: (1) observation of typical gross lesions, (2) rule out other causes of lameness in turkeys (e.g., osteomyelitis, primary bacterial arthritis, muscle rupture, footpad dermatitis, Mycoplasma synovitis, dietary deficiencies) and (3) isolation of reovirus, referred to as turkey arthritis reovirus (TARV), from the gastrocnemius and/or digital flexor tendon in embryonated eggs or cell culture.

- **Suspect diagnosis** requires the veterinarian to fulfill these two criteria: (1) observation of typical gross lesions, (2) ruling out other causes of lameness in turkeys (e.g., osteomyelitis, primary bacterial arthritis, muscle rupture, footpad dermatitis, Mycoplasma synovitis, dietary deficiencies).

National Turkey Federation Turkey Arthritis Reovirus Isolate Nomenclature:

- **Species (tk/ck) /U.S./State (bird location)/ Isolate ID/ Tissue (spelled out)/ Year**
- **Example**: TRV/US/GA//UMN-1234/Tendon/ 2018

Highly Pathogenic Avian Influenza (HPAI) continues to be a focus for the U.S. poultry industry. Since the outbreak in 2015, detection, prevention and response across the industry has greatly improved. In March and April, 11 commercial turkey farms were affected by an outbreak of low pathogenic...
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avian influenza (LPAI) in North and South Carolina. In addition, one commercial turkey farm was affected by HPAI in South Carolina. Flocks were swiftly depopulated to control the spread of the disease. Following, thorough cleaning and disinfecting were conducted on the farms in addition to increased surveillance of commercial flocks in the surrounding areas. USDA published a set of 14 biosecurity principles of the National Poultry Improvement Plan (NPIP) in 2017 that serve as the basis for biosecurity at poultry facilities. Strict biosecurity remains important to prevent avian influenza outbreaks and routine testing is essential to identify flocks positive for avian influenza as early as possible.

In October, APHIS issued their final rule updating the NPIP to align with changes in the poultry industry and incorporate new scientific information and technologies into the NPIP. These updates were approved by representatives from across the poultry industry at the 2018 NPIP Biennial Conference, and a draft rule was published in December 2019. This is the final step in the rulemaking process. Among other important updates, of most interest to the turkey industry is the clarification of low pathogenic avian influenza (LPAI) regulations on indemnity and compensation. These sections amend the terms and definitions of H5/H7 LPAI infection (infected) and H5/H7 LPAI exposed. The new terms proposed were H5/H7 LPAI virus exposed (noninfectious) and H5/H7 LPAI virus actively infected (infectious). The revision to these terms does not change APHIS' response policies for LPAI events. Compensation for cleaning and disinfection (virus elimination) of premises, conveyances and materials that encountered poultry infected with or exposed to H5/H7 LPAI will continue to be determined using the current APHIS flat-rate virus elimination (VE) calculator. These revisions to terminology in the final rule do not pertain to the conditions for payment, nor how payment is calculated. APHIS is in the process of discontinuing the use of the indemnity calculator in favor of a different appraisal apparatus, and NTF has been working closely with the agency to make sure turkey is valued fairly.

Although not a major turkey health concern, Salmonella continues to be reported as a top priority for the turkey industry in this survey. NTF continues to assist the turkey industry in efforts to reduce Salmonella throughout turkey production and processing. In the last year, NTF has hosted three meetings for industry members focused on Salmonella. As part of the discussions on reduction strategies, NTF updated its Salmonella Risk Mitigation Practices document that details best practices to be considered at all sectors of the supply chain, including breeder and hatchery, commercial production and processing operations. This document is located on EatTurkey.org. While this document is not all encompassing and every intervention may not be appropriate in all operations, the best practices included are potential strategies for reducing Salmonella. However, there is still a need for the development of interventions to mitigate Salmonella, and NTF continues to support research with the objectives of improving the understanding of Salmonella and products that reduce colonization of Salmonella in turkeys.
The approval of new anticoccidials remains a significant need for the turkey industry. There currently is one commercial vaccine available and the number of chemical anticoccidials approved and available for turkeys on the market are limited. The lack of efficacious options is a challenge for the industry as a whole but is especially burdensome for antibiotic free production.

Autogenous biologics play an integral role in the disease prevention and control programs of turkey producers. In addition, autogenous biologics are frequently a component of food safety programs because of their effectiveness at reducing the colonization in turkeys of pathogens associated with foodborne illness. Veterinarians work with live production specialists and farmers to supervise the day-to-day management of disease for turkey flocks, and therefore have most adequate knowledge of health needs of the animals for which they oversee. Members of the Turkey Health Task Force and NTF staff continue to advocate for policies that accelerate the approval of safe and effective biologics to assist the turkey industry with managing important pathogens. Center for Veterinary Biologics (CVB) published Draft Veterinary Services Memorandum No. 800.69 Draft No. 638 in June that would extend the isolate approval length for autogenous biologics from two years to up to six years. NTF supported the extension on the use of autogenous isolates on a justifiable basis when previous use of the autogenous biologic was deemed beneficial to flock health by the veterinarian, and to NTF’s knowledge there is no scientific basis for concern related to the proposed option for autogenous isolate extensions. A final draft is expected in late 2020 or early 2021.

FDA released the annual antimicrobial sales and distribution data for 2018. Though there was a slight increase (nine percent) in the sales and distribution of medically important antimicrobials from 2017 through 2018, the overall decrease from 2015 remains significant at 38 percent. Tetracyclines, which represent the largest volume of these domestic sales (3,974,179 kg in 2018), increased by 12 percent from 2017 through 2018. Of the 2018 domestic sales and distribution of medically important antimicrobials approved for use in food-producing animals tetracyclines accounted for 66 percent, penicillins for 12 percent, macrolides for eight percent, sulfas for five percent, aminoglycosides for five percent, lincosamides for two percent, cephalosporins for one percent and fluoroquinolones for less than one percent. NTF continues to support the judicious use of antimicrobials to manage turkey health issues.

FDA is currently evaluating the interpretation of zero-day withdrawal times assigned to new animal drugs. Since the 1980s, FDA has assumed that poultry spent at least six hours withdrawn from drugs prior to slaughter due to transit process and additional times for other livestock. However, FDA sought comments to determine if its assumptions are correct based on current industry practices. Based on a survey conducted to understand current industry practices, NTF submitted comments noting that six hours is an appropriate zero-day withdrawal period especially given that government
sampling of turkey products consistently shows virtually no violative residues in turkey meat produced in the United States. Determination by FDA on the interpretation of zero-day withdrawal times is expected in the next year.

NTF remains in regular contact with officials at FDA to monitor the timeline of several key CVM items including, those listed below, and to communicate needs of the turkey industry.

- A concept paper on updating the medically important drugs listed in Appendix A of FDA’s Guidance for Industry #152 is anticipated this fall. The paper is expected to detail FDA’s proposed process for updating the list of drugs and how the drugs would fall using this process.
- A concept paper on the duration of use for animal drugs is projected to publish in early fall for comment.
- A coordinated publication on antibiotic use is anticipated to be out by the end of 2020. This publication would include industry data from Randy Singer like the information reported in 2019.
- A package of four guidance documents should be released from FDA related to data necessary for drug approvals. NTF continues to be a vocal advocate supporting flexibility on this issue.

In 2020, APHIS made $10 million available for the National Animal Disease Preparedness and Response Program (NADPRP). The NADPRP sought proposals for projects that will advance capabilities and capacities related to rapid large-scale animal depopulation and carcass disposal in a high-consequence animal disease outbreak or enhance U.S. livestock biosecurity. NTF continues to work with members and executives from state associations on application efforts to secure funding for projects that address turkey industry needs as part of this important program. In addition, $5 million was made available for the strengthening of the National Animal Health Laboratory Network (NAHLN). NTF, along with most other major animal-related commodity organizations as a part of the Animal Agriculture Coalition (AAC), pioneered the Animal Pest, Disease and Disaster Prevention and Response Program (APAD) in 2016 that was fully funded in the 2018 Farm Bill. This program is an important for disease prevention and response preparedness, especially for foreign disease threats to the U.S. poultry and livestock industries.

In 2019, turkey production decreased from 7,598,289.00 to 7,432,801.00 pounds (live weight) and decreased to 229,000,000 head with an average live weight of 32.22 lbs. In 2018, 244,750,000 head were produced with an average live weight of 31.12 lbs. Per capita consumption for turkey products decreased from 16.2 in 2018 to 16.0 in 2019. (Reference: National Turkey Federation Sourcebook, pending publication October 2019).
Table 1. Turkey health survey (August 2019 - 2020) of professionals in US turkey production ranking current disease issues (1= no issue to 5 = severe problem). n=26.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Score Average (1-5)</th>
<th>Score Mode (1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of approved, efficacious drugs</td>
<td>4.5</td>
<td>5</td>
</tr>
<tr>
<td>Colibacillosis</td>
<td>4.2</td>
<td>5</td>
</tr>
<tr>
<td>Clostridial Dermatitis (Cellulitis)</td>
<td>4.0</td>
<td>5</td>
</tr>
<tr>
<td><em>Ornithobacterium rhinotraceale</em> (ORT)</td>
<td>3.8</td>
<td>3</td>
</tr>
<tr>
<td>Coccidiosis</td>
<td>3.6</td>
<td>5</td>
</tr>
<tr>
<td>Salmonella</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>Leg Problems</td>
<td>3.2</td>
<td>4</td>
</tr>
<tr>
<td><em>Bordetella avium</em></td>
<td>3.2</td>
<td>3</td>
</tr>
<tr>
<td>Late Mortality</td>
<td>3.1</td>
<td>4</td>
</tr>
<tr>
<td>Poult Enteritis of unknown etiologies</td>
<td>2.9</td>
<td>2</td>
</tr>
<tr>
<td>Blackhead (Histomoniasis)</td>
<td>2.8</td>
<td>1</td>
</tr>
<tr>
<td>Cholera</td>
<td>2.8</td>
<td>3</td>
</tr>
<tr>
<td>Cannibalism</td>
<td>2.7</td>
<td>3</td>
</tr>
<tr>
<td>Round Worms (<em>Ascaridia dissimilis</em>)</td>
<td>2.6</td>
<td>3</td>
</tr>
<tr>
<td>Protozoal Enteritis (Flagellated)</td>
<td>2.6</td>
<td>1</td>
</tr>
<tr>
<td>Necrotic enteritis</td>
<td>2.6</td>
<td>3</td>
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<tr>
<td>Tibial Dyschondroplasia (TDC, Osteochondrosis)</td>
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<td>2</td>
</tr>
<tr>
<td>THRV (Turkey Hepatitis Reovirus)</td>
<td>2.5</td>
<td>1</td>
</tr>
<tr>
<td>TR-DFTR (Turkey Reovirus Digital Flexor Tendon Rupture)</td>
<td>2.5</td>
<td>1</td>
</tr>
<tr>
<td>Avian Influenza</td>
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</tr>
<tr>
<td>Breast Blisters and Breast Buttons</td>
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<td>3</td>
</tr>
<tr>
<td>Heat stress</td>
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<td>2</td>
</tr>
<tr>
<td>Bleeders (aortic, hepatic ruptures)</td>
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<td>1</td>
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<td>Osteomyelitis (OM)</td>
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<tr>
<td>Newcastle Disease Virus (NDV)</td>
<td>1.9</td>
<td>1</td>
</tr>
<tr>
<td>Shaky Leg Syndrome</td>
<td>1.8</td>
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<tr>
<td>Turkey Coronavirus</td>
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<td>1</td>
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<tr>
<td><em>Mycoplasma gallisepticum</em> (MG)</td>
<td>1.7</td>
<td>1</td>
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<tr>
<td>Fractures</td>
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<td>1</td>
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<td>PEMS (Poult Enteritis Mortality Syndrome)</td>
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<tr>
<td><em>Mycoplasma synoviae</em> (MS)</td>
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<td>1</td>
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<td>H3N2 (H1N1) Swine Influenza</td>
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<td>Erysipelas</td>
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</tr>
<tr>
<td>Avian Metapneumovirus</td>
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<td>1</td>
</tr>
<tr>
<td>Spondylolisthesis (Kinky-Back)</td>
<td>1.2</td>
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</table>
### Table 2. Turkey health survey (August 2019 - 2020) of professionals in U.S. turkey production reporting cases of diseases. n=26.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Blackhead (Histomoniasis)</td>
<td>82</td>
<td>96</td>
<td>127</td>
<td>109</td>
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<td><em>Mycoplasma synoviae</em> (MS)</td>
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<td>25</td>
<td>35</td>
<td>33</td>
<td>20</td>
<td>24</td>
<td>41</td>
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<tr>
<td>Turkey Coronavirus (TCV)</td>
<td>27</td>
<td>95</td>
<td>185</td>
<td>12</td>
<td>6</td>
<td>119</td>
<td>43</td>
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<tr>
<td>Turkey Reovirus Digital Flexor Tendon Rupture</td>
<td>548</td>
<td>486</td>
<td>234</td>
<td>182</td>
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</tr>
<tr>
<td><em>Mycoplasma gallispecticum</em> (MG)</td>
<td>31</td>
<td>30</td>
<td>50</td>
<td>52</td>
<td>29</td>
<td>31</td>
<td>17</td>
</tr>
</tbody>
</table>

### Table 2a. Turkey Blackhead (Histomoniasis) survey (August 2019 - 2020) of professionals in U.S. turkey production.

<table>
<thead>
<tr>
<th>Question</th>
<th>n=</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many cases (##) of Blackhead (Histomoniasis) did you confirm in last 12-months (since Aug.)?</td>
<td>82</td>
<td>-</td>
</tr>
<tr>
<td>How many blackhead flocks/barns destroyed?</td>
<td>9</td>
<td>11%</td>
</tr>
<tr>
<td>How many respondents?</td>
<td>26</td>
<td>-</td>
</tr>
<tr>
<td>How many respondents reported blackhead?</td>
<td>16</td>
<td>62%</td>
</tr>
</tbody>
</table>

### Table 3. In-feed and In-water FDA approved medications for turkeys. ^ = Not currently marketed. G = Includes label claim for improved weight, gain and feed conversion. ® All trademarks or trade names are property of their respective owners. *CAUTION: Federal law restricts medicated feed containing this veterinary feed directive (VFD) drug to use by or on the order of a licensed veterinarian. *Extralabel Drug Use (EDLU) is not permitted in feed. **CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian. Species can vary, observe label indications. ® TM All trademarks or trade names are property of their respective owners.

<table>
<thead>
<tr>
<th>VFD Medications</th>
<th>Non VFD Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albamix (Novobiocin) ^</td>
<td>Albac® (Bacitracin Zinc) ^G</td>
</tr>
<tr>
<td>Aureomycin® (Chlortetracycline)</td>
<td>Amprol® (Amprolium)</td>
</tr>
<tr>
<td>ChlorMax® (Chlortetracycline)</td>
<td>Avatec® (Lasalocid)</td>
</tr>
</tbody>
</table>
### Prescription Medications*

- Chloronex® (Chlortetracycline)
- CTC Soluble (Chlortetracycline)
- Di-Methox® 12.5% (Sulfadimethoxine)^
- Gallimycin® PFC (Erythromycin)^
- NeoMed® 325 Soluble Powder (Neomycin Sulfate)
- Neo-Sol® (Neomycin Sulfate)
- Oxytet® Soluble (Oxytetracycline)
- PenAqua Sol-G® (Penicillin G Potassium)
- Pennchlor 64® (Chlortetracycline)
- Pennox 343® (Oxytetracycline)
- PoultrySulfa® (Sulfamerazine, Sulfamethazine, Sulfaquinoxaline)^
- R-PEN® (Penicillin G Potassium)
- SpecLINX-50 (Lincomycin + Spectinomycin)
- Sulmet® (Sodium Sulfamethazine)
- Sul-Q-Nox® 31.92% (Sulfaquinoxaline)
- Tetra-Bac® 324 (Tetracycline)
- TetraMed® 324 HCA (Tetracycline)
- Tetroxy® HCA Soluble (Oxytetracycline)
- Tet-Sol™ 324 Soluble (Tetracycline)
- Tylan® Soluble (Tylosin Tartrate)
- Tylovet® Soluble (Tylosin Tartrate)

### Non Script Medications

- BMD® Soluble (Bacitracin Methylene-Disalicylate)^
- BMD® Soluble (Bacitracin Methylene-Disalicylate)^
- Clinacox® (Diclazuril)^
- Clinacox® (Diclazuril)^
- Coban® (Monensin)
- Coyden® (Clopidol)^
- Flavomycin® (Bambermycin)^
- Flavomycin® (Bambermycin)^
- PMD® (Bacitracin Methylene-Disalicylate)^
- PMD® (Bacitracin Methylene-Disalicylate)^
- Safe-Guard® (Fenbendazole)
- Safe-Guard® (Fenbendazole)
- Stenorol® (Halofuginone)^
- Stenorol® (Halofuginone)^
- Topmax™ (Ractopamine)^
- Topmax™ (Ractopamine)^
- Zoamix® (Zoalene)
- Zoamix® (Zoalene)
Table 4. Turkey health survey (August 2019 – August 2020) of professionals in U.S. turkey production coccidia control programs (n=260.0 million head).

<table>
<thead>
<tr>
<th>Program</th>
<th>How many months (average)</th>
<th>How many head (count divided by total count)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ionophore</td>
<td>7.0</td>
<td>60%</td>
</tr>
<tr>
<td>Chemical</td>
<td>5.5</td>
<td>28%</td>
</tr>
<tr>
<td>Alternative (Phytonutrients)</td>
<td>4.7</td>
<td>23%</td>
</tr>
<tr>
<td>Vaccine</td>
<td>5.5</td>
<td>11%</td>
</tr>
</tbody>
</table>

National Veterinary Services Laboratories (NVSL) Avian Influenza and Newcastle Disease Report
Mia Kim Torchetti, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NVSL
Dr. Torchetti gave an update on avian influenza (AI) and Newcastle Disease Virus (NDV) findings from NVSL.

National Veterinary Services Laboratories (NVSL) Bacteriology Diagnostics Report
Brenda Morningstar-Shaw, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NVSL

Poultry Salmonella, Mycoplasma, and Pasteurella Diagnostics at the National Veterinary Services Laboratories (NVSL) January 1-December 31, 2019
Brenda Morningstar-Shaw, Kristina Lantz, Linda Cox, Karen LeCount, K. Toot, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NVSL

Salmonella serotyping
The Bacterial Identification section within the Diagnostic Bacteriology and Pathobiology Laboratory of the National Veterinary Services Laboratories (NVSL) routinely performs serotyping of 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, 2019, originating from poultry.
Salmonella isolates are identified as clinical (clinical signs of salmonellosis from primary or secondary infection) or non-clinical (flock monitoring programs, environmental sources, feed). 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 via classical serotyping using polyvalent and single factor antisera to determine the O and H antigens and/or via molecular typing using the xMAP Salmonella serotyping assay. 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, 2019, 10,613 isolates were received for *Salmonella* serotyping. Of those, 3,011 isolates were from chicken sources and 788 isolates were from turkey sources. The most commonly isolated serotypes from chicken and turkey are listed in Tables 1 and 2 respectively.

The NVSL provided a *Salmonella* Group D proficiency test (PT) to 100 individuals from 85 different laboratories. The purpose of the PT was to assess the ability of laboratories to detect or isolate *Salmonella* Group D and/or *Salmonella* Enteritidis from simulated environmental samples. The test consisted of ten lyophilized cultures containing various combinations of *Salmonella* and common contaminants typically found in environmental swabs. The 2019 test included *Salmonella* serotypes Anatum, Enteritidis, I9, 12:n:nonmotile, and Heidelberg. Contaminant bacteria included *Citrobacter amalonaticus*, *Citrobacter freundii*, *Enterobacter cloacae*, *Enterobacter* species, *Klebsiella pneumoniae*, *Providencia rettgeri* and *Pseudomonas aeruginosa*. Laboratories were instructed to test the samples according to the procedures used in their laboratories. The NVSL randomly retained approximately ten percent of the test kits for quality assurance (QA) purposes. All were tested blindly with no discrepancies. The results of the proficiency test are shown in Table 3.

**Salmonella Enteritidis**

From January 1 to December 31, 2019, 3,011 *Salmonella* isolates were received from chickens and their environment for identification of serotype. This was a 36% decrease in chicken submissions from 2018. *Salmonella* Enteritidis was isolated in 12% of these isolates and remains in the top five serotypes observed in both clinical and non-clinical submissions. A summary of the number of *S*. Enteritidis isolates identified from chickens during the previous five years is shown in Table 4.

**Salmonella Pullorum and Gallinarum**

The NVSL received 159 samples for *Salmonella* Pullorum and Gallinarum serological testing in 2019. No isolates of *Salmonella* Pullorum or Gallinarum were identified or confirmed at the laboratory in 2019. The NVSL provided 3,835 mL of *S*. Pullorum tube antigen, a four percent decrease from 2018; 3,325 mL of *S*. Pullorum stained microtiter antigen, a 43% increase from 2018; and 536 mL of control antisera, a 21% increase from 2018, to testing laboratories between January 1 and December 31, 2019.

**Pasteurella**

The NVSL received 130 isolates for *Pasteurella multocida* Gel-Diffusion Precipitin testing, which was a 22% decrease from 2018. Twenty-four
isolates were identified as type 3 in 2019, making up 18.5% of all isolates tested as compared to 30% of the isolates in 2018. A summary of the results is provided in Table 5. Additionally, 107 isolates were received for *P. multocida* DNA fingerprinting, which was a decrease of 37% from 2018. The NVSL supplied 73 mL of *P. multocida* typing sera and 2 cultures to testing laboratories.

**Mycoplasma**

The NVSL received 116 samples for avian *Mycoplasma* hemagglutination inhibition testing in 2019. In addition, 772 mL of *Mycoplasma* control antisera and 355 mL of *Mycoplasma* hemagglutination antigen were supplied to testing laboratories. Information on *Mycoplasma* reagents provided is shown in Tables 6 and 7.

### Table 1: Most common serotypes in 2019: 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>154</td>
<td>Mbandaka</td>
<td>404</td>
</tr>
<tr>
<td>Kentucky</td>
<td>99</td>
<td>Senftenberg</td>
<td>303</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>31</td>
<td>Tennessee</td>
<td>229</td>
</tr>
<tr>
<td>Infantis</td>
<td>12</td>
<td>Kentucky</td>
<td>220</td>
</tr>
<tr>
<td>I 4,[5],12:i:-</td>
<td>11</td>
<td>Enteritidis</td>
<td>216</td>
</tr>
<tr>
<td>All others</td>
<td>72</td>
<td>All others</td>
<td>1,260</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>379</strong></td>
<td><strong>Total</strong></td>
<td><strong>2,632</strong></td>
</tr>
</tbody>
</table>

### Table 2: Most common serotypes in 2019: 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>36</td>
<td>Ouakam</td>
<td>130</td>
</tr>
<tr>
<td>Ouakam</td>
<td>29</td>
<td>Albany</td>
<td>80</td>
</tr>
<tr>
<td>Typhimurium</td>
<td>26</td>
<td>Alachua</td>
<td>40</td>
</tr>
<tr>
<td>Albany</td>
<td>25</td>
<td>Senftenberg/Kentucky</td>
<td>39</td>
</tr>
<tr>
<td>Infantis</td>
<td>23</td>
<td>Litchfield/Uganda</td>
<td>23</td>
</tr>
<tr>
<td>All others</td>
<td>125</td>
<td>All others</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>264</strong></td>
<td><strong>Total</strong></td>
<td><strong>524</strong></td>
</tr>
</tbody>
</table>

### Table 3: Summary of the NVSL *Salmonella* Group D proficiency test

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>94</td>
<td>98</td>
<td>101</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>Mean Score</td>
<td>98%</td>
<td>97%</td>
<td>95%</td>
<td>98%</td>
<td>97.8%</td>
</tr>
<tr>
<td>Below Passing</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

Table 4: Number of *Salmonella* Enteritidis isolates in chicken per calendar year at the NVSL

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. chicken isolates</td>
<td>4,593</td>
<td>3,539</td>
<td>4,397</td>
<td>4,742</td>
<td>3,011</td>
</tr>
<tr>
<td>No. chicken SE isolates</td>
<td>513</td>
<td>342</td>
<td>358</td>
<td>418</td>
<td>370</td>
</tr>
<tr>
<td>SE percent of all isolates</td>
<td>11%</td>
<td>9.7%</td>
<td>8%</td>
<td>9%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Table 5: Somatic types of *Pasteurella multocida* observed at the NVSL per calendar year

<table>
<thead>
<tr>
<th>Type</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>18</td>
<td>34</td>
<td>37</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Type 3</td>
<td>4</td>
<td>8</td>
<td>14</td>
<td>51</td>
<td>24</td>
</tr>
<tr>
<td>Type 3,4</td>
<td>28</td>
<td>22</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>All other</td>
<td>99</td>
<td>122</td>
<td>118</td>
<td>81</td>
<td>67</td>
</tr>
<tr>
<td>TOTAL</td>
<td>149</td>
<td>186</td>
<td>183</td>
<td>167</td>
<td>130</td>
</tr>
</tbody>
</table>

Table 6: *Mycoplasma* antisera (mL) provided by NVSL per calendar year

<table>
<thead>
<tr>
<th>Antisera</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>M. gallisepticum</em></td>
<td>290</td>
<td>192</td>
<td>376</td>
<td>236</td>
<td>282</td>
</tr>
<tr>
<td><em>M. meleagridis</em></td>
<td>68</td>
<td>42</td>
<td>58</td>
<td>48</td>
<td>46</td>
</tr>
<tr>
<td><em>M. synoviae</em></td>
<td>260</td>
<td>172</td>
<td>362</td>
<td>192</td>
<td>178</td>
</tr>
<tr>
<td>Negative</td>
<td>250</td>
<td>322</td>
<td>340</td>
<td>262</td>
<td>266</td>
</tr>
<tr>
<td>TOTAL</td>
<td>868</td>
<td>728</td>
<td>1,136</td>
<td>738</td>
<td>772</td>
</tr>
</tbody>
</table>

Table 7: *Mycoplasma* antigen (mL) provided by NVSL per calendar year

<table>
<thead>
<tr>
<th>Antigen</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>M. gallisepticum</em></td>
<td>70</td>
<td>275</td>
<td>290</td>
<td>145</td>
<td>165</td>
</tr>
<tr>
<td><em>M. meleagridis</em></td>
<td>45</td>
<td>80</td>
<td>90</td>
<td>45</td>
<td>25</td>
</tr>
<tr>
<td><em>M. synoviae</em></td>
<td>205</td>
<td>215</td>
<td>235</td>
<td>125</td>
<td>165</td>
</tr>
<tr>
<td>TOTAL</td>
<td>320</td>
<td>570</td>
<td>615</td>
<td>315</td>
<td>355</td>
</tr>
</tbody>
</table>

References

National Poultry Improvement Plan (NPIP) Update
Elena Behnke, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), NPIP

Pullorum-Typhoid Status: There were no isolations of *Salmonella* pullorum in commercial poultry in FY2016, FY2017, FY2018, FY2019 or FY2020. There were no isolations of *Salmonella* pullorum in backyard birds in FY2016, FY2017, FY2018, FY2019 or FY2020. There have been no isolations of *Salmonella gallinarum* since 1987 in any type of poultry in the U.S. U.S. Pullorum-Typhoid Clean participating hatcheries include: 273 egg and meat-type chicken hatcheries, 49 turkey hatcheries, and 833 waterfowl, exhibition poultry, and game bird hatcheries.

**NPIP U.S. Pullorum-Typhoid Clean Participating Breeding Flocks and Number of Birds are listed below:**

- **Egg-Type Chickens**
  - 270 Flocks with 6,874,107 birds

- **Meat-Type Chickens**
  - 6,000 Flocks with 118,447,921 birds

- **Turkeys**
  - 472 Flocks with 4,283,033 birds

- **Waterfowl, Exhibition Poultry, and Game Birds**
  - 5,854 Flocks with 2,170,070 birds

- **Meat-Type Waterfowl**
  - 115 Flocks with 343,202 birds

**Avian Influenza Status:**
From October 2019-September 2020, there were a total of 12 confirmed cases of H7 low pathogenicity avian influenza (LPAI) in the Carolinas, in three adjacent counties:

- 2 in Anson County, NC
- 9 in Union County, NC
- 1 in Chesterfield, SC

**Table 1: 2020 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 2: 2020 MG, MS, and MM positive breeding 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>311</td>
<td>8,473,245</td>
<td>26,933</td>
</tr>
<tr>
<td>Table-Egg Layers-Commercial</td>
<td>5,598</td>
<td>484,560,627</td>
<td>109,436</td>
</tr>
<tr>
<td>Meat-Type Chicken Breeders</td>
<td>7,749</td>
<td>135,163,348</td>
<td>569,688</td>
</tr>
<tr>
<td>Meat-Type Chickens-Commercial</td>
<td>101,376</td>
<td>7,998,737,505</td>
<td>121,088,119</td>
</tr>
<tr>
<td>Turkey Breeders</td>
<td>872</td>
<td>7,694,772</td>
<td>38,426</td>
</tr>
<tr>
<td>Turkeys-Commercial</td>
<td>12,000</td>
<td>160,879,697</td>
<td>138,090</td>
</tr>
<tr>
<td>Waterfowl, Upland Game birds, Exhibition Poultry</td>
<td>4466</td>
<td>2,001,850</td>
<td>93,250</td>
</tr>
<tr>
<td>Upland Game birds, Waterfowl, Raised for Release</td>
<td>3,147</td>
<td>56,272,365</td>
<td>44,793</td>
</tr>
<tr>
<td>Total</td>
<td>124,719</td>
<td>8,853,783,409</td>
<td>122,108,735</td>
</tr>
</tbody>
</table>

Table 2: 2020 MG, MS, and MM positive breeding flocks:

| Mycoplasma gallisepticum, Mycoplasma synoviae, and Mycoplasma meleagridis positive breeding flocks - National Poultry Improvement Plan FY2020 |
|-------------------------------------------------------------------------------------------------|--------|--------|--------|--------|
| WEGBY                                                                                          | Egg-Type | Meat-Type | Turkeys |
| M. gallisepticum                                                                               | 20     | 1      | 8      | 1      |
| M. synoviae                                                                                   | 19     | 2      | 59     | 1      |
| M. meleagridis                                                                                 | 0      | 0      | 0      | 0      |

Avian Influenza (AI) and Newcastle Disease Virus (NDV) Subcommittee Report, Southeast Poultry Research Laboratory (SEPRL) Report

David Suarez, USDA, Agricultural Research Service (ARS), SEPRL

The subcommittee report intends to summarize major events related to avian influenza and Newcastle disease virus worldwide. The information is derived from a variety of sources including the World Organization of Animal Health (OIE), the Food and Agriculture Organization (FAO), Promed, information from scientific meetings and from published and unpublished research.

Newcastle disease remains an ongoing disease threat around the world and remains endemic in many countries around the world. Notable outbreaks of genotype VII occurred in Russia throughout 2019. These outbreaks were
POULTRY AND OTHER AVIAN SPECIES

mostly in chicken flocks spread throughout the country, but one outbreak in geese was also reported. Vaccination for Newcastle disease is practiced widely, but there are notable exceptions in Europe where five of 25 countries do not routinely vaccinate. For the countries that vaccinate in Europe, the use of live attenuated vaccines in Europe remain the norm with LaSota vaccines and more attenuated genotype II vaccines like B1, C2, VGGA, clone 30 being most commonly used. The genotype I vaccine Ulster is also commonly used vaccine in some countries in Europe.

Avian influenza continues to be of zoonotic concern. The number of cases for both H5Nx and H7N9 have been decreasing in the last few years and no reports of H5 or H7 human infections were reported in 2020. Low pathogenic H9N2 continues to be a concern and four cases in China and Hong Kong have been reported in the last year. Because historically human H9N2 infections cause only mild respiratory disease, it is likely that most H9N2 cases are not identified and the true number of human infections is likely much higher, which is supported by serologic studies. The decrease in human cases may also be affected by the COVID-19 outbreak whose control measures may have impacted new human infections.

H9N2 avian influenza continues to be endemic and highly adapted to poultry in Asia, the Middle East, parts of Africa and parts of Europe. New outbreaks in Nigeria and Oman were reported. Japan also reported detection of H9N2 in illegally imported meat, which raises concern about poultry products spreading the virus from endemic countries. Vaccination is commonly used for control, but antigenic variants make it difficult to effectively vaccinate for the disease. Despite being widespread and costly to poultry producers, H9N2, because it remains a low pathogenic virus, is not reportable to OIE.

H7 highly pathogenic avian influenza (HPAI) outbreaks continue throughout the world. Although China has not reported to OIE new H7N9 outbreaks in 2020, the virus is still considered to be endemic in China despite the widespread use of vaccination. China has even updated their reverse genetics vaccine from RE-1 to RE-2 in late 2018 to deal with antigenic drift of the virus. The H7N3 outbreak in Mexico is also considered to be ongoing despite lack of reporting to OIE. Vaccination is also being used as a control tool in Mexico. Two new outbreaks of H7 HPAI were reported in 2020, including H7N3 in the USA (details reported by other speakers) and H7N7 in Australia. The Australian outbreak that occurred in late July 2020 was in commercial free range layer operations on three farms with around 105,000 birds being affected. The outbreak appears to be under control.

The goose Guangdong lineage of H5 HPAI remains the largest threat around the world. Outbreaks from Asia in China, India, Taiwan, Afghanistan, Philippines, Saudi Arabia, Israel, and North Korea in both poultry and non-poultry were reported. Other countries, including Indonesia, Pakistan and Bangladesh, are also considered as being endemic in poultry. A variety of subtypes including H5N1, H5N2, H5N5, H5N6, and H5N8 were identified.
showing that viruses continue to reassort and multiple antigenic variants are present. Because of delays in reporting sequence, a complete picture of the antigenic variants present are not known. Because of the overall trend of decreased reporting, it is unclear how many countries have H5 HPAI in the region. Of note is the detection in the Philippines, which has not had a report of H5 HPAI for a number of years. The situation in Taiwan is also notable because of reports of three different H5 HPAI viruses. A H5N2 virus continues to persist that can be traced back to Mexican H5N2-like vaccine virus introduced in 2003, H5N2 goose Guangdong lineage virus that persisted from introduction of H5N8 in 2015, and the most recent introduction of H5N5 in 2020.

Europe has had a number of detections of goose Guangdong lineage H5N8 that started in late 2019 and winter 2020. This was the first detection of H5N8 in Europe since 2017. Detections of virus in wild birds and in poultry were reported. Epidemiology suggests wild bird introduction to poultry with some local spread. The most serious outbreaks were in Hungary which reported detections of virus on 273 farms. More than 4.7 million birds died or were culled to control the outbreak. The outbreak involved a large number of domestic ducks, domestic geese, turkeys and chickens with the outbreak starting in January and continuing until May. Other sizable poultry outbreaks occurred in Bulgaria and Poland and sporadic detections in Czech Republic, Germany, Slovakia, Kazakhstan, Ukraine, and Russia were reported. The outbreaks in Russia started in August 2020 in both wild birds and backyard poultry. They have concerns that these detections may predict the spread of the virus to Western Europe in the coming Fall and Winter months. They recommend increased vigilance for introductions of the virus.

Africa continues to have several hotspots of infection. Egypt continues to have several variants of goose Guangdong lineage virus including H5N1 and H5N8 and they also have H9N2 virus. Since 2017 a number of sub-Saharan African countries have had outbreaks of H5N1, H5N6, or H5N8 HPAI, and it is unclear which countries are still dealing with the disease except for Nigeria which has reported H5N6 in poultry in 2020. South Africa also continues to deal with a number of outbreaks both in poultry and in wild birds of H5N8 HPAI. South Africa reported outbreaks as recently as July 2020 and continues to struggle with the disease.

**North Carolina/South Carolina LPAI-HPAI H7N3 Event Overview**

Julie Helm, Clemson University
Michael Martin, North Carolina Department of Agriculture and Consumer Services

In March and April of 2020, North Carolina (NC) and South Carolina (SC) responded to a H7N3 low pathogenic avian influenza (LPAI) and highly pathogenic avian influenza (HPAI) event just as COVID-19 human cases began to increase. In total, there were 12 commercial turkey farms with LPAI and one commercial turkey farm with HPAI. The 12 LPAI cases included two breeder farms (one pre-lay flock in the dark house and one young laying
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flock) and ten meat turkey farms consisting of over 304,000 birds. Eleven of
the 12 flocks were asymptomatic, with the young laying flock reporting a
decrease in egg production. The one HPAI case was a commercial meat
turkey farm located in SC with over 32,000 birds.

The 11 LPAI NC cases were located in two adjacent counties, which
were densely populated with commercial broiler, broiler breeder, turkey,
turkey breeder and table egg farms. The two SC cases were located in one
county adjacent to the NC cases, which was sparsely populated with mainly
turkey and broiler breeder farms and one each of a broiler and table egg
layer farm. Most of the cases were from a single commercial integrator, but
the integrator also had the most farms located in this area; and there was no
difference in incidence between all the turkey integrators in the region.

The H7N3 LPAI virus was from the North American wild bird lineage.
The virus was not associated with any previous U.S. poultry events. Initial
sequencing did suggest that this virus was at risk of mutating from LPAI into
HPAI and USDA rapidly approved both NC and SC to depopulate these
flocks, which facilitated a rapid response from the beginning of the event.

Foam was primary method of depopulation used during the event. After
receiving USDA approval for indemnity and compensation and having water
available on farm, depopulation conducted by state and industry personnel
was completed within 24 hours. In North Carolina, burial was not allowed for
dead birds, so dead birds, litter, and feed were composted in-house. In South
Carolina, dead birds were allowed to be buried in approved mass burial sites
on the farms. The manure, litter and feed were composted in the barns
initially and after the first heat treatment cycle was moved and turned outside
on the property to complete the second heat cycle. Allowing the compost to
move out of the barns after the first heat cycle was completed helped to start
the cleaning process earlier.

The first three farms that tested positive for Avian Influenza on March 11,
2020 all were in North Carolina. These flocks included two meat turkey flocks
tested as part of routine NPIP pre-slaughter sampling and one turkey breeder
flock that had a slight drop in egg production in two of seven houses on the
farm. The three flocks were from different integrators with no common feed
supply, different methods of dead disposal, and were separated by at least
eight km distance between farms. No epidemiological links have tied these
three farms together at the time of this report.

Two of the NC LPAI surveillance zones dropped down into SC and the
first SC LPAI farm was found on zone testing. More NC LPAI farms were
found from March 13 to April 1 through zone testing and routine NPIP pre-
movement testing. Commercial farms located within the LPAI zones were
tested twice: initially when the zone was established and then again 14-21
days later. The SC zone was released on April 2, most of the NC zones were
released by April 5, and the last zone released on April 17.

On April 6 early Monday morning, a turkey supervisor reported that he
received a call from his SC grower about increased mortality and respiratory
signs overnight and was on his way out to a farm to collect samples. This
was a 12-week-old tom turkey farm with only one house out of five showing signs. This farm was previously the Contact Farm (the same grower) from first SC LPAI farm. Once his first farm was detected as positive, the grower did not go back to his second farm and he had separate personnel working the two farms. This farm had been tested three times prior on March 15, 19 and 31. The March 15 and 31 dates were mimicking the LPAI zone testing just north of this location and the middle testing date was the company collecting additional samples on their own as they were very concerned that this farm would also be positive for LPAI. The samples collected on April 6 were presumptive positive on AI matrix and H7 PCR in the SC National Animal Health Laboratory Network (NAHLN) laboratory from all five houses. Four dead birds were also submitted for necropsy and tested PCR presumptive positive for H7. Samples from the farm and necropsy were sent to the National Veterinary Services Laboratory (NVSL) in Ames, Iowa for confirmation. There was a pond located on the property about 150 yards from the main driveway and a few wild waterfowl birds were seen and heard on the pond, but the grower reported that these wild birds were never near the houses. Depopulation was approved by USDA and was performed the next day with about 2,500 birds either dead or too sick to move in that one clinical house. NVSL worked very late into the night and reported to SC that both LPAI and HPAI H7N3 viruses were in that one house. There was LPAI virus isolated in three other houses. The last house had no virus isolated, but there had H7 PCR detection with a high Ct. value.

SC transitioned from a LPAI response to a HPAI response. The established LPAI zone became a Control Area with increased weekly testing. A minimum of three weeks of testing is required, but SC did an additional fourth week of zone testing. All Control Area zone testing was negative. LPAI movement documents, procedures and testing transitioned into USDA’s Emergency Management Response System (EMRS) permitting in order to move approved birds and eggs out of the zone. SC established the Gateway Permitting with the industry and receiving states and used the Secure Poultry Supply Plans to move hatchery chicks and 1 flock of broilers located in the zone.

After the flock in South Carolina was identified as positive for HPAI, SC performed contact premises testing and changed their enhanced testing zone from 10 km to 20 km for a single testing cycle. North Carolina had already been testing aggressively based on the sequencing of the isolate, epi-linked testing, and density of the poultry operations and had no farms with 10km of the HPAI farm, so no additional testing was performed.

In both states with all the farms, wet cleaning and disinfection procedures were used for the houses and equipment, with a cleaning inspection in between. Environmental swabs were collected and tested negative on all the farms.

An epidemiology survey was conducted with USDA taking the lead. A questionnaire was created and vetted through the states and industry. Data
was collected based on Case/Control and Observational Cross-Sectional epidemiological models. Results are still pending as of this report.

Lessons learned for NC and SC: First, communications in general were very good between federal, state, and industry personnel and industry felt they were well informed by states via regularly scheduled conference calls. Second, states have been actively collaborating including the Southern Animal Health Association (SAHA) to improve response capabilities for LPAI and have been actively learning and collaborating with industry on preparation and response procedures based on other avian influenza events in the U.S. There is a need to work with federal resources more to improve communications about preparedness at the state and industry level. Third, another area of improvement would be to have more training for state employees on the positions of site manager and case manager and have a clearer delineation of biosecurity oversight. Ongoing EMRS training is always needed as well. Fourth, North and South Carolina did collaborate well over the development of LPAI conveyance documents for the event.

North Carolina had some specific lessons learned based on the event. First, the LPAI plan needed significant updating. NC was unable to attend planning meetings conducted by SAHA and so ended up looking to the SC plan, SAHA plan standardization, and USDA guidance documents during the event. NC has been updating their LPAI since the event and is near completion. Second, NC had requested some federal resources during the event and in future events will get clarity on specific site needs for those resources and request more details on resource maintenance to avoid operational delays. Third, NC will seek better clarity of responsibilities for a state based and state disease response in contrast to federal needs to validate finances. Lack of a clear delineation of responsibilities during the event between state and federal personnel contributed to inconsistent messaging in field operations and delays in release of farms from quarantine.

South Carolina also had some specific lessons learned on the event. First, the best lesson was that our recently updated LPAI plan worked very well with only a few updates during the LPAI event. The SC LPAI plan also helped to transition into a HPAI response. The Southern Animal Health Association (SAHA) LPAI planning and collaboration in 2018 was invaluable for this event. After the 2017 LPAI event, Dr. Tony Frazier in Alabama had the foresight to call in all his neighboring states and eventually all the SAHA states to come together as a region to try to get the LPAI plans as similar as possible, specifically with testing requirements. A critical product that came out of these meetings was a LPAI testing matrix for zones and movement, which allowed easier movement of birds and eggs out of the zone and interstate to these same states. South Carolina’s State Veterinarian would make an initial call to the other receiving State Veterinarians reporting that SC was initiating the LPAI plan and using the SAHA AI testing matrix and would they still accept birds or eggs coming out of the zone – and they did. The lesson is so valuable that regional planning needs to continue, especially after any AI events. Second, developing a method to update commercial
farm data continuously (perhaps during NPIP inspections and audits) rather than at the beginning of an incident. The companies were very responsive in cleaning up their farm lists, but it still caused delays. It seemed that USDA had even older farm data in EMRS and their perception of farm populations and AI surveillance testing was not the same as what SC knew was occurring at the state level. USDA recommended more testing than SC felt was necessary, as there was concern that additional testing could present a biosecurity risk and spread the virus to more farms.

Third, at the state level, a big problem is retrieving all the AI testing data from SC farms that is conducted in other out of state laboratories in a timely manner. Out of state NAHLN and NPIP laboratories who are testing SC flocks need to message testing data directly to the SC database electronically so that all AI surveillance can be readily accessible, especially in situations like this and will reduce days of gathering information when you are busy doing other activities. Fourth, using the established Federal/National Premises Identification Number (PIN) as the unique farm identifier for each farm provided better communication between the state, industry and USDA. Fifth, the commercial company employees are part of the SC responder team and collect their own farm samples and conducts an annual training for new company hires on routine NPIP and Al Event sampling and farm biosecurity. Sampling instructions to the companies went through many revisions for LPAI and then HPAI and need to remember to keep it as simple and consistent as possible. There were concerns reported that the company responders may not be sampling properly, such as not targeting dead and sick birds and not collecting throughout the whole house. Response training with all of the company responders will be planned on a routine schedule. Sixth, SC feels there is a need to update the minimum requirements for composting manure, litter and feed not containing bird carcasses. Normally this process is managed as both minimum time and temperature for two heat treatment cycles by reaching the minimum temperature for minimum days within a 14-day period for each cycle. When the compost does not include bird carcasses in it, the minimum temperatures are reached sooner. SC believes this should be changed from time and temperature to be a minimum time at temperature for each cycle with the temperature driving the timing of the heat cycle. In the first LPAI farm, we were able to complete the first heat cycle and move the compost out of house after ten days versus waiting for 14 days, which allowed the grower to begin clean activities sooner. SC would like to see more research on composting manure not containing bird carcasses. Seventh, a good tip for state counterparts – in your flock plans, be sure to include due dates for the different activities that need to be completed (such as cleaning and disinfection), so that growers do not lose focus on the houses and start to plant corn. This will reduce delays in releasing the zone, since everyone is waiting for the last house to be disinfected.

A human pandemic (SARS-CoV-2, COVID-19) occurring at the same time created significant challenges in the response for the event. Getting
resources such as biosecurity supplies for field operations or laboratory supplies for testing was more time consuming and there was a risk of running out of operations materials. Testing needed to be balanced to facilitate rapid testing needs while optimizing laboratory supplies. In the field, it was more challenging to access hotel and restaurants, communications between the Incident Command System (ICS) was mostly virtual contributing to unclear separation of responsibilities, and concerns with staff interacting with on site with other people given the human pandemic. Some engagement was limited, especially associated with messaging to backyard flock owners. Although some staff felt that the intense work pressures provided some normalcy during the human pandemic, many felt isolated and concerned about quarantine from family.

Assessment of the Risk Associated with the Movement of Pullets out of the Pullet Barn in a Control Area During a Highly Pathogenic Avian Influenza (HPAI) Outbreak in the United States
Carol Cardona and Marie Culhane, University of Minnesota, Center of Veterinary Medicine (CVM)

Overall Conclusion of the Pullets Out of the Barn Risk Assessment
The objective of this assessment was to estimate the risk that the movement of pullets out of a pullet barn (e.g., to the driveway of the pullet premises, not to a specific location), from a premises located within a Control Area during an HPAI outbreak in the poultry industry in the U.S., will result in the movement of infectious but undetected birds and the likely number of infectious birds at the time of movement.

The assessment considered relevant current industry practices and current biosecurity measures as well as outbreak-specific measures from the SPS Plan, in particular the PMIP and additional load-out mitigation measures. The assessment focused on the risk pathways for HPAI infection of pullets on premises located within an HPAI Control Area via components of local area spread, people and vehicles, and load-out processes. Many of these pathways do not involve the movement of live birds, and rather relate to the likelihood of infection of live birds that will then move and the potential for missed detection prior to movement. Qualitatively compiling the assessed
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risks and likelihoods of the pathways analyzed yields the estimated risk of moving HPAI infected but undetected pullets out of the barn (Figure 30).

**Figure 30:** Diagrammatic representation of the assessed risk with the relative amount of risk increasing as the width of the figure increases (the risk of component parts is not to scale). The risk assessment is based on consideration of the steps needed to move pullets off a farm and the pathways that could lead to infection of a flock, the subsequent likelihood of detection of the infected flock, and potential movement of an infected but undetected flock.

The evaluation of the major risk pathways identified resulted in the following conclusions:

**Local Area Spread Pathways**

- **Insects.** The likelihood of a pullet premises becoming infected with HPAI virus via insect transmission varies with distance and with source premises infection status. The estimated likelihood ratings range from negligible to moderate, with a higher likelihood of infection closer to a known infected premises. For premises located closer than 1.5 km to an infected flock, there are too many variables to accurately assess the risk of becoming infected with HPAI via insect transmission.

- **Aerosols.** The likelihood of a pullet premises becoming infected with HPAI virus via bioaerosol transmission varies with distance and with viral load at the source premises. Literature review and most previous outbreak reports indicated that aerosol transmission was not an important factor at distances more than 1.5 km from an infected flock. However, there is some evidence of aerosol transmission over short distances and both expert opinion and exploratory dispersion modeling indicate possible risk of transmission beyond 2 km. Thus, the likelihood of a pullet premises becoming infected via bioaerosol transmission is rated as follows:
  - **Low to Extremely high** if <3 km from an infected poultry premises
  - **Negligible to Low** if >3 km from an infected poultry premises

- **Wild Birds.** The likelihood of HPAI virus spread to a pullet premises via wild birds depends upon the type of wild birds and exposure to the wild birds. With an effective Pre-Movement Isolation Period (PMIP), the likelihood of HPAI infection via wild aquatic birds and via non-passerine non-aquatic birds is low, as these birds and their waste are unlikely to access or be tracked into a pullet barn. Given that passerine birds may access the inside of pullet barns (even during a PMIP) and have been shown to be capable of shedding the virus, the likelihood of HPAI infection via
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passerine birds in the farm vicinity was assessed as low to moderate.

People, Vehicles, and Equipment Pathways

- **Live-haul Routes.** The risk of HPAI virus spread to pullet premises near poultry live-haul routes via feathers, feces, and other fomites depends on both distance and source flock. For trucks hauling birds that had an effective PMIP and negative rRT-PCR test results, the risk is estimated to be negligible to low no matter the distance. In contrast, for trucks hauling birds that had no PMIP and no diagnostic tests (e.g., from premises outside the Control Area), the risk ranges from low to high, with premises within 100 meters of the live-haul route at highest risk.

- **Feed Delivery and Emergency Operational Visits.** Operational visits will be limited during PMIP; however, delivery of feed during this period is likely, and the potential for emergency maintenance visits also exists. The likelihood of a pullet flock becoming infected with HPAI via feed delivery and emergency operational visits during PMIP was assessed as negligible to moderate, as follows:
  - Negligible to low via contaminated feed
  - Low via feed delivery (i.e., contaminated driver and/or vehicle)
  - Low to moderate via other emergency operational visits (i.e., emergency personnel or their vehicle)

- **People and their Vehicles.** Provided PMIP measures for people are strictly followed (e.g., people wear LOS-specific clothing and footwear, no vaccination crews are allowed on-site during a PMIP) we rate the likelihood of a pullet flock becoming infected with HPAI via people and their vehicles entering the premises during the PMIP as low.

- **Shared Equipment (other than load-out equipment).** Previous outbreaks have demonstrated that shared equipment poses a disease transmission risk; however, during the PMIP, no off-site equipment will be pre-staged and only feed delivery and emergency operational visits may continue. Thus, we rated the likelihood of a pullet flock becoming infected with HPAI virus via shared equipment as low.

- **Dead Bird Disposal.** The risks of HPAI introduction associated with off-site dead bird disposal methods, such as rendering, are well documented, and off-site disposal of mortality must be discontinued during PMIP. However, the risky practice of off-site dead bird disposal may still occur outside of a PMIP.

  - For on-farm dead bird disposal, given that many scavenger species can biologically or mechanically carry HPAI virus and have home ranges large enough to contain adjacent poultry farms, we
assessed the likelihood of HPAI introduction to a pullet farm during the PMIP as low to moderate.

- Off-site dead bird disposal methods prior to a PMIP may possibly result in premises contamination. However, the implementation of a PMIP does reduce the likelihood that such contamination will be tracked inside a pullet barn during the PMIP. We thus assessed the likelihood of a pullet flock becoming infected as a result of HPAI virus introduction to the flock via off-site dead bird disposal that takes place prior to the PMIP as moderate.

- Garbage Management. There is potential working Draft l for HPAI virus associated with garbage management to be tracked into a poultry house, and thus we assessed the likelihood of a pullet flock becoming infected with HPAI virus due to garbage management without a PMIP to be moderate to high. During a PMIP, no off-site movement of garbage is allowed, and thus we assessed the likelihood of a pullet flock becoming infected with HPAI virus due to garbage management during a PMIP as low.

Load-out Pathways

- Load-out Operations. Assuming PMIP enhanced biosecurity and testing measures are strictly implemented, and that additional load-out mitigation measures are in place for the duration of the load-out process, the risk that a pullet flock will become infected with HPAI virus via load-out operations and that this will result in an infected but undetected movement off the premises is estimated to range between low and high.

Overall Risk

It is concluded that the risk of moving infected but undetected pullets out of a pullet barn from within a Control Area during an HPAI outbreak ranges between low and extremely high, provided that all applicable preventive measures from the SPS Plan, in particular the PMIP and additional load-out mitigation measures, are strictly followed. The likelihood of moving a large number of infectious pullets (>80 birds) is rated to be low.

In using the results of this risk assessment, it should be remembered that:

- This assessment is based on current (January 2019) information and will need to be reviewed and revised as circumstances warrant.
- The assessment does not replace the judgment of on-scene officials with first-hand knowledge of the outbreak situation and the premises in question.

This document was developed through the Continuity of Business / Secure Food Supply Plans / Secure Poultry Supply project initiative. Related documents can be found at: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/sa_emergency_management/ct_fadprep_continuity_of_business
American Association of Avian Pathologists (AAAP) Research Priorities Survey Update
Eric Gingerich, Diamond V

In June of 2020, the AAAP Research Priorities Committee conducted its second survey of the broiler, turkey, and egg layer production veterinarians as well as the Association of Primary Breeder Veterinarians to find the top research priorities for health/diseases, vaccines and pharmaceuticals, diagnostic tools, food safety, poultry welfare, and management/environmental concerns.

Dr. Natalie Armour, AAAP Research Priorities Committee chair prepared a presentation given at the 2020 annual meeting of AAAP. This presentation is summarized here.

Veterinarians in Production Surveys

Three surveys were sent to the three associations of veterinarians in production – Broiler, Turkey, and Layer. The electronic surveys contained 87, 49, and 63 research needs statements respectively for the Broiler, Layer, and Turkey veterinarians. The categories of the statements were as follows:

- Health & Disease
- Vaccines & Pharmaceuticals
- Diagnostic Tools
- Food Safety
- Animal Welfare
- Management & Environment

The research priorities statements were sourced from the leadership of the associations of vets in production.

The participants were asked to score each statement on a scale of 1 to 5:

- 1 = no need
- 2 = little need
- 3 = moderate need
- 4 = high need
- 5 = very high need.

The Veterinarians in Broiler Production had 35 veterinarians respond for a 90% response rate. Their top 10 research priorities were as follows:

1. (Tie) Salmonella – Production and processing interventions
2. (Tie) Salmonella – Methods to quantify the impact of control methods
3. Campylobacter – Production and processing interventions
4. (Tie) Autogenous vaccines – Efficient isolate selection
5. (Tie) Reovirus – Improved current & emerging strains
6. (Tie) Bronchitis – Improved live vaccines
7. (Tie) GI Health – Non-antibiotic interventions
8. Autogenous Vaccines – Production efficiency
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9. Woody Breast – Causes & interventions
10. (Tie) Campylobacter – Vaccines for breeders and broilers
10. (Tie) Histomoniasis – Treatment & prevention

The Veterinarians in Egg Production had 38 veterinarians respond for a 95% response rate. Their top 10 research priorities were as follows:
1. In-ovo sexing – Develop & apply
2. Coryza – Safe and effective mass applied live vaccine
3. Bronchitis – DMV/1639 prevention strategies
4. (Tie) Euthanasia – Safe & effective whole house CO2 gassing
4. (Tie) Bronchitis – Safe & effective vaccines for variant strains
5. Bronchitis – DMV/1639 effect on hens exposed in lay
6. (Tie) Colibacillosis – Effective non-antibiotic treatments
6. (Tie) Colibacillosis – Vaccine control strategies
6. (Tie) Various – Treatments with zero-day withdrawal for eggs
10. Bronchitis – False Layer Syndrome prevention

The Veterinarians in Turkey Production had 23 veterinarians respond for an 85% response rate. Their top 10 research priorities were as follows:
1. Reovirus – Diagnostic tools for surveillance & strain ID
2. Reovirus – Epidemiology & emergence of novel strains
3. Salmonella – Interventions for processing & products
4. Reovirus – Rapid test for detection in the hatchery
5. Reovirus – Alternative vaccine technologies
6. Reovirus – Efficacious inactivated vaccines
7. Salmonella – Interventions at each production stage
8. Salmonella – Quantify impact of control interventions
9. (Tie) Salmonella – Epidemiology & control emerging serotypes
9. (Tie) Coccidiosis – Non-antibiotic anticoccidials & vaccines
9. (Tie) Histomoniasis – Treatment & prevention

AAAP Committees Research Priorities Lists
12 different AAAP Committees were asked to provide a list of 1 to 5 research needs. The 12 committees were as follows:
1. Animal Welfare
2. Diseases of Public Health Significance
3. Enteric Diseases
4. Drugs and Therapeutics
5. Epidemiology
6. Food Safety
7. Outreach
8. Legislative Advisory (LAC)
9. Respiratory Diseases
10. Small Flock
11. Toxic, Infectious, Miscellaneous, and Emerging Diseases (TIME)
12. Tumor Virus
Their results will be reported later when the report is published.

**Federal Agencies Research Priorities**

Six Federal Agencies were identified, and each was asked to submit 1 to 5 research priorities under the headings of 1) Health/Disease, 2) Vaccines & Pharmaceuticals, 3) Diagnostic Tools, and 4) Food Safety.

The six agencies were as follows:

1. CDC-One Health Office
2. FDA-CVM
3. APHIS-VS
4. NVSL
5. USDA-CVB
6. USDA-Forest Service

Their list of top priorities is as follows:

**Health/Disease**

- AI and Newcastle
  - Infectivity & pathogenesis on non H5/H7 types
  - Mitigate risk in the poultry/wild bird interface
- Re-emerging pathogens
  - Surveillance
  - Control

**Vaccines & Pharmaceuticals**

- Newcastle vaccine potency testing
- Salmonella vaccines
- Histomoniasis treatments
- Coccidiosis treatments
- Colibacillosis treatments

**Diagnostic Tools**

- AI serology
- Newcastle RRT-PCR
- Salmonella isolation and serology
- Emerging pathogen diagnosis

**Food Safety**

- Salmonella and Campylobacter
  - Backyard and commercial concerns
  - Epidemiology & sources
  - Interventions (vaccines, treatments, etc.)

**Overall Summary**

The four top diseases and the classes involved were as follows:

1. Salmonella – Broiler, Turkey, Backyard
2. Reovirus – Turkey, Broiler
3. Bronchitis – Layer, Broiler
4. Histomoniasis – Broiler, Turkey
The next four important diseases/practices in broilers:
1. Campylobacter
2. GI health
3. Autogenous vaccines
4. Woody breast

The next three important diseases/practices in layers:
1. In-ovo sexing
2. Infectious coryza
3. Euthanasia

The top three diseases affecting all poultry:
1. Avian influenza
2. Newcastle
3. Emerging pathogens

Dr. Armour is planning to publish the survey results in their entirety soon.

REPORT OF THE WORKING GROUP ON LIVE BIRD MARKETING SYSTEM (LBMS) AVIAN INFLUENZA PROGRAM FY2020
Fidelis N. Hegngi, MD

On October 20, 2004, Veterinary Services (VS) published uniform standards for H5 and H7 LPAI prevention and control in the LBMS to establish a more consistent approach by participating States in the control of LPAI in the LBMS. The LBMS Uniform standards have been revised in 2008, 2012, 2016, and currently in 2020. The standards are currently being implemented.

State participation is voluntary; participating States will enact regulations necessary for compliance of their live bird markets (LBMs), producers, and distributors. All LBMs, producers, and distributors that supply the markets must be registered or licensed with the State and must allow Federal and State inspectors access to their facilities, birds, and records. These facilities must also have written biosecurity protocols in place. USDA-APHIS coordinates and administers the program. USDA-APHIS provides personnel and resources to assist States with implementation and compliance with program requirements.

The LBM Working Group held its annual business meeting in February 2020 in Atlanta, Georgia. More than 79 participants representing 25 States attended the meeting including APHIS field, district, and headquarters staff; State Department of Agriculture representatives; and LBMS industry stakeholders. Participants discussed the program’s progress, shared ideas for continued program implementation, and agreed on further advancement of the program.

The working group also discussed:
1) Fiscal Year (FY) 2020 Avian Health line item budget update.
2) An update on Initial State Response and Containment Plan (ISRCP) indemnity and compensation procedures.
3) Pennsylvania Non-commercial mixed duck flock AI Incidents – H7N3 LPAI Overview, Challenges and Lessons Learned.
4) Connecticut Live Bird Market AI Incident– H7N3 LPAI Overview, Challenges and Lessons Learned.
5) Minnesota NPIP Biosecurity Plan Audits.
6) 2016 LBMS Uniform Standards –Suggested Proposed Changes and Additions to the 2020 Uniform Standards.
8) vND: Lesson Learned from an Epidemiologist.
9) USA Poultry & Egg Export Council (USAPEEC) 2020 President’s Report: Year in Review.
11) H1 avian influenza detection at an auction site in GA.
12) Live Avian Imports – what are the risk of disease introductions.
13) An update on the National Poultry Improvement (NPIP) Program.
14) NPIP authorized laboratories system and compartmentalization update.
15) USDA Southeast Poultry Research Laboratory (SEPRL) Update on vND and Avian Influenza.
16) CDC – Salmonella Outbreaks Linked to Contact with Backyard Poultry.
17) Discussion on Outreach and Education Projects: Defend the Flock (DTF) – Combined campaign; Background/Goals/Outreach materials; Webinar/Launch/Partnering; Calendar Replacements Social media vND response
18) Plans for 2020 LBMS Continuing Education Training Course at the School of Vet Medicine, University of California, Davis, CA.
19) Role of Wild Waterfowl in the Ecology of Avian Influenza.
20) Transmission of avian influenza virus among wild and domesticated animals.

In FY 2020, USDA reached a milestone in its’ Defend the Flock campaign: releasing a full suite of resources for poultry owners and handlers. These materials will help anyone who owns or works with poultry to practice good biosecurity every day, every time in order to protect our nation’s flocks from infectious disease. These materials include:

- A series of 15 checklists, each based on a different biosecurity principle
- Recordings of the Defend the Flock webinars with APHIS veterinarians and other experts
- Graphics for use in social media
- Videos
- Newsletters
Information that can be shared on websites and newsletters
Most resources are available in multiple languages, including English, Spanish, Chinese, Vietnamese, and Tagalog, as well as accessible versions for individuals with disabilities. USDA also recently announced the return of the annual calendar – order copies of the 2021 Defend the Flock calendar online today. Defend the Flock materials and information are available at www.aphis.usda.gov/animalhealth/defendtheflock.

LBMS surveillance remained a high USDA priority in FY 2020. There was no detection of AI in the U.S. LBMS.
COMMITTEE ON SHEEP, GOATS, AND CAMELIDS
Chair: Amy Hendrickson, WY
Co-Vice Chair: Maggie Highland, KS
Co-Vice Chair: Pat Long, NE

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The Committee met on October 15, 2020, virtually, from 2:30-4:30 p.m. EST. There were 125 members and guests present. Chairman Hendrickson gave a quick review of the agenda and explained that no resolutions had been submitted. Furthermore, she stated that discussion on the survey sent asking for feedback on USDA responses to last year would be held during the very short business session.

Report of the Subcommittee on Scrapie and Identification
Cheryl Miller presented the report of the Subcommittee on Scrapie and Identification. The report, in its entirety, is included at the end of this report.

Food Animal Residue Avoidance and Depletion (FARAD) Program: Updates and New Initiatives
Lisa Tell, University of California, Davis

An update was provided on the FARAD program and some of the new initiatives within the program. FARAD was established in 1982 and is a university-based national program that serves as a primary source for providing veterinarians with scientifically based withdrawal recommendations following extra label drug use in food animals. This
ensures that drug residues are not present in the food supply and that products are safe for human consumption. The primary task for FARAD is to provide a no fee service and answer questions submitted by veterinarians regarding on-label and extra-label drug use in food animals. In cases of extra-label drug use, FARAD provides withdrawal interval recommendations for both major and minor food animal species when there is enough scientific data. In addition, FARAD provides withdrawal interval recommendations for contamination cases such as feed mill errors or accidental exposures to drugs or pesticides.

One of the initiatives that FARAD has been focusing on is development of physiologically based pharmacokinetic models that will allow responders to estimate withdrawal intervals for high priority medications and species. In addition, the program is working on the development of an updatable list of rapid assays that can be used for food animals. This feature will include the test name, active ingredient, species, matrix, and sensitivity of the test.

FARAD also disseminates information through various outreach platforms with the goal of providing information on topics that are of high interest, new regulations, or medications for which a lot of questions are received. In addition, FARAD continues to publish Digests in the Journal of the American Veterinary Medical Association. The FARAD website, http://www.farad.org/, provides links to the various educational resources that are available.

**NAHMS Update and 2019 Goat Study**

Natalie Urie, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Strategy and Policy (S&P), Center for Epidemiology and Animal Health (CEAH), National Animal Health Monitoring System (NAHMS)

NAHMS conducts national studies that provide essential information on livestock and poultry health and management to decision makers, including producers, researchers, and policymakers. National estimates generated from a NAHMS study are used to provide up-to-date and trend information needed to monitor animal health, support trade decisions, assess research and product development needs, answer questions for consumers, and set policy. To be successful, producer participation must be voluntary, and data from individual operations must be kept confidential. This ensures the collection of high-quality data. NAHMS partners with USDA’s National Agricultural Statistics Service (NASS) to ensure that potential study participants are selected from a statistically representative sample of producers.

Before a NAHMS study begins, a needs assessment is conducted years in advance. This is accomplished through networking with industry, producers, academia, and other individuals within USDA Veterinary Services (VS). A study is then designed and includes sample allocation, questionnaire development, biologic incentives, training, and development of all materials. Data collection is completed in two phases. At first, there is contact by a
NASS representative to obtain informed consent and then someone from the VS field force will follow up with a questionnaire and gather any needed biologics. Data analysis is completed by NAHMS and includes validation of all data, weighting, and estimation, and then double checking the numbers and analyzing results. Results are then reported in various forms and disseminated to a broad audience.

2019 Goat Study

Of all eligible operations, sixty percent completed the General Goat Management Questionnaire (n=1,840). Of those, 60.5% completed the VS questionnaire.

Findings- Highlights

- Regardless of operation size or region, the primary use for goats was meat; 63.5 percent of all operations had at least one goat to produce meat. Milk production was a primary use for at least one goat on 26.1 percent of all operations. Only 2.7 percent of all operations kept any goats with a primary use as angora/fiber. Any goats as pets/companions were a primary use on 11.6 percent of operations. A higher percentage of small and medium operations (15.5 percent and 9.3 percent) reported any goats with a primary use as pets/companions compared to large operations (1.1 percent).
- There was no predominant single breed for meat or dairy goats. Boer and Spanish goats represented 68.5 percent of the total meat goat inventory. On dairy operations, Crossbred/experimental, Alpine, Saanen, and Nubian represented 27.5, 19.7, 17.8, and 13.8 percent of the goat inventory, respectively. Over one-half of goats on operations with a primary production type of other were and Boer, which were likely used for angora fiber production and show/seed stock, respectively.
- Of the operations that bred any goats, about three-fifths had a defined breeding season. A higher percentage of large operations had a defined breeding season than small operations. There were no differences by region in the percentage of operations that had a defined breeding season.
- A higher percentage of producers on large operations than on small operations consulted a veterinarian. A higher percentage of dairy producers than meat or other producers consulted a veterinarian.
- For operations that added adult or kid goats in the past year, the majority (85.0 percent) required inspections or treatments either prior to arrival on the operation or after arrival but before commingling with other goats and 55.9 percent required inspections and treatments both prior to arrival on the operation and prior to commingling with other goats. The procedures required by the highest percentage of operations prior to or after arrival and before commingling goats were any vaccinations, internal parasite treatment and inspecting goats for abscesses and/or scars from previous abscesses.
State of the Sheep Industry & Update on the Secure Sheep & Wool Supply Plan
Erica Sanko, American Sheep Industry Association

An update was provided on the impact of the COVID-19 Pandemic on the sheep industry. Like other industries, the sheep industry was not immune to the COVID-19 pandemic, and it was a challenging period with a lot of uncertainty. Initial impact came at the industry’s peak market and perhaps weighed more heavily on the lamb industry as it is more dependent on the foodservice sector than other proteins. Nonetheless the Lamb industry was able to weather the impacts better than other livestock & poultry sectors in terms of supply management.

Today, the lamb processing sector looks much different today than pre COVID-19. The second largest processing plant was forced into sale and was purchased by a cattle processor to further process beef. However, there is some renewed optimism in the industry with a new carcass processing plant coming online in mid-September and the purchase of an old lamb processing and fabricating plant in Texas, which is expected to be processing and fabricating by end of the year. Lamb was not the only sheep product impacted. Wool, which was already struggling due to the China trade issues, has also been impacted by COVID-19 pandemic. The U.S. exports more than half of American wool to China, our largest market by far. China is also the largest export destination for sheep skins. Today, demand for sheepskins and beef hides/leather is down dramatically with much of the world’s production going to landfills or rendered.

In addition, an update was given on the completion of the industry’s business continuity plan. The Secure Sheep and Wool Supply (SSWS) plan provides protocols and procedures that may allow the sheep and wool industries to maintain some critical aspects of business or enable a quicker return to business during an animal disease outbreak response. With 65 pages of content that address topics such as inventory and movements, financial planning, enhanced biosecurity, communications, sheep health and managing inputs and outputs, as well as unique considerations such as wool handling and grazing public land allotments, the plan lays out factors to consider regarding surveillance, biosecurity movement permitting of sheep in a foot and mouth disease (FMD) outbreak with an eye toward the unique aspects of sheep, FMD infection in sheep and typical sheep husbandry practices. Lastly, a review of the resources available with the plan, the website and expected next steps for the plan, was provided.

Transitioning to Electronic Identification (EID) – Can we do it and by when…
Cindy Wolf, University of Minnesota

Current mandatory ID requirements for sheep industry have been in place since 2001. The primary focus of identification requirements has been on breeding stock movement. The availability of no cost visual tags has been key to enhancing compliance. Recently ASI formed an Electronic ID
Transition Working Group in anticipation of an expected USDA move to electronic ID as an official form of identification.

Charge of the Working group is to develop a blueprint for the sheep and goat industries to transition from mandatory visual identification to electronic identification were deemed appropriate for animal disease traceability, including but not limited to scrapie eradication. Working group has had virtual meetings occur twice a month since May and during this time, meetings have included presentations of sheep and goat EID programs in other parts of the world, details regarding EID device options plus options for readers and in-depth discussion of the multitude of challenges regarding implementation in commerce. The Working group consists of 18 members with good representation from all aspects of the sheep industry, tag manufacturers, goat industry, extension and American Sheep Industry (ASI) leadership. In addition, there are subject matter experts from state and local government invited to participate when possible.

Two subgroups have been identified. The first has studied the current use of EID technology in the Sheep/Goat industries. Currently, uses of EID can be found in integrated flock/herd management systems, carcass trait evaluation of market lambs from fairs, in dairy goat herd management, including active use of EID implants in goats (base of ear, ventral aspect of distal half of tail). However, none of these uses can be found on an industry-wide scale.

Some of the current challenges include adoption on industry-wide scale by all stakeholders are significant pushback by auction markets and operations with extensively raised goats, (i.e., not-easy to handle or to apply ID), available software, costs relative to benefits (i.e., slaughter bound lambs and kids) and value of the animal, (i.e., low dollar value of cull ewe), adaptability and cost of EID to all different sized operations, and record-keeping.

The second subgroup will begin discussions in early November and will examine gaps in EID usage and identify what is not in place to transition to EID for everyday sheep and goat movements.

Sheep and goats share some of the same challenges that the cattle industry faces. Working together will be helpful. The common theme is the need for ongoing education.

Update on Current Status of Sheep and Goats in Alaska
Maggie Highland, Kansas State University

*M. ovipneumoniae* facts
- Opportunistic pulmonary pathogen of *Caprinae* subfamily members (sheep, goats, muskox)
- First identified in sheep in Australia (1972)
- Sheep and goats considered the “natural” hosts
- Nasal carriage (“shedding”) allows for antemortem testing
REPORT OF THE COMMITTEE

- Recently identified in: *Capreolinae* subfamily members (white-tailed deer, mule deer, caribou, moose), bison, antelope (Qatar), cattle (Colorado, Kansas)
- Never been identified/reported in camelids
- Identified as a bacterial agent (highly) associated with respiratory disease in bighorn sheep
  - Western North America (as far north as southern Canada)
- Never been reported in association with pneumonia outbreaks in Alaska wildlife species
  - Prior to 2017 – some suggested *M. ovipneumoniae* must not be in Alaska
  - To date, identified in caribou, mountain goats, Dall sheep, moose, domestic sheep, domestic goats

**Places to find information on *Mycoplasma ovipneumoniae* (in Alaska and in general)**
- Alaska Department of Fish and Game
- Alaska Division of Environmental Conservation – Office of the State Veterinarian (Dr. Bob Gerlach) http://dec.alaska.gov/eh/vet/movi/
  (Under “Resources and Links”: *Domestic/Wildlife Interactions: Mycoplasma ovipneumoniae in Alaska* – Summarizes latest data from both ADF&G and ADEC-OSV)
- USDA-APHIS (posted/updated 9/25/2020)

**Proposed Alaska Regulation for *M. ovipneumoniae***
- Beginning in 2016 proposals to regulate domestic sheep and goats in Alaska – primarily pushed by the Alaska Chapter of the Wild Sheep Foundation (not a state/regulatory agency)
  - 2016 (Proposition 90) and 2017 (Proposition 64)
    - Remove sheep and goats from the “clean list”
    - Fencing requirements w/in 15 miles of Dall sheep habitat
  - None passed to date
- New/current proposed regulations by DEC-OSV [18 AAC 36] – Regulations that were directed by a request from the governor’s office
  - Proposal includes adding *M. ovipneumoniae* testing requirement to importing sheep and goats
  - Information regarding these proposed regulations can be found at:
    http://dec.alaska.gov/eh/vet/regulations/animal-health
  - Copy of the proposed regulations:
    https://aws.state.ak.us/OnlinePublicNotices/Notices/View.aspx?id=199102
SHEEP, GOATS, AND CAMELIDS

- Open public comment period: August 7, 2020 through October 30, 2020  
  http://alaskadec.commentinput.com/?id=crx28
- FAQ site:  
  http://dec.alaska.gov/eh/vet/regulations/animal-health/faq/
  Regarding the FAQ site, one thing to point out for the answer to the following FAQ:
  Question: Why require *Mycoplasma ovipneumoniae* testing of sheep and goats older than 2 months of age?
  Answer: “Testing at 2 months and older is based on recommendations from Washington Disease Diagnostic Laboratory at Washington State University. Lambs and kids typically remain uninfected with *Mycoplasma ovipneumoniae* for a considerable time after birth. Data shows this is typically about 2 months, although in some herds can be 6 months or longer.”
  M. Highland’s Comment: This is not backed by scientific data, in fact goat kids are significantly more likely to shed than are adult goats based on a 2016 pack goat surveillance study (n=571; 83 premises), performed by the USDA-ARS-ADRU.
  In that goat study, 90% of (+) animals were <1 year old, 77% were <6 months old, multiple were ≤2 months. While no “peer-reviewed” published data to support either statement for goat kids, the USDA-ARS-ADRU data has been publicly presented and all data has been shared multiple times. All USDA-ARS-ADRU data from this study is available upon request.

Additional (scientific based) considerations for imposing *Mycoplasma ovipneumoniae* import testing:
- *M. ovipneumoniae* is not a regulatory/select disease agent
  (anywhere in the world)
- No official standardized and no validated regulatory diagnostic test exists for identifying positive (*M. ovipneumoniae* carrier/infected) animals
- Culture methods for *M. ovipneumoniae* have a low sensitivity
  (fastidious bacteria that forms very small colonies on agar)
- Sheep and goats can be intermittent nasal shedders (different result on different test dates)
  - Does this mean an animal is truly positive but only sheds periodically at a detectable level?
  - Does this mean that these animals are truly negative and pick up the bacteria from other animals in the herd/flock, then clear it, then pick it up, etc.
  - How many tests are enough?
- Serological testing that is commercially available (at only one state diagnostic laboratory) does not work in goats
This serologic test is not usable for testing an individual sheep’s carriage status – positive serologic animals may repeatedly test negative by nasal swab PCR testing.

Statement by ADFG regarding current testing methods:

Update from Camelid Industry

Patrick Long, Alpaca Owners Association

The following is a summary of the Camelid industry in the U.S. in 2020:
1) Covid 19 has caused cancelation of many local, regional, and national shows in the alpaca community. At least locally, on farm sales are up slightly, possibly due to more at home time for farm owners and a trend for more small farms and movement out of urban areas.
2) Agritourism activities have slowed or are non-existent on many farms. State laws and guidelines vary from state to state and have made on farm events difficult or impossible to conduct for most farms.
3) People for the Ethical Treatment of Animals (PETA) released a video of alpaca shearing in South America with worldwide distribution. While only two or three alpacas were depicted in this video, PETA implied that all alpacas worldwide were sheared in this manner. This video is not typical of shearing that occurs on most U.S. farms or even on most farms in South American countries. Worldwide some major manufactures have stopped using alpaca fiber as a result of this video. Mills in South America and the Alpaca Owners Association have responded with rebuttal statements to counter this video. I feel impact on U.S. alpaca owners will be minimal as most U.S. producers market their products through home knitters and craft fairs.
4) Camelids have been affected by proposed regulations banning domestic near wildlife. Another report from this committee covers that topic, but pack llamas will be the most severely affected by these proposed regulations.
5) Camelids made the news with their unique heavy chain antibodies and their potential use in treatment of Covid 19 in people. Camelids and sharks have heavy chain antibodies, which are much smaller (15 kilodaltons vs 150 kilodaltons) than conventional antibodies. These heavy chain antibodies were discovered over 30 years ago by researchers in Belgium and are being used by many firms. (Ablynx and Abcore are two companies that have more detailed information on their websites).

Update from Goat industries

Joan Dean Rowe, University of California, Davis

Dr. Rowe gave an update on the goat industry beginning with a summary of the 2020 Impacts on Goat Industries, including the COVID-19 pandemic impact on goat industries, public events, community. She also discussed the
impact that many recent natural disasters, western wildfires, storms/hurricanes, catastrophic weather disruptions, have had in 2020. Dr. Rowe then addressed some key emerging Issues in Goat Health and Veterinary Services including the FDA 5-year Plan - Antimicrobial Stewardship and the transition of currently available over the counter (OTC) medically important antimicrobials products to Rx only Label. She also updated the committee on Q-fever as ongoing existential threat to goat industries. Coxiella Brunetti infections in goats result in production losses but are also an occupational health risk and a public health risk. Concern about the possible impact on land use policy related to goat/sheep production at suburban interface and potential for liability across wide range of potential risk. There continues to be an urgent need for vaccines to prevent carrier state in livestock and human vaccine for public health. Dr. Rowe also discussed some ongoing animal health and industry/commerce threats, namely animal disease traceability (ADT). ADT in an increasingly complex environment for the goat industry. They are actively involved in addressing the complexities of goat industries from production units to pet enterprise industries as part of the need to develop an ADT program for the goat industry.

American Goat Federation Overview and Project Updates
Anita Dahnke, American Goat Federation

In 2018, the American Goat Federation (AGF) established the American Goat Initiative to operate as a national goat center to find and help fund research beneficial to the goat industry, to provide education and support to producers, as well as collaboration with other groups to benefit the goat industry.

In addition, AGF has worked with USDA for several years to promote USDA programs while providing services to goat producers. In late 2019 AGF, through cooperative agreements with USDA/APHIS began two projects of interest to this group. The first includes a field trial of prototype radio frequency identification (RFID) ear tags, applicators and readers in which AGF will work with manufacturers, recruit producers and evaluators, distributes tags, readers, and applicators, and record data about each tag, application and reading. A follow-up 6-month evaluations will be conducted to assess tag loss, infection rate, chip failure, reader failure and visual character fading. In addition, the AGF developed an education program about the National Scrapie Eradication Program and Q Fever and use proper management practices for control of the zoonotic disease.

AGF has recently entered into three additional cooperative agreements with USDA, Animal and Plant Health Inspection Service (APHIS), that include another agreement to provide Scrapie and Q Fever information that will continue all activities conducted under the FY-19 agreement and added presentations to encourage recordkeeping. This project will include promotion of the free excel-based recordkeeping-performance program for AGF members that is individualized to each producer and includes free
technical support and provides advancement to the American Sheep Industry (ASI) National Sheep Improvement Program (NSIP) program, should the producer want extensive performance data. Also, a scholarship program has been created for youth ages 12 – 21 who submit a presentation on Scrapie or Q Fever. Applications are judged by a committee of AGF directors, advisors, and others. Applicants with qualifying scores receive a scholarship, as well as feedback on the accuracy of their information and quality of their presentation.

Another FY20 cooperative agreement focuses on developing a Secure Goat Supply Plan patterned after the Secure Sheep and Wool Supply plan and the Secure Dairy Supply plan. Due to the fragmentation of the goat industry and multi-uses for goats that put them in the public sector the Secure Goat Supply plan will include additional features. Design of this plan will involve major goat associations as well as state veterinarians and others. Lastly, AGF entered into a cooperative agreement with USDA to develop and test two Safe Handling Sheep and Goat Equipment prototypes. The prototypes will be installed at two different livestock markets in different parts of the country for testing. AGF, the ASI and manufacturers will work on this together. AGF will deliver, train market personnel and will make follow up visits to evaluate the usefulness and any need for changes. A video will be made showing how the equipment works to help promote the equipment to markets and commercial goat producers.

Committee Business:

The Sheep, Goat and Camelid Committee members discussed the response options supplied by USAHA leadership in reply to answers received on the 2019 committee resolutions. Following discussion, the committee agreed to the following:

2019 RESOLUTION 26 – Need for Ongoing Scrapie Research
Response is sufficient for the purposes of the resolution, no further action. Considered Completed.

2019 RESOLUTION 27 Q-Fever (Coxiella burnetii) Vaccine
Response is sufficient for the current time; however additional follow-up will be needed.

The response only addressed the first part of resolution regarding applications for licensure of candidate vaccines. We are satisfied that the USDA – CVB remains ready to receive applications for licensure of candidate vaccines. However, ARS did not provide a response to the second part of the resolution:

“In addition, USAHA urges the USDA, Agricultural Research Service (ARS) to continue development of research models that could lead to the development of vaccines in the United States; the development of tests for accumulation and shedding of Coxiella burnetii; and identification of genetic tools for improved control of Coxiella infections, including reduced shedding. USDA-ARS should pursue vaccine
SHEEP, GOATS, AND CAMELIDS

candidates that can be cost-effectively produced in a Biological Safety Level-2 facility."

Recommended timeframe for follow-up.

a. Spring Government Relations Meeting

2019 RESOLUTION 28 Scrapie Eradication Program-Animal Identification

Response is sufficient for the current time; however additional follow-up will be needed. Recommend timeframe for follow-up: at 2021 USAHA meeting.

There being no further business to be brought before the committee the meeting was adjourned at approximately 2:42 p.m.
REPORT OF THE SUBCOMMITTEE ON SCRAPIE AND IDENTIFICATION

Chair: Cheryl Miller, IN
Vice Chair: Larry Forgey, MO

The Subcommittee met on October 15, 2020, on a virtual platform, from 12:00 to 2:00 p.m. EST. There were a maximum of 130 people listening to the session at one point. The meeting was called to order by the chairman, Dr. Cheryl Miller. After introducing herself and the vice-chair, Dr. Larry Forgey, she read the subcommittee mission.

Presentations and Reports

USDA-APHIS Scrapie Program
Diane Sutton, USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Scrapie Eradication Program Results*
- The National Scrapie Eradication Program made progress in FY 2020.
- There were no new infected or source herds in FY 2020. There was one new infected or source herd in each of FY 2018 and FY 2019. Both were found through goat slaughter surveillance.
- The last confirmed classical scrapie positive animal was in June 2019 in a goat. The last confirmed positive sheep was in October 2018.
- When first measured in FY 2002-2003, the percentage of cull sheep sampled at slaughter that tested positive for classical scrapie was 1 in 500. Since the last classical scrapie case in June 2019, APHIS has sampled over 39,000 animals and no cases of classical scrapie have been confirmed.
- Nor98-like scrapie was confirmed in two sheep sampled at slaughter in May and August 2020. The World Animal Health Organisation and APHIS have determined that Nor98-like scrapie is not a disease of trade concern.

Surveillance*
- Since the scrapie slaughter surveillance program began in FY 2003, over 664,000 samples have been collected.
- As of August 31, 2020:
  - 31,129 animals have been sampled for scrapie testing in FY 2020.
  - 29,680 RSSS samples and 1,449 on-farm samples
  - Of which 24,308 were sheep and 6,821 were goats.
- Surveillance was down about 20% in FY 2020 due to Covid-19 restrictions.

Slaughter Surveillance Genotyping Pilot Project
- APHIS is genotyping sheep at two large collection sites to reduce costs
- Only specimens from genetically susceptible sheep are tested for scrapie
• 71% samples were considered genetically resistant or genetically less susceptible
• To date, none of the 1,393 samples from genetically susceptible sheep have tested positive

**Scrapie Resistance Genetics in Goats**
• Recent research indicates that some goats have genetic resistance to scrapie.
• Amino acids S and D (D is rare in U.S.) at codon 146 and K at codon 222 appear to provide some resistance and may be like R in sheep
• NVSL is in the process of developing a proficiency test for approval of laboratories.
• If infected goat herds are identified APHIS will consider doing genetic based pilot project clean-up plan.
• APHIS is conducting a survey to determine the prevalence of scrapie resistance in goats.
• 3,000 geographically representative goats from routine slaughter and on-farm surveillance will be tested for codons 146, 211 and 222.
• Approximately 1,600 samples have been submitted to NVSL to date

**Scrapie Flock Certification Program (SFCP)**
As of August 31, 2020, there were 237 flocks participating in the Scrapie Free Flock Certification Program (SFCP). Statuses of these flocks were 41 export monitored, 41 export certified, and 155 select monitored flocks
*As of August 31, 2020. FY 2020 numbers are not final and may change.

**Scrapie Review and Research Update Presentation Summary**
Eric Cassmann, USDA, Agricultural Research Service (ARS), National Animal Disease Center (NADC)

**Scrapie Review**
  Disease cause, transmission, pathogenesis, testing, genetics, classical versus atypical.

**Research Updates**

**Sheep Scrapie - Atypical Scrapie Transmission**
  Atypical scrapie brain homogenate was transmitted to sheep with three different genotypes. The disease phenotype was retained upon transmission. Early sites of scrapie prion accumulation included the cerebellum and the retina.

Lysine (K) at codon 171
  Sheep homozygous for lysine at codon 171 that were orally inoculated with classical scrapie brain homogenate did not develop scrapie during a six-year study. Heterozygous QK171 sheep seem to be less resistant than QR171 genotype sheep.

**Interspecies transmission - CWD from mule deer in sheep**
  A second passage study that took sheep brain homogenate from an original mule deer CWD inoculum found widespread lymphoid dissemination
Scrapie Review and Research Update
David A. Schneider, Animal Disease Research Unit

Susceptibility of small ruminants to scrapie infection is highly influenced by genetic factors, most notably variations in the prion protein gene (PRNP) that change the amino acid sequence of the prion protein (PrP). We have demonstrated strong resistance of goats bearing genetic variation that changes the amino acid at position 222 (from Q to K, represented Q222K) or at position 146 (N146S) of the prion protein. These variations caused significant resistance to infection by oral exposure to infectious placenta at birth. Tissues from the oldest surviving goats are to be checked for infectious prions by inoculation of transgenic mice highly susceptible to scrapie prions (tg338 mice). To date, tg338 bioassay has not detected infectious prions in the brain from Q222K goats, and the two oldest N126S goats are still alive at 11 and 12 years of age. An oral inoculation study to determine the effects of the GS127 variation. Now in its last year, about two thirds of the inoculated goats have been culled. The preliminary results demonstrate strong exposure was achieved as evidenced by all GG127 goats (the fully susceptible genotype) becoming positive for the misfolded prion protein - PrP(Sc) - in lymphoid and brain tissues by 18 months of age and clinically affected by 36 months of age. In contrast, no clinical cases have been observed in GS127 goats even though all (to date) have been determined positive for infection by 36 months of age. The progression of local tissue accumulation and spread of PrP(Sc) appears greatly reduced in GS127 goats.

It is long known that sheep genotyped as PRNP RR171 are strongly resistant to infection by typical forms of scrapie (a.k.a., classical scrapie) but not to some atypical forms, including those referred to as Nor98 or Nor98-like scrapie. To evaluate the risk for natural transmission, four ewes bearing the RR171 genotype were successfully infected with Nor98-like scrapie and bred for up to seven years, producing progeny and placentas for evaluation. While accumulation of PrP(Nor98-like) was generally absent from the placentas collected, very small amounts of a proteinase K-resistant PrP were more frequently detected in placental samples as they aged. Representative placental samples from each ewe were inoculated into tg338 mice: infectivity was not detected in placental samples from three of the infected ewes but one in ten tg338 mice did indicate possible transmission from a placental sample of the fourth ewe. Importantly, natural transmission from these infected ewes to their progeny has not been observed to date.

Lymphoid accumulation of PrP(Sc) is typically associated with the highly transmissible form of scrapie, classical scrapie, in genotype-susceptible sheep and goats (QQ171). In the past few years, two separate inconclusive cases of scrapie-like protein accumulation in lymphoid tissue were detected.
in young RR171 sheep. Limited to testing residual samples of formalin-fixed tissue from one of these cases, infectious scrapie prions have not been detected by bioassay in tg338 mice nor by serial protein misfolding cyclic amplification (sPMCA) assay. The inconclusive samples from the second case are not yet available for similar testing. However, PrP(Sc) accumulation has not been detected in any of the fresh tissue collected from the source flock, which included late term pregnancy placenta and many tissues from sheep related to this second inconclusive case. Sequencing PRNP of flock mates has not revealed coding variations that could explain the unusual staining by only two of four anti-prion antibodies.

Subcommittee Business:
- Two resolutions from 2019 that were associated with the scrapie eradication program and USDA’s responses were emailed out prior to subcommittee meeting. The responses will be reviewed in the parent committee, Committee on Sheep, Goats, and Camelids.
- Dr. Sutton reported that APHIS agreed to continue the current free tag policy through FY 2022.
- There was no old business from 2019.
- Dr. Cheryl Miller reported to the subcommittee that this was her final year as chairman. Dr. Larry Forgey agreed to move forward as the subcommittee chair and Dr. Larry Holler agreed to become the subcommittee vice-chair.
- Dr. Jean Rowe moved that the meeting be adjourned. Dr. Ben Smith seconded this motion.
REPORT OF THE COMMITTEE ON SWINE
Chair: Lisa Becton, IA
Vice Chair: Maryn Ptaschinski, TX

Bobby Acord, NC; Chris Ashworth, AR; Bill Barton, ID; Peter Belinsky, RI; Carolyn Bissett, VA; Nancy Boedeker, IN; Paul Brennan, IN; Charlie Broaddus, VA; Beth Carlson, ND; Michael Carter, MD; Tim Condict, OK; Stephen Crawford, NH; Barbara Determan, IA; Leah Dorman, OH; Brandon Doss, AR; Roger Dudley, NE; Jamee Eggers, IA; Brigid Elchos, MS; Dee Ellis, TX; Jessica Emerson, FL; Joseph Essler, TX; Kathy Finnerty, NY; Katie Flynn, KY; Larry Forgey, MO; Tolani Francisco, NM; Robert Gerlach, AK; Colin Gillin, OR; Eric Gingerich, IN; K. Fred Gingrich II, OH; Gail Golab, IL; Eric Gonder, NC; Chelsea Good, KS; Tony Good, OH; Alicia Gorczyca-Southerland, OK; James Grimm, ; Kristin Haas, VT; Thomas Hairgrove, TX; Rod Hall, OK; Steven Halstead, MI; Charles Hatcher, TN; Karyn Havas, MN; Andy Hawkins, KS; Bill Hawks, DC; Carl Heckendorf, CO; Julie Helm, SC; Maggie Highland, KS; Robert Hilsenroth, FL; Clayton Hilton, TX; Heather Hirst, DE; Donald Hoenig, ME; Dennis Hughes, NE; Carolyn Hurwitz, ME; Eric Jensen, AL; Annette Jones, CA; Jamie Jonker, VA; Anne Justice-Allen, AZ; Susan Keller, ND; Donna Kelly, PA; Bradley Keough, KY; Diane Kitchen, FL; Patrice Klein, DC; Terry Klick, OH; Michael Kopp, IN; Dale Lauer, MN; Maureen Lee-Dutra, CA; Mary Jane Lis, CT; Pat Long, NE; Travis Lowe, MN; Mark Luethke, MN; Bret Marsh, IN; David Marshall, NC; Scott Marshall, RI; Chuck Massengill, MO; Brittany McCauslin, Otago; David Meeker, VA; Antone Mickelson, WA; Gay Miller, IL; Mendel Miller, SD; Eric Mohlman, NE; Peter Mundschenk, AZ; Michael Neault, NC; Dustin Oedekoven, SD; Gary Olson, MN; Elizabeth Parker, TX; Boyd Parr, SC; Elisabeth Patton, WI; Allison Phibbs, DC; William Pittenger, MO; Maryn Ptaschinski, TX; Dave Pyburn, IA; John Ragan, VA; Tim Richards, HI; Keith Roehr, CO; Susan Rollo, TX; Ron DeHaven, CA; Mark Ruder, GA; Travis Schaal, IA; Shawn Schafer, OH; David Schmitt, IA; Stacey Schwabenlander, MN; Andy Schwartz, TX; Charly Seale, TX; Laurie Seale, WI; Chelsey Shivley, CO; Kathleen Simmons, DC; Staci Slager, IL; Caleb Smith, MN; David Smith, NY; Julie Smith, VT; Harry Snelson, IA; Diane Stacy, LA; Philip Stayer, MS; Sandra Strilec, NJ; Manoel Tamassia, NJ; Belinda Thompson, NY; Beth Thompson, MN; Alberto Torres, AR; Charles Vail, CO; Liz Wagstrom, DC; Michele Walsh, ME; John Walther, LA; Jessica Watson, MI; Patrick Webb, IA; Sherrie Webb, IA; Cliff Williamson, DC; Ross Wilson, TX; Josh Winegarner, TX; Nora Wineland, MI; Richard Winters, Jr., TX; Stephanie Wisdom, IA; Cindy Wolf, MN; Peregrine Wolff, CA; Marty Zaluski, MT; Ernest Zirkle, NJ.

The Committee met virtually on October 15, 2020, 2:30-4:30 p.m. EST via Zoom. Housekeeping items were reviewed including member eligibility, resolution discussion and points of order.

Presentations and Reports
COVID-19: Lessons Learned to Apply to Improve FAD Preparedness • What were the challenges? • What were the successes? • What do we need to improve upon? • How do we move forward?
Producer/Veterinarian Perspective
Matthew Turner, JBS
Dr. Turner reviewed lessons learned from Covid 19:
• Be aware of unintended consequences. The supply chain is not flexible and infrastructure to move animals is near capacity. Value of animals was impacted with Covid.
• There is a need for clear communications. Speed and quality matters. Frequency and clarity are important. Regions with different rules can undermine an effective response.
• We must have better euthanasia options. Industry needs to be on the same page and these discussions and best practices need to be discussed ahead of time. Euthanasia is hard on people, and they need support as well.
• Testing and results must be timely. Covid testing capacity was overwhelmed. Delays were experienced in sample collection, laboratory capacity, and communication of results.
• People say and do different things. Procedural and biosecurity compliance was variable. Enhancing biosecurity during an outbreak is not as effective as increasing the standard normally.

Packer Perspective
Shane Horsley, Smithfield
Mr. Horsley gave an overview of Covid’s impact on the pork industry. Hog plant closures in mid-April had a major effect on the industry. The executive order on April 28th was helpful in turning things around. The supply and demand negatively impacted the cash hog and positively impacted the pork cutout markets. Priorities during Covid were the health and safety of employees, feeding the American consumer, and operating plants in the best manner possible to minimize the supply chain disruptions for hog suppliers. The major impacts of Covid for Smithfield:
• Significant labor shortfall - this backed up the live hog supply, led to reduced availability of pork products in retail markets, and shifted export production back to the domestic market.
• Drastic in-line and in-plant environmental changes for employees were forced. Increased personal protective equipment (PPE), social distancing and physical barriers were utilized. Other wellness measures were also necessary and implemented.
• Reduce complexity in the plants. Simplification was necessary.
• Flexibility on the both the live production and sales side of the business were needed. Product distribution and shipping were affected.
• Increased communication was essential.
Key lessons:
• U.S. Pork industry is a just in time supply model. U.S. operates in regions on market hog movements due to freight capacity and cost constraints on transportation.
• Wean and feeder pig shipments move inter-regionally.
• Space in nursery, finishing, and wean to finish barns quickly become depleted over the course of two weeks.
• Producers were successful in adjusting feed rations to slow hog growth rates, but this does not solve space issues.
• Industry received exposure to euthanasia possibilities.
• Biosecurity measures need to be kept top priority.
• Impact from a foreign animal disease (FAD) needs to be looked at in an integrated fashion with plant capacities and alternative movements included.
• Regionalization is a must.

State Animal Health Official Perspective
Beth Thompson, Minnesota Board of Animal Health

Dr. Thompson reviewed Covid from a regulatory perspective. Challenges included state authority limitations, timeliness, funding, equipment, trained personnel availability, and human aspect. Producers were needing assistance with depopulation and looking for guidance to deal with the situation. Successes included being able to create and utilize communication pathways including a hotline, mobilizing personnel, implementing collaborative efforts and utilizing diverse solutions. Improvements moving forward include having funding available ahead of time. Improving education and communication resources especially in the area of depopulations and disposal. Improving funding for increased laboratory capabilities, equipment and testing. We should consider if we are ready, if not, why not and what we need.

Discussion:
There was discussion surrounding the changes made within the packing plants. The feeling is that some of these changes will become the normal and although there may be slight disruptions or inefficiencies these will not be significant. Participants discussed changes that they could implement to reduce the impact of future issues like an FAD. Communication improvements were highlighted as essential. Also understanding who clearly is in charge and who is making decisions is important. Understanding who the experts are and consulting them is important as well. There was also discussion around indemnity/compensation for producers that are forced out of business due to market consequences of diseases. It is a consideration that needs to be undertaken, but in this instance this may have occurred on a state by state basis but not on a federal level. Discussion about the just-in-time approach for the pork supply chain being modified occurred. From an industry perspective, modifying this would be a big challenge and isn’t likely to change. The industry may change if it becomes completely vertically integrated but at this point that is not the reality. There was discussion about
SAHO’s needing to work with public health departments and other entities creating some unique challenges. A question to producers about where equipment for depopulation etc. should be held was asked. The topic of keeping and hiring new employees at the packing plants and in live production throughout the outbreak was addressed.

**Committee Business:**

**Old Business**
- 2019 Resolutions - The responses provided for all of the 2019 resolutions were sent to committee members for review. The committee members were asked to reply with any comments by Monday October 19th. 2019 Recommendation - No action for 2020. Cobb made the motion to look at the 2019 Recommendation for 2020-2021. Sundberg seconded. The recommendation passed. The final motion was passed with majority voice vote.

**New Business**
- Recommendation – Moved and seconded. Motion passed by voice vote.

**Resolutions:**
- *Feed import restrictions to protect against ASF importation in feed.* The motion was amended. Moved and seconded. Passed by poll vote.
- *Assessment of trade implications for viral feed mitigation practices.* Moved and seconded. Passed by voice vote.
- *Sustainable diagnostic supply chains and lessons learned from the COVID19 pandemic.* Moved and seconded. Passed by voice vote.

With no further business, a motion to adjourn was made and seconded. Meeting adjourned at 4:00 p.m. CST.
The Committee met on October 12, 2020, virtually, from 2:30 to 4:40 p.m. There were 141 individuals participating on the call. The Committee Mission was read, and it was briefly discussed that we may want to convene a small group to review the mission to clarify terms and reduce redundancy. The committee acknowledged the loss of Dr. Bob Ditmar, veterinarian for Texas Parks and Wildlife Department, along with two biologists, Dewey Stockbridge and Brandon White in a helicopter crash on August 8, 2020. Dr. Ditmar was an active and important member of the Committee on Wildlife and his loss is deeply felt by his friends and colleagues in wildlife health.

**Presentations and Reports**
Distribution and Etiologic Investigation of an Emergent Hoof Disease of Elk in the Pacific West
Margaret Wild, Washington State University

Recent surveillance has identified expansion of the known distribution of an emergent hoof disease in free-ranging elk (Cervus elaphus). The disease was initially investigated in 2008-2009 following a marked increase in limping elk observed in Southwest Washington. The disease is now locally endemic and has also been detected at lower prevalence to sporadically in other areas of Washington, Oregon, Idaho, and California. Characteristic lesions include ulceration of the interdigital space, undermining of the heel bulb, and breakage or sloughing of the hoof capsule with associated lameness and debilitation. Spirochetes are routinely observed within areas of eroded epithelium with marked suppurative inflammation on histologic examination. In previous studies of elk from Southwest Washington, immunohistochemistry, (Polymerase Chain Reaction) PCR, and culture detected Treponema spp. in a majority of samples examined. Cultured isolates were similar to those reported in digital dermatitis of cattle and sheep. Thus, the disease is currently diagnosed as treponeme-associated hoof disease (TAHD). While treponeme-associated, additional investigation conducted over a broader geographic range is necessary to further investigate the etiology and refine the case diagnosis. Digital dermatitis in livestock is generally considered to be a polybacterial disease. We hypothesize a similar process may occur in elk. In a preliminary investigation, we compared the bacterial (16S rRNA) metagenomes in biopsies collected postmortem from affected and unaffected elk (n=32) from across the known distribution of disease. Results supported treponeme association, although as with previously reported methods, 16S analysis failed to detect Treponema in all samples classified positive by gross and histologic examination. Uncultured members of the phylum Spirochaetae were more commonly detected than typical bovine digital dermatitis Treponema phylotypes in analyzed samples. In addition to Spirochetes, other potential pathogens including Tenericutes (primarily Mycoplasma spp.) and Fusobacteria, were overrepresented in lesions as compared to normal feet. Further investigation of the bacterial consortium of hoof lesions, as well as expanded disease surveillance in free-ranging and captive elk, are warranted and necessary to more fully understand this emergent disease.

Update on the use of RT-QuIC- In consideration of RT-QuIC as a CWD diagnostic assay
Tracy Nichols, USDA, APHIS, Veterinary Services (VS), Cervid Health Program

There are a number of important components of good diagnostic assays: Reproducibility, Reagent availability, Cost effectiveness, Reasonable turn-around time, Standardized methods, High sensitivity and specificity, Confidence in results, etc. All of these items, and more, are considered with the USDA evaluates an assay for official use.
RT-QuIC is a highly sensitive assay, that uses a small sample volume to detect the presence of amyloid plaques as a biomarker for Chronic Wasting Disease (CWD) or other infectious prions. While the assay has its strong points, there is an abundance of unrealistic expectations and misinformation surrounding the assay.

RT-QuIC Facts:
- Not a carcass-side test
- Replicates (3-4) are required for each sample
- Takes several days to get results
- Proper sample is crucial to accurate outcome
- Cross contamination from improper sample collection and handling can be an issue
- A single ante mortem test utilizing RT-QuIC is still not sufficient to determine CWD status (related to sample type)
- Not an approved official CWD test
- Requires high quality specialized substrate
- Substrate is not commercially available
- Cost of substrate is unknown so ultimate test cost is still unknown
- Sensitivity and specificity has yet to be established for many sample types

The USDA is in the process of collecting the sensitivity and specificity data necessary to evaluate RT-QuIC as an official test.

There may be Federal and/or commercial substrate production options in the near future.

Things to Consider Before Using RT-QuIC as a Diagnostic Assay:
- There is no visualization of positivity upon analysis like immunohistochemistry (IHC), therefore how much do you trust your sample collectors to submit the correct tissue? An incorrect tissue submission could give a false negative result.
- Elimination of cross contamination during sample collection and handling is of high importance due to the sensitivity of RT-QuIC. How much do you trust your sample collectors to strictly follow sample collection instructions? Reuse of gloves or instruments could cross-contaminate multiple samples.
- Consequences of a CWD positive result can be significant, particularly in farmed cervids. Is a positive RT-QuIC result sufficient to declare a herd positive? What is the procedure if RT-QuIC is positive and IHC is negative?
- How do you see your agency utilizing RT-QuIC?
- What would policy development look like surrounding RT-QuIC?

Recurrent outbreaks of severe pleuropneumonia in free-ranging pronghorn (Antilocapra americana) due to Mycoplasma bovis
Mycoplasma bovis is an economically important bacterial pathogen of cattle that contributes to polymicrobial bovine respiratory disease. Reports of M. bovis in wildlife are rare, consisting of a few isolated cases in mule deer (Odocoileus hemionus) and white-tailed deer (Odocoileus virginianus). In the spring of 2019, however, we documented a fatal M. bovis outbreak involving over 60 pronghorn antelope (Antilocapra americana) in northeastern Wyoming. In the spring of 2020, we documented a second outbreak of M. bovis with greater than 350 pronghorn mortalities in the same geographic region. The seasonal recurrence of M. bovis suggests either a repeat spillover event, or infection of naïve animals by pronghorn that survived the 2019 outbreak. We characterized the pathology and genetics of M. bovis in pronghorn and found that isolates from pronghorn are most similar to those from North American cattle, and more distantly related to isolates from bison and deer. Further, isolates from pronghorn represent a unique sequence type based on two multilocus sequencing typing schemes (MLST). We report that pronghorn are at risk of highly virulent respiratory disease following M. bovis infection, which could have population-level impacts on this sensitive and unique species.


Jonathan Sleeman, U.S. Geological Survey (USGS), National Wildlife Health Center

Founded in 1994, this Working Group informs and advises the OIE on all health problems relating to wild animals, whether in the wild or in captivity, and includes members from all the OIE Regions. The Working Group on Wildlife held its annual meeting in March, 2020 and topics discussed include:

1. While the specific mechanism of SARS-CoV-2 emergence has not been definitely identified, it’s potential link to wildlife, and the wildlife trade were discussed at the meeting. Consequently, the Working Group on Wildlife developed and released a statement on Wildlife Trade and Emerging Zoonotic Diseases, which recognizes the threat of repeated emergence of zoonotic diseases and the linkages of some of these along the value chain of the wildlife trade. The statement outlines that the wildlife trade poses threats to animal health, causes impoverishment of biodiversity, and may result in serious public health problems, and there is a need to support legal,
sustainable and responsible wildlife use by providing sound guidance, standards, and risk assessment and risk management tools. These guidelines or standards for trade in wildlife should be based on sound governance and regulatory principles that reduce health risks and support animal welfare and biodiversity conservation. The statement also discusses the need for the creation of a set of tools to ensure best practices regarding risk assessments and disease management associated with the value chain for the wildlife trade. Based on these recommendations the OIE is exploring a wildlife health management framework.


2. The World Organisation for Animal Health (OIE) has selected 53 non-OIE listed diseases affecting wildlife for voluntary reporting due to their importance for wildlife conservation and for providing early warning to protect animal and human health. OIE Member Countries report data on these diseases to the OIE on a 6-monthly basis. Reporting of wildlife diseases is important to build situational awareness regarding wildlife health, build national and global knowledge capacity, increase coordination among agencies, and integrate wildlife health data into other surveillance frameworks. The Working Group on Wildlife reviewed trends in disease reporting and discussed methods to enhance participation by Member countries. One project is the development of wildlife disease technical cards. The technical cards contain information on the non OIE-listed diseases in wildlife including the etiology, epidemiology, diagnosis, prevention and control, and potential impacts of the disease agent. The cards provide guidance on case and disease definition and are designed to facilitate reporting of these diseases to the OIE.

Link to the list of non-OIE listed diseases affecting wildlife: https://www.oie.int/wahis_2/public/wahidwild.php/Diseaseinformation/popup/diseaselists

Link to the wildlife disease technical cards: https://www.oie.int/animal-health-in-the-world/technical-disease-cards/
3. The OIE has disease control and eradication strategies for a number of economically important diseases, including several diseases that interface with wildlife, including peste des petits ruminants (PPR), and African swine fever (ASF). For PPR there is an ongoing global control and eradication strategy in collaboration with Food and Agriculture Organization (FAO); however, PPR continues to spread, especially in Asia. Recent outbreaks in wildlife (including a large die-off of saiga antelope in Mongolia) have illustrated the potential impact of this disease on wildlife populations and the need to consider wildlife in disease eradication plans. In this regard the Working Group on Wildlife has drafted “Guidelines for the control and prevention of PPR in wildlife populations” that is currently in press. African swine fever also continues to spread globally and the Working Group on Wildlife is providing support to assist with training programs on wild boar hunting biosecurity and with a project to globally map wild boar populations.

The full report of the meeting of the Working Group on Wildlife can be found at the following link:

Rabbit Hemorrhagic Disease Virus Serotype 2
Thomas Gidlewski, USDA, APHIS, Wildlife Services (WS), and Julianna Lenoch, USDA, APHIS, Veterinary Services (VS)
Lynn Creekmore, USDA, APHIS, VS

Rabbit hemorrhagic disease virus serotype 2 (RHDV2) was detected in wild lagomorph species for the first time in the United States in 2020. USDA, APHIS, Veterinary Services and Wildlife Services have responded to the outbreak, in partnership with State agriculture and wildlife agencies. RHDV2 has now been detected in the United States in European domestic rabbits (Oryctolagus canninculus), feral domestic populations, and four wild species (Sylvilagus nuttallii, Sylvilagus audubonii, Lepus californicus, Lepus alleni). Experimental research has shown that Eastern cottontail rabbit is also susceptible to RHDV2. In the spring of 2020, there was a major outbreak of RHDV2 in the southwest that not only involved domestic rabbits, but this was the first-time wild lagomorph species were naturally infected and widely involved. Current efforts include disease detection and reporting, increased education and biosecurity, vaccine importation, and movement controls. Both RHDV1 and RHDV2 are reportable diseases to the World Organisation for Animal Health (OIE).

Zoological Response to SARS CoV2
Yvonne Nadler, Zoo and Aquarium all Hazards Partnership
The exotic animal industry has faced some unique challenges during the COVID pandemic. Keeping staff and animals safe has been the highest priority during this time, while trying to understand the risk to the wide variety of species in our care. The Zoo and Aquarium All Hazard Partnership (ZAHP) provides valuable information to the industry, leveraging subject matter experts to share current and accurate information on SARS CoV2.

Update on National Surveillance in Wildlife for Foreign Animal Diseases
Vienna Brown, USDA, APHIS, Wildlife Services (WS) and Thomas Gidlewski, USDA, APHIS, Wildlife Services (WS)

The introduction of a foreign animal disease is likely to cause substantial morbidity and mortality, production losses, and trade impacts. Many of the most detrimental foreign animal disease pathogens can also be maintained and transmitted in free-ranging wildlife and feral populations. National surveillance efforts have been underway and are currently ongoing for wild birds for avian influenza and feral swine for classical swine fever, African swine fever, and foot-and-mouth disease.

Chronic Wasting Disease (CWD) Multistate Conservation Grant
John Fischer, Wildlife Management Institute

Multistate Conservation grant titled National Coordination and Technical Assistance for the Prevention, Surveillance, and Management of CWD.

Initially we conducted a survey of state fish and wildlife (FW) agencies requesting their greatest nonfiscal CWD-related needs and the best ways we could assist them in meeting these needs. Response to the questionnaire was excellent and we were able to prioritize the greatest needs. Thank you!!

Many of the priorities from survey are best illustrated spatially as they are individual, state-associated, information items such as CWD-related regulations and locations of CWD-affected free-ranging and captive cervid herds. Our tactical approach here will be an ESRI-based national information map and we currently are populating it. It will be accessible at the CWD Alliance website.

Regarding increased communication among state wildlife agencies, respondents to the survey indicated that they favor a password-protected, backside portal that is accessible to the agencies so they can view national information and enter their own data, rather than receiving multiple questionnaires requesting the specifics for their state.

We also are coordinating with other MSCG-funded CWD projects, the new APHIS CWD grants, the Midwest Landscape Initiative’s CWD Value Stream Mapping Program, and the Multistate CWD Research Consortium operating out of Michigan State University, as well as a workshop that will be held this fall to identify the science and societal needs created by chronic wasting disease.

The Rocky Mountain Elk Foundation (RMEF) recently contacted the CWD Alliance (administered by the Wildlife Management Institute) to discuss the possibility of providing another year of funding for applied CWD research
WILDLIFE

projects. Currently there are three such projects being administered by the CWD Alliance. The projects are funded by RMEF and the Boone and Crockett Club and are leveraged with in-kind contributions from the three organizations that received the grants. A great advantage of this approach is the ability to pool contributions from multiple NGOs and other entities in order to assemble appropriate amounts of funding for the support of applied CWD research, which tends to be very expensive.

Committee Business:

A resolution directed to the Food and Drug Administration (FDA) regarding Draft Guidance for Industry #256 was moved by Patricia Kline with a second by David Hunter. The motion was discussed, no amendments were made, and the motion passed unanimously.

The group had discussed the final USDA response to the 2019 resolution on chronic wasting disease (CWD) amplification assay approval over email prior to the meeting. Due to time there, was no further discussion during the meeting. The feeling by respondent’s was that response is sufficient for the purposes of the resolution; no further action; considered completed was appropriate however the Committee looks forward to further updates from USDA, APHIS at the annual USAHA meeting on use of RT-QuIC as a CWD diagnostic assay.
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 2020

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 national non-profit organization that is actively and directly concerned with and supportive of the interests and objectives of the Association as outlined in Article II 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 or animal research and who supports the interests and objectives of the
III. ORGANIZATIONAL MATTERS

Association as outlined in Article II 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 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 an AVMA-accredited or an AVMA-listed veterinary college or engaged in the formal study of a discipline outlined in Article II, and who supports the interests and objectives of the Association as outlined in Article II, is eligible to become a member of the Association. Student applicants may be asked to provide proof of student status, including a letter from the registrar or transcript. Student members 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 or 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, 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 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 maintain that status unless membership or voting privileges are revoked by a two-thirds vote of the Board of Directors. Failure to pay dues results in an automatic loss of voting privileges. 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 Individual Member 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
III.A. USAHA BYLAWS

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 bylaws.

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 represent, vote, and act for each of these member classifications 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 may result in automatic termination of membership.

b. **Voluntary Withdrawal of Membership.** A member may voluntarily terminate membership effective upon submission of written 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 as described in Article III, and payment of annual dues.

3.5. **Suspension or Expulsion.** Any member may be suspended or terminated for cause, and upon reasonable notice. Sufficient cause for such suspension or termination of membership shall be violation of these bylaws or any lawful rule or practice duly adopted by this Association, or any other
conduct prejudicial to its interests. Suspension or expulsion shall be by two-thirds vote of the entire membership of the Board of Directors.

**ARTICLE IV – MEETINGS**

4.1. **Annual.** There shall be an Annual Meeting between September 15 and November 15 for receiving annual reports and the transaction of official business of the Association.

   a. **Notice Requirements.** Written notice setting forth the agenda and location of the Annual Meeting shall be made publicly available or noticed electronically to all members at least 60 days prior to the first day of the 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 three years in advance of the meeting. If 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.

4.2. **Special Meetings.** Special meetings may be called by the President, in consultation with the Executive Committee, or by a majority of the Board of Directors. The membership shall be electronically notified of any special meeting at least 30 days in advance. Notification shall include the time, location and subject(s) to be considered. Emergency meetings shall be noticed by the Executive Director with the approval of the Executive Committee with 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.
III.A. USAHA BYLAWS

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 Official Agency Members comprise a majority of those in attendance. 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 are: 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 other duties as customarily belong to that office or which the Board of Directors or Executive Committee may assign. The President is an ex-officio member of all committees and may designate a qualified member to attend committee meetings in his or her place.

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. The President-Elect shall chair all meetings of the Board of Directors. The President-Elect shall perform other duties as the President, Board of Directors or Executive Committee may assign. The President-Elect shall automatically become President upon election at the close of the Annual Meeting.

c. First Vice-President. The First Vice-President shall act in place of the President-Elect in the event of his/her absence, death or inability to act and shall perform 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 other duties as the President, Board of Directors or Executive Committee may assign.
e. **Third Vice-President.** The Third Vice-President shall act in place of the Second Vice-President in the event of his/her absence, death, or inability to act and shall perform 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 chairperson of the Audit Committee and shall perform those duties that are delegated to the office by the Board of Directors and the Executive Committee. The Treasurer shall not be responsible for the day-to-day financial transactions of the Association, which will be assumed by the Executive Director.

g. **Election.**

1) The Committee on Nominations and Resolutions shall annually report its recommendations for the offices of President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President, Treasurer and Regional Delegates to the Association membership at the first business session of the Annual Meeting and again during the second business session at a time certain specified in the program for “Report of Action of the Committee on Nominations and Resolutions.” The report shall be read at a time that minimizes conflict with other proceedings, with adjustments as needed at the President’s discretion.

2) The District from which the President originated shall submit a nominee for the office of Third Vice-President.

3) Should vacancy(ies) coincide with the 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 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. **Resignation.** An elected officer may resign his or her position before term maturation by submitting notice in writing to the Executive Director of the Association.

i. **Succession.**

1) If vacancy(ies) occur between Annual Meetings, the District(s) from which the officer(s) vacated shall submit nominee(s) in writing and within a reasonable time frame to the Executive Director for those office(s).

2) At the discretion of the Executive Committee, the nominee(s) may serve as interim-elected officer(s) until the next Annual Meeting. While serving in an interim capacity, the nominee(s) may fulfill all responsibilities, including voting, and complete all tasks normally associated with the office(s) or which the Board of Directors or Executive Committee may assign.

3) The interim-elected officer(s) may fulfill the District’s nomination to be elected as described in section 5.1.g of this Article during the Annual Meeting that immediately follows the vacancy announcement(s).

j. **Term.** The officers shall serve for one year or until their successors are elected and qualify. The Treasurer may serve for up to six years. The Treasurer’s term may be extended by the Committee on Nominations.

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 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:
III. ORGANIZATIONAL MATTERS

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 departments of Canada, Mexico, Australia and New Zealand, or said person’s designee.
f. Members of the Executive Committee

6.3. Meetings. The Board of Directors shall have a regular meeting at the time and place of the Annual Meeting, and shall meet at such other times and places selected by the President or by request of a majority of the directors, in which latter event, the President shall promptly set the time and place of the meeting. Notice of all meetings of the Board of Directors shall be made publicly available and/or transmitted electronically to the membership 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 other functions set forth in the bylaws 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. 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 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 time(s) and place(s) determined by the President. 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, he or she may convene a telephone or other type of electronic conference meeting of the Executive Committee, which may then act provided a quorum participates. The Executive Committee may also conduct voting electronically if circumstances require and convening is not reasonable.

ARTICLE VIII – ORGANIZATIONAL DISTRICTS

8.1. Districts. The Association is composed of five districts including 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 comprises the Allied Organization Members, Elected Regional Delegate Members and Past-Presidents of the Association.

ARTICLE IX – STANDING AND SPECIAL COMMITTEES
III. ORGANIZATIONAL MATTERS

9.1. General. The President shall annually appoint from the members of the Association standing or special committees or subcommittees and their chairpersons as required by the bylaws or as he or she finds necessary. Each committee shall meet during the Annual Meeting and at other times deemed necessary by the President of the Association and committee chairperson to accomplish the work of the committee. Only members of the Association permitted by these bylaws are permitted to vote on the work of the committee.

9.2. Program Committee. A Program Committee comprising the chairpersons of all standing committees and subcommittees and the elected officers of the Association shall be appointed by the President 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 comprises the 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. Chairperson. 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 at least one month prior to the first membership meeting convened at the Annual Meeting.

   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 recommendations to the Board of Directors necessary to ensure the
III.A. USAHA BYLAWS

proper management of the finances of the Association.

9.5. Special Committees. The President with the advice of the Executive Committee shall appoint the chairperson(s) and members of such other committees as are necessary to accomplish the purposes of the Association.

ARTICLE X – MISCELLANEOUS

10.1. Amendments.

a. Proposed amendment(s) to these bylaws may be submitted in writing to the Executive Committee by Association members in good standing. The Executive Committee shall provide its recommendations on the proposed amendment(s) to the Board of Directors for deliberation and action. If approved by majority vote of the Board of Directors, the proposed amendment(s) shall be communicated to the general membership by electronic transmission and by posting on the Association website. The proposed amendment(s) shall then be presented to the Association 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 proposed amendment(s) are not approved by the Board of Directors as set forth in 10.1.a, they may be considered by the general membership as described in 10.1.a as prompted by a petition signed by at least thirty members.

10.2. Fiscal Year. The Executive Committee shall establish the Association’s fiscal year.

10.3. Parliamentary Procedure. All questions of order not specially provided for in applicable federal or state statute or rule, or Association articles of incorporation, bylaws or policies shall be decided by the usual parliamentary rules, Roberts’ Rules of Order Newly Revised being taken as the guide and standard.

10.4. Confidential Information. Information of the Association, including personal information of members, shall be maintained in confidence and not used for any other than Association purposes nor disclosed to others, except as permitted or required by law, these bylaws or written consent of the
III. ORGANIZATIONAL MATTERS

Association, by Association members, directors, officers, employees and agents.

10.5. **Liability of Officers and Directors.** The officers and directors of the Association shall not be personally liable for the debts or actions of the Association.

10.6. **Annual Audit.** The Association shall cause an independent certified public accountant, selected by the Executive Committee, to make an annual examination of its financial accounts and shall submit the report of examination to Audit Committee.

10.7. **Compensation/Reimbursement.** No member of the Board of Directors, committee member or elected officer of the Association shall receive any compensation for his or her services as such. The Association shall develop policies providing for reimbursement of expenses reasonably incurred in attending meetings and performing special assignments of the Association by the elected officers.

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.

10.9. **Electronic Communication.** Any action to be taken or notice delivered under these bylaws may be taken or transmitted by electronic mail or other electronic means, and any action or approval required to be written or in writing may be transmitted or received by electronic mail or other electronic means.
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.

COMMITTEE LEADERSHIP CONFLICT OF INTEREST

2018

Individuals interested in, nominated for or currently serving in committee leadership positions (Chair, Vice Chair, Subcommittees, Working Groups) will disclose any possible conflict of interest prior to appointment, or during service whereas a change in circumstance presents a possible conflict. A conflict of interest exists if there is any matter of jurisdiction for the committee’s purpose that the individual knows would inure to his or her special private gain or loss. Special private gain or loss means an economic benefit or harm that would inure to the individual, his or her relative, business associate, employer, or principal, unless the measure affects a class that includes the officer, his or her relative, business associate, or principal."
III. ORGANIZATIONAL MATTERS

If a conflict is present, the individual shall not be appointed to such a position under given circumstances, and similarly if a conflict arises during a term of service, the individual will be relieved of the leadership position. Further, if the individual fails to disclose with the intent of special private gain or loss, the Executive Committee will review and determine necessary recourse.

PARTICIPATION IN USAHA OF FEDERAL AGENCIES AND FEDERAL EMPLOYEES

Federal agencies and personnel have long been an integral and valuable part of USAHA. Agencies have taken part in the organization through official membership and representation on the Board of Directors. This provides the opportunity for presenting agency positions and concerns to the Association. 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 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

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.
III. B. USAHA ADMINISTRATIVE POLICIES

Delegation of Authority
Both Treasurer and Executive Director should be designated as signors on any USAHA accounts.

Responsibilities
- Treasurer: Primary authority for investment decisions, acting within parameters of investment policy. Responsible for monthly review of financials and chairing audit committee.
- Executive Director: Manager of investments, to act under direction of Treasurer. Provide research, recommendations to Treasurer for decisions. Responsibility for day-to-day bookkeeping and reporting (to Treasurer/Executive Committee) of financial information. Compile and distribute quarterly investment reports to EC.
- Executive Committee: Provide regular review of investments from quarterly reports. Provide oversight of Treasurer and Executive Director decisions.
- Board of Directors: Provide approval and/or amendments to investment policy for execution.

Investment Constraints
At all times the account will have at a minimum of $900,000 in marketable CD's. Investments that require Committee approval before being placed in the portfolio include individual derivatives, such as options and futures, collectibles, currencies, tangible real estate, mineral exploration and non-covered options, unless part of a commingled fund. No securities shall be purchased on margin. Additional guidelines are as follows:

Equity
- Single security concentrations: No single security (excluding pooled funds) shall represent more than 10% of the equity portfolio unless approved by the Committee.
- Liquidity: No stock security shall exceed 5% of the outstanding voting shares of a company. Investments in illiquid private equity must be approved by the Committee.

Fixed Income
- Quality: Unless specifically designated for a high-yield portfolio, the average weighted credit rating of individual bonds shall be no lower than "A" (or comparable rating) as measured by Moody’s, Standard & Poor’s. High-yield securities are permissible as long as overall quality standards are maintained.
- Duration: Unless approved otherwise by the Committee, duration of individual CD’s shall be no longer than 36 months with a maximum of $50,000 in each CD.
- Issuer Concentration: No issuer (except for the U.S. government) shall exceed 10% of the fixed income portfolio. At
III. ORGANIZATIONAL MATTERS

all times the account will have at a minimum of $900,000 in marketable CD’s.

Alternative Investments

— Concentrations: Aggregated hedge funds should be diversified, whether by asset class, strategy, manager, geography, sector, or other factors. Likewise, aggregated real estate investments should represent a broad array of properties or securities. Commodities in aggregate should represent a broad basket of commodities.

— Liquidity: Investments with liquidity and pricing that are less frequent than daily shall be approved by the Committee. Investments involving private placements shall be approved by the Committee.

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.

TREASURER LIFE MEMBERSHIP

2016

The organization’s Treasurer shall become eligible for Life Membership upon completion of at least a six-year term in the office. This aligns with other executive committee officers’ commitment through the chain of officers. Organizational dues, however, are not waived if the individual continues to represent an official agency or allied organization member, as is true with any past president.
III. ORGANIZATIONAL MATTERS

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
2008
USAHA prohibits third-party video and audio recording of committee meetings at the Annual Meeting.

THIRD PARTY MEETINGS
2008
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
2008
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
2010
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
III. B. USAHA ADMINISTRATIVE POLICIES

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.

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 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>
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<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>
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<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>
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<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, Hennepin, MT</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>28</td>
<td>Dec. 3-5, 1924</td>
<td>Chicago, IL</td>
<td>*Dr. J. G. Ferneyhough, Richmond, VA</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
</tr>
<tr>
<td>29</td>
<td>Dec. 2-4, 1925</td>
<td>Chicago, IL</td>
<td>*Dr. J. H. McNeil, Trenton, NJ</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
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<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>
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<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>
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<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>
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<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>
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<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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<tr>
<td>39</td>
<td>Dec. 4-6, 1935</td>
<td>Chicago, IL</td>
<td>*Dr. Edward Records, Reno, NV</td>
<td>*Dr. O. E. Dyson, Kansas City, MO</td>
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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>
<td>*Dr. O. E. Dyson, Kansas City, MO</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 Walsh, 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 Walsh, 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 Walsh, College Park, MD</td>
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<td>47</td>
<td>Dec. 1-3, 1943</td>
<td>Chicago, IL</td>
<td>*Dr. W. H. Hendricks, Salt Lake City, UT</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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### III. C. PREVIOUS MEETINGS

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<tr>
<td>48</td>
<td>Dec. 6-8, 1944</td>
<td>Chicago, IL</td>
<td>*Dr. J. M. Sutton, Atlanta, GA</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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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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<tr>
<td>51</td>
<td>Dec. 3-5, 1947</td>
<td>Chicago, IL</td>
<td>*Dr. Will J. Miller, Topeka, KS</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>52</td>
<td>Oct. 13-15, 1948</td>
<td>Denver, CO</td>
<td>*Dr. Jean V. Knapp, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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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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<tr>
<td>56</td>
<td>Oct. 29-31, 1952</td>
<td>Louisville, KY</td>
<td>*Dr. Ralph L. West, St. Paul, MN</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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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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<tr>
<td>63</td>
<td>Nov. 15-18, 1959</td>
<td>San Francisco, CA</td>
<td>*Mr. F. G. Buzzell, Augusta, ME</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>64</td>
<td>Oct. 17-21, 1960</td>
<td>Charleston, WV</td>
<td>*Dr. J. R. Hay, Chicago, IL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>65</td>
<td>Oct. 30-Nov. 3, 1961</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. P. Schneider, Boise, ID</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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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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<tr>
<td>69</td>
<td>Oct. 25-29, 1965</td>
<td>Lansing, MI</td>
<td>*Dr. J. W. Safford, Helena, MT</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tr>
<td>70</td>
<td>Oct. 10-14, 1966</td>
<td>Buffalo, NY</td>
<td>*Dr. C. L. Campbell, Tallahassee, FL</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<tbody>
<tr>
<td>71</td>
<td>Oct. 16-20, 1967</td>
<td>Phoenix, AZ</td>
<td>*Dr. Grant S. Kaley, Albany, NY</td>
<td>*Dr. R. A. Hendershott, Trenton, NJ</td>
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<td>72</td>
<td>Oct. 6-11, 1968</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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<tr>
<td>73</td>
<td>Oct. 12-19, 1969</td>
<td>Milwaukee, WI</td>
<td>*Dr. John L. Oharra, Reno, NV</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<tr>
<td>74</td>
<td>Oct. 18-23, 1970</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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<tr>
<td>75</td>
<td>Oct. 24-29, 1971</td>
<td>Oklahoma City, OK</td>
<td>*Dr. M.D. Mitchell, Pierre, SD</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<tr>
<td>76</td>
<td>Nov. 5-10, 1972</td>
<td>Miami Beach, FL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>77</td>
<td>Oct. 14-19, 1973</td>
<td>St. Louis, MO</td>
<td>*Dr. W. C. Tobin, Denver, CO</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>78</td>
<td>Oct. 13-18, 1974</td>
<td>Roanoke, VA</td>
<td>*Mr. O. H. Timm, Dixon, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<tr>
<td>79</td>
<td>Nov. 2-7, 1975</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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<tr>
<td>80</td>
<td>Nov. 7-12, 1976</td>
<td>Miami Beach, FL</td>
<td>*Dr. H. E. Goldstein, Columbus, OH</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>81</td>
<td>Oct. 16-21, 1977</td>
<td>Minneapolis, MN</td>
<td>*Dr. A. E. Janawicz, Montpelier, VT</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>82</td>
<td>Oct. 21-Nov. 3, 1978</td>
<td>Buffalo, NY</td>
<td>**Dr. L. E. Bartell, Sacramento, CA</td>
<td>*Dr. W.L. Bendix, Richmond, VA</td>
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<td>83</td>
<td>Oct. 28-Nov. 2, 1979</td>
<td>San Diego, CA</td>
<td>*Dr. T. F. Zweigart, Raleigh, NC</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
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<tr>
<td>84</td>
<td>Nov. 2-7, 1980</td>
<td>Louisville, KY</td>
<td>*Mr. B. W. Hawkins, Ontario, OR</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>85</td>
<td>Oct. 11-16, 1981</td>
<td>St. Louis, MO</td>
<td>*Dr. L. W. Hinchman, Indianapolis, IN</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>86</td>
<td>Nov. 7-12, 1982</td>
<td>Nashville, TN</td>
<td>*Dr. G. B. Rea, Salem, OR</td>
<td>*Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>87</td>
<td>Oct. 15-21, 1983</td>
<td>Las Vegas, NV</td>
<td>Dr. J. R. Ragan, Nashville, TN</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>88</td>
<td>Oct. 21-26, 1984</td>
<td>Fort Worth, TX</td>
<td>*Mr. J. O. Pearce, Jr., Okeechobee, FL</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>89</td>
<td>Oct. 27-Nov. 1, 1985</td>
<td>Milwaukee, WI</td>
<td>*Dr. David U. Walker, Montpelier, VT</td>
<td>*Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>90</td>
<td>Oct. 14-19, 1986</td>
<td>Louisville, KY</td>
<td>*Dr. N. W. Kruse, Lincoln, NE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>91</td>
<td>Oct. 25-30, 1987</td>
<td>Salt Lake City, UT</td>
<td>*Dr. J. F. Hudelson, Denver, Co</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>92</td>
<td>Oct. 16-21, 1988</td>
<td>Little Rock, AR</td>
<td>*Dr. J. A. Cobb, Atlanta, GA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>93</td>
<td>Oct. 28-Nov. 3, 1989</td>
<td>Las Vegas, NV</td>
<td>Mr. P. E. Bradshaw, Griggsville, IL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>94</td>
<td>Oct. 6-12, 1990</td>
<td>Denver, CO</td>
<td>Dr. M. A. Van Buskirk, Harrisburg, PA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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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>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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<tr>
<td>96</td>
<td>Oct. 31-Nov. 6, 1992</td>
<td>Louisville, KY</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>97</td>
<td>Oct. 23-29, 1993</td>
<td>Las Vegas, NV</td>
<td>Dr. T. J. Hagerty, St. Paul, MN</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>98</td>
<td>Oct. 29-Nov. 4, 1994</td>
<td>Grand Rapids, MI</td>
<td>*Mr. J. B. Finley, Jr., Encinal, TX</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>99</td>
<td>Oct. 28-Nov. 3, 1995</td>
<td>Reno, NV</td>
<td>Dr. H. Wesley Towers, Dover, DE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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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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<tr>
<td>101</td>
<td>Oct. 17-24, 1997</td>
<td>Louisville, KY</td>
<td>Dr. Larry L. Williams, Lincoln NE</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>102</td>
<td>Oct. 3-9, 1998</td>
<td>Minneapolis, MN</td>
<td>Dr. Jones W. Bryan, Columbia, SC</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>103</td>
<td>Oct. 7-14, 1999</td>
<td>San Diego, CA</td>
<td>Dr. Richard H. McCapes, Davis, CA</td>
<td>*Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>104</td>
<td>Oct. 19-26, 2000</td>
<td>Birmingham, AL</td>
<td>Dr. Ernest W. Zirkle, Trenton, NJ</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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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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<tr>
<td>106</td>
<td>Oct. 1-24, 2002</td>
<td>St. Louis, MO</td>
<td>Dr. Maxwell Lea, Jr., Baton Rouge, LA</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>107</td>
<td>Oct. 9-16, 2003</td>
<td>San Diego, CA</td>
<td>*Mr. Bob Frost, Lincoln, CA</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<tr>
<td>108</td>
<td>Oct. 21-27, 2004</td>
<td>Greensboro, NC</td>
<td>Dr. Donald Lein, Ithaca, NY</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>109</td>
<td>Nov. 3-9, 2005</td>
<td>Hershey, PA</td>
<td>Dr. Richard D. Willer, Phoenix, AZ</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<tr>
<td>110</td>
<td>Oct. 12-18, 2006</td>
<td>Minneapolis, MN</td>
<td>Dr. Bret D. Marsh, Indianapolis, IN</td>
<td>Dr. J Lee Alley, Montgomery, AL</td>
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<tr>
<td>111</td>
<td>Oct. 18-24, 2007</td>
<td>Reno, NV</td>
<td>Dr. Lee M. Myers, Atlanta, GA</td>
<td>§Dr. J Lee Alley, Montgomery, AL/ Mr. Benjamin Richey, St. Joseph, MO</td>
</tr>
<tr>
<td>112</td>
<td>Oct. 23-29, 2008</td>
<td>Greensboro, NC</td>
<td>Mr. James W. Leafstedt, Alcestor, 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>
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<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>
<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>
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<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>
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### 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>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>
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<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>
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<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>
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<tr>
<td>121</td>
<td>Oct. 12-18, 2017</td>
<td>San Diego, CA</td>
<td>Dr. Boyd H. Parr, Columbia, SC</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>122</td>
<td>Oct. 18-24, 2018</td>
<td>Kansas City, MO</td>
<td>Ms. Barbara C. Determan, Early, IA</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>123</td>
<td>Oct. 24-30, 2019</td>
<td>Providence, RI</td>
<td>Dr. Kristin M. Haas, Montpelier, VT</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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<tr>
<td>124</td>
<td>Oct. 15-21, 2020</td>
<td>Nashville, TN</td>
<td>Dr. Marty Zaluski, Helena, MT</td>
<td>Mr. Benjamin Richey, St. Joseph, MO</td>
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</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

*v 2020 was held exclusively virtual due to the Covid-19 pandemic
III. D. USAHA Award Recipients
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 T. Hawks, Washington, District of Columbia

119th Annual Meeting, Providence, Rhode Island – 2015
Dr. Richard E. Breitmeyer, Davis, California

120th Annual Meeting, Greensboro, North Carolina – 2016
Mr. Jim W. Leafstedt, Alcester, South Dakota

121st Annual Meeting, San Diego, California – 2017
Mr. Bobby R. Acord, Rocky Point, North Carolina

122nd Annual Meeting, Kansas City, Missouri – 2018
Dr. Donald E. Hoenig, Belfast, Maine

123rd Annual Meeting, Providence, Rhode Island – 2019
Dr. Belinda Thompson, Ithaca, New York
III.D. USAHA AWARD RECIPIENTS

124th Annual Meeting, Virtual – 2020
Dr. John Clifford, Stone Mountain, Georgia
III. ORGANIZATIONAL MATTERS

USAHA FEDERAL PARTNERSHIP AWARD RECIPIENTS

Dr. Jack A. Shere, Raleigh, North Carolina
Dr. William G. Smith, Sutton, Massachusetts

Dr. Donald J. Otto, Knoxville, Iowa

117th Annual Meeting, San Diego, California – 2013
Dr. Donald E. Evans, Topeka, Kansas

118th Annual Meeting, Kansas City, Missouri – 2014
Dr. Sarah M. Tomlinson, Fort Collins, Colorado

119th Annual Meeting, Providence, Rhode Island – 2015
Dr. Kevin L. Petersburg, Des Moines, Iowa

120th Annual Meeting, Greensboro, North Carolina – 2016
Dr. Angela M. Pelzel-McCluskey, Fort Collins, Colorado

121st Annual Meeting, San Diego, California – 2017
Dr. Jonathan T. Zack, Riverdale, Maryland

122nd Annual Meeting, Kansas City, Missouri – 2018
Dr. Jack C. Rhyan, Fort Collins, Colorado

123rd Annual Meeting, Providence, Rhode Island - 2019
Dr. Barb Porter-Spalding, Raleigh, North Carolina

124th Annual Meeting, Virtual - 2020
Dr. Darrel K. Styles, Riverdale, Maryland
### III.D. USAHA AWARD RECIPIENTS

#### OTHER AWARDS

<table>
<thead>
<tr>
<th>Year</th>
<th>APHIS Administrator’s Award</th>
<th>National Assembly Award</th>
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<tr>
<td>2020</td>
<td>Dr. Michael Neault</td>
<td>Dr. Michael Neault</td>
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<tr>
<td>2019</td>
<td>Dr. Beate Crossley</td>
<td>Dr. Susan Keller</td>
</tr>
<tr>
<td>2018</td>
<td>Dr. Andy Schwartz</td>
<td>Dr. David Schmitt</td>
</tr>
<tr>
<td>2017</td>
<td>Dr. Bruce Akey</td>
<td>Dr. Kent Fowler</td>
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<td>2016</td>
<td>Dr. Annette Jones</td>
<td>Mr. Paul Rodgers</td>
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<td>2015</td>
<td>Dr. Dustin Oedekoven</td>
<td>Dr. Bob Meyer</td>
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<td>2014</td>
<td>Dr. Donald Ritter</td>
<td>Dr. Tom Holt</td>
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<td>2013</td>
<td>Dr. James Roth</td>
<td>Dr. Bill Hartmann</td>
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<td>2012</td>
<td>Dr. Donald Hoenig</td>
<td>Dr. Jim Logan</td>
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<td>2011</td>
<td>Dr. Don Lein</td>
<td>Dr. Taylor Woods</td>
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<tr>
<td>2010</td>
<td>Dr. Alex Ardans; Dr. Alfonso Torres</td>
<td>Mr. George Teagarden</td>
</tr>
<tr>
<td>2009</td>
<td>Mr. James Leafstedt</td>
<td>Mr. John Adams</td>
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<tr>
<td>2008</td>
<td>Dr. Claude Barton</td>
<td>Dr. Bret D. Marsh</td>
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<td>2007</td>
<td>Dr. Francois Elvinger</td>
<td>Dr. Bob Hillman</td>
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<tr>
<td>2006</td>
<td>Dr. Terry McElwain; Dr. Willie Reed</td>
<td>Dr. Sam Holland</td>
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<tr>
<td>2005</td>
<td>Dr. Bob Hillman</td>
<td>Dr. Richard D. Willer</td>
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<td>2004</td>
<td>Dr. Joan Arnoldi</td>
<td>Dr. Steven England</td>
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<tr>
<td>2003</td>
<td>Ms. Martha Roberts</td>
<td>Dr. John Huntley</td>
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<td>2002</td>
<td>Mr. Gus Douglas</td>
<td>Dr. Ernest W. Zirkle</td>
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<td>2001</td>
<td>Dr. Richard E. Breitmeyer</td>
<td>Dr. Richard E. Breitmeyer</td>
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<td>2000</td>
<td>Dr. Mo Salman</td>
<td>Dr. H. Wesley Towers, Jr</td>
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<td>1999</td>
<td>Dr. Terry Beals</td>
<td>Dr. Ralph Knowles</td>
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<td>1998</td>
<td>Dr. Marvin Beeman</td>
<td>Dr. Larry L. Williams</td>
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<td>1997</td>
<td>Dr. Elizabeth A. Lautner</td>
<td>Dr. Terry L. Beals</td>
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<td>1996</td>
<td>Dr. Paul B. Doby</td>
<td>Dr. J. Lee Alley</td>
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<td>1995</td>
<td>Mr. Philip E. Bradshaw</td>
<td>Dr. Lewis P. Thomas</td>
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<td>1994</td>
<td>Mr. Neal Black</td>
<td>Dr. J. C. Shook</td>
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### III. ORGANIZATIONAL MATTERS

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<th>Chairman</th>
<th>Vice-Chairman</th>
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<tbody>
<tr>
<td>1993</td>
<td>Mrs. Ella Blanton</td>
<td>Dr. Calvin W. S. Lum</td>
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<td>1992</td>
<td>Dr. Pat Smith</td>
<td>Dr. Patton L. Smith</td>
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<td>1991</td>
<td>Dr. C. L. Campbell</td>
<td>Dr. Paul B. Doby</td>
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<td>1990</td>
<td>Dr. David T. Berman</td>
<td>Dr. Clarence L. Campbell</td>
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<tr>
<td>1989</td>
<td>Mr. John B. Armstrong</td>
<td>Ms. Mabel Owen</td>
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<td>1988</td>
<td>Dr. Frank A. Hayes</td>
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<tr>
<td>1987</td>
<td>Dr. Robert P. Hanson</td>
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<tr>
<td>1986</td>
<td>Dr. Benjamin s. Pomeroy</td>
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<td>1985</td>
<td>Dr. J. G. Flint</td>
<td></td>
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<td>1984</td>
<td>Dr. William C. Tobin</td>
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<td>1983</td>
<td>Dr. Harold E. Nadler</td>
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<td>1982</td>
<td>Dr. John L. O’Harra</td>
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<td>1981</td>
<td>Dr. J. D. Lamont</td>
<td></td>
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<td>1980</td>
<td>Dr. John F. Quinn</td>
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<td>1979</td>
<td>Dr. A. G. Boyd</td>
<td></td>
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<td>1978</td>
<td>Mr. Francis Buzzell</td>
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<td>1977</td>
<td>Dr. Jay Arthur Myers</td>
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IV. APPENDIX
   A. GLOSSARY OF COMMONLY USED ACRONYMS
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AAAP</td>
<td>American Association of Avian Pathologist</td>
</tr>
<tr>
<td>AAC</td>
<td>Animal Agriculture Coalition</td>
</tr>
<tr>
<td>AAEP</td>
<td>American Association of Equine Practitioners</td>
</tr>
<tr>
<td>AARS</td>
<td>Administrative Action Records System</td>
</tr>
<tr>
<td>AASV</td>
<td>American Association of Swine Veterinarians</td>
</tr>
<tr>
<td>ABADRU</td>
<td>Arthropod-Borne Animal Diseases Research Unit</td>
</tr>
<tr>
<td>AHI</td>
<td>Animal Health Institute</td>
</tr>
<tr>
<td>AHOs</td>
<td>Animal Health Officials</td>
</tr>
<tr>
<td>AHS</td>
<td>African Horse Sickness</td>
</tr>
<tr>
<td>ALHT</td>
<td>Asian Longhorned Ticks</td>
</tr>
<tr>
<td>AmPV</td>
<td>Avian Metapneumovirus</td>
</tr>
<tr>
<td>AMR</td>
<td>Antimicrobial Resistance</td>
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<tr>
<td>APHIS</td>
<td>Animal and Plant Health Inspection Service</td>
</tr>
<tr>
<td>ARS</td>
<td>Agricultural Research Service</td>
</tr>
<tr>
<td>ASEf</td>
<td>Accelerated Scrapie Eradication Program</td>
</tr>
<tr>
<td>ASf</td>
<td>African swine fever</td>
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<tr>
<td>ABVP</td>
<td>American Board of Veterinary Practitioners</td>
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<tr>
<td>AVBP</td>
<td>Association of Veterinarians in Broiler Production</td>
</tr>
<tr>
<td>AVEP</td>
<td>Association of Veterinarians in Egg Production</td>
</tr>
<tr>
<td>AVMA</td>
<td>American Veterinary Medical Association</td>
</tr>
<tr>
<td>BA</td>
<td>Bordetella avium</td>
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<tr>
<td>BAPA</td>
<td>Buffered Acidified Plate Antigen</td>
</tr>
<tr>
<td>BCO</td>
<td>Bacterial chondronecrosis with osteomyelitis</td>
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<tr>
<td>BDV</td>
<td>Border Disease Virus</td>
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<tr>
<td>BSL</td>
<td>Biosafety level</td>
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<tr>
<td>BTV</td>
<td>Bluetongue virus</td>
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<tr>
<td>CCT</td>
<td>Comparative Cervical Tuberculin test</td>
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<tr>
<td>CD</td>
<td>Clostridial Dermatitis</td>
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<tr>
<td>CDT</td>
<td>Central Daylight Time</td>
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<tr>
<td>CEAH</td>
<td>Center for Epidemiology and Animal Health</td>
</tr>
<tr>
<td>CEM</td>
<td>Contagious Equine Metritis</td>
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<tr>
<td>CF</td>
<td>Caudal Fold</td>
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<tr>
<td>CFT</td>
<td>Cattle Fever Tick</td>
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<tr>
<td>CFTEP</td>
<td>Cattle Fever Tick Eradication Program</td>
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<tr>
<td>CFTRL</td>
<td>Cattle Fever Tick Research Laboratory</td>
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<tr>
<td>CheRI</td>
<td>Cervidae Health Research Initiative</td>
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<tr>
<td>CNOG</td>
<td>National Confederation of Livestock Unions, Mexico</td>
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<tr>
<td>CRADA</td>
<td>Cooperative research and development agreement</td>
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<tr>
<td>CSF</td>
<td>Classical swine fever</td>
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<tr>
<td>ACRONYM</td>
<td>FULL FORM</td>
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<td>----------</td>
<td>-----------------------------------------------</td>
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<tr>
<td>CVB</td>
<td>Center for Veterinary Biologics</td>
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<tr>
<td>D&amp;B</td>
<td>Dun &amp; Bradstreet</td>
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<tr>
<td>DHS</td>
<td>Department of Homeland Security</td>
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<tr>
<td>DIVA</td>
<td>Differentiating Infected from Vaccinated Animals</td>
</tr>
<tr>
<td>DNA</td>
<td>Deoxyribonucleic acid</td>
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<td>EBT</td>
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<td>EDS</td>
<td>Egg Drop Syndrome</td>
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<td>EEE</td>
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<td>EHDV</td>
<td>Epizootic haemorrhagic disease virus</td>
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<td>EIA</td>
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<td>FAO</td>
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<td>Farmers Assuring Responsible Management</td>
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<td>Fluorescence Polarization Assay</td>
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<td>GF-TADs</td>
<td>Global Framework for the Progressive Control of Transboundary Animal Diseases</td>
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<tr>
<td>GMP</td>
<td>Good Manufacturing Practices</td>
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<td>GRM</td>
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<td>JEV</td>
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<td>KBUSLIRL</td>
<td>Knipling Bushland U.S. Livestock Insects Research Laboratory</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<td>LAPRU</td>
<td>Livestock Arthropod Pest Research Unit</td>
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<td>LBMS</td>
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<td>LIMS</td>
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<td>LOINC</td>
<td>Logical Observation Identifiers Names and Codes</td>
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<td>MG</td>
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<td>Multilocus sequence typing</td>
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<td>MS</td>
<td>Mycoplasma synoviae</td>
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<td>Multi-States Partnership</td>
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<td>MUMS</td>
<td>Minor Use in Major Species</td>
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<td>NADC</td>
<td>National Animal Disease Center</td>
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<td>NADPRP</td>
<td>National Animal Disease Preparedness and Response Program</td>
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<td>NAE</td>
<td>No antibiotics ever</td>
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<td>NWHC</td>
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<td>OIE</td>
<td>World Organization of Animal Health</td>
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<td>OM</td>
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<td>ORT</td>
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<td>ORV</td>
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<td>Acronym</td>
<td>Definition</td>
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<tr>
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<tr>
<td>OS&amp;C</td>
<td>Office of Surveillance and Compliance</td>
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<tr>
<td>PCR</td>
<td>Polymerase chain reaction</td>
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<td>PEDV</td>
<td>Porcine Epidemic Diarrhea Virus</td>
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<td>PEMS</td>
<td>Poult Enteritis Mortality Syndrome</td>
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<td>PHF</td>
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<td>Pre-Movement Isolation Period</td>
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<td>PPR</td>
<td>Peste des petits ruminants</td>
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<td>PRP</td>
<td>Platelet-rich plasma</td>
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<td>PT</td>
<td>Proficiency test</td>
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<td>QA</td>
<td>Quality assurance</td>
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<td>R&amp;D</td>
<td>Research and development</td>
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<td>RCC</td>
<td>Regulatory Cooperation Council</td>
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<td>RNA</td>
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<td>Real-time quaking-induced conversion</td>
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<td>RVFV</td>
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<td>SAADRA</td>
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<td>Southern Animal Health Association</td>
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<td>SCWDS</td>
<td>Southeastern Cooperative Wildlife Disease Study</td>
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<td>SE</td>
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<td>SENASICA</td>
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<td>SEPRL</td>
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<td>SFCP</td>
<td>Scrapie Flock Certification Program</td>
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<td>Science Gateways Community Institute</td>
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<td>SLD</td>
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<td>SNOmedCT</td>
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<td>TAHD</td>
<td>Treponeme-associated hoof disease</td>
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<td>Turkey Arthritis Reovirus</td>
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<td>Tibial dyschondroplasia</td>
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<td>TR-DFTR</td>
<td>Turkey Reovirus Digital Flexor Tendon Rupture</td>
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<td>U.S. Roundtable for Sustainable Poultry &amp; Eggs</td>
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<td>University of Texas Medical Branch</td>
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<td>VBD</td>
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<td>Veterinary Drugs Directorate (Canada)</td>
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<td>VDL</td>
<td>Veterinary diagnostic laboratory</td>
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<td>Virus elimination</td>
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<td>Veterinary Export Health Certification System</td>
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<td>World Trade Organization</td>
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<td>XML</td>
<td>Extensible Markup Language</td>
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