REPORT OF THE USAHA COMMITTEE ON FOREIGN AND EMERGING DISEASES

Chair: Tammy Beckham, KS
Vice Chair: Alfonso Clavijo, KS

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

The Committee met on October 18, 2016 at the Sheraton Greensboro Hotel in Greensboro, North Carolina from 8:00 a.m. to 5:30 p.m. The Chair opened the session with an introduction, a welcome, and a review of the purpose of the committee.

Time-Specific Paper

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

Presentations

Session 1: Federal and Center Updates

DHS S&T'S Agricultural Defense Program Overview

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

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

USDA-APHIS-NVSL Update

Beverly Schmitt, APHIS-NVSL

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

USDA-APHIS-NAHLN Update

Sarah Tomlinson, APHIS-NAHLN-NVSL

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

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

Increasing NAHLN laboratory messaging capabilities continues to be a top priority with Veterinary Services (VS) now accepting messages for nine diseases, with two more targeted for implementation this year. The NAHLN is also collaborating with four NAHLN laboratories and the Swine Health Information

Center on a project to enhance messaging data standards and to develop data flow and reporting requirements for supporting the National List of Reportable Animal Diseases (NLRAD) initiative.

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

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

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

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

USDA-APHIS-NVSL FADDL Program Overview

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

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

Foreign Animal Disease Research Updates from USDA-ARS, Plum Island

Luis L. Rodriguez, Plum Island Animal Disease Center

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

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

Swine Health Information Center Overview

Paul Sundberg, Swine Health Information Center

The mission of the Swine Health Information Center (SHIC) is to protect and enhance the health of the United States swine herd through coordinated global disease monitoring, targeted research investments that minimize the impact of future disease threats, and analysis of swine health data.

To start meeting this mission in 2015, the nine members of the SHIC Board hired Dr. Sundberg as the organization's first executive director in June 2015. A summary of SHIC's achievements includes the following:

- **Communication/Collaboration**. From the onset, SHIC reached out to many groups that have a connection to swine health to help define and refine its mission. Chief among these stakeholders include USDA-APHIS, pork producers, veterinarians, and allied industry. Because of our linked industries, SHIC also has engaged Canadian counterparts as well to help coordinate disease information and response with their domestic industry.
- **Global Disease Assessment**. To build on SHIC's assessment of disease status from a global perspective, it conducted a survey of swine diseases and disease issues with the international network of the group's Monitoring and Analysis Working Group. Responses came from 13 foreign countries, including Japan, Korea, Philippines, China, Poland, Ukraine, Russia, United Kingdom, Spain, Brazil, Chile, Columbia, and Canada.
- **VDL Support**. Acting upon its mission, SHIC gave support to four veterinary diagnostic laboratories with the explicit purpose of standardizing the way that they report their testing results. This collaboration is on track to improve the ability of the diagnostic laboratories to communicate test results and just as importantly to help improve communication about the real-time status of U.S. disease trends and outbreaks.
- **Disease Risks Research**. SHIC funded many research projects over the past year. However, a highlight would have to be the project that will help define disease introduction risks to the U.S. pork industry that come from importing feedstuffs and feed components.
- **Rapid Response Teams**. To help foster rapid onsite responses to disease investigations across the United States, SHIC developed a geographic system for rapid response investigations of disease outbreaks on farms. SHIC's board approved dividing the country into regions with Rapid Response Teams, each with small groups swine health experts who can be deployed on farms within 72 hours after a request. Each group is tasked with investigating any disease or potential outbreak for epidemiology, assessment of potential introduction pathways and management of the outbreak review.
- **Diagnostic Fee Support**. To help more producers and their veterinarians solve outbreaks with unknown etiology, SHIC developed a system of support to help offset some diagnostic fees after the initial diagnostics are completed. SHIC can help producers in cases where there are incidents of high or ongoing morbidity or mortality where an etiology is either not identified or there is a strong suspicion that the identified etiology is not the likely cause of the outbreak.
- **Swine Disease Matrix**. This project will help the pork industry be better prepared for emerging diseases and has helped to bring coordination of researchers to meet this objective.
- **Senecavirus A**. From the SHIC's targeted SVV research, practitioners and producers alike learned much more about SVV's etiology and how to combat it at the farm level. A combination of fact sheets, webinars, and research reports all combined to help the industry get a handle on this emerging disease.

Institute for Infectious Animal Diseases Overview

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

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

global challenges. As an OIE collaborating center, IIAD provides its expertise internationally to support and implement animal health initiatives, provide scientific and technical training, and conduct scientific research focused on global animal health.

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

- Biological research – delivering better tools and options for comprehensively addressing disease detection, control and eradication.
- Integrated data-sharing tools – improving daily animal health management, providing real-time information to support improved decisions during disease events and contribute to business continuity.
- Training – educating a diverse, multi-sectoral workforce of animal and public health workers, laboratory scientists, and epidemiologists.

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

1. Tools to mitigate spread of FMD at feedyards - this just completed project resulted in advancements for an affordable commercial undercarriage and wheel truck wash installed at a feedyard. The unit uses approximately three gallons of water per full tractor-trailer wash and waste water is re-captured. Further advancements or expansion to other livestock sectors are currently under discussion between other interested parties. Funding was provided by Department of Homeland Security (DHS) Science and Technology Directorate (S&T). Partners included West Texas A&M University, Texas Cattle Feeder's Assocation, and a feedyard in Texas.
2. Integrated biosurveillance for mosquito-borne diseases - this collaborative project between the Lawrence Livermore National Library (LLNL), IIAD and Texas A&M University (TAMU) College of Veterinary Medicine and Biomedical Sciences (CVM) aims to establish an operational biosurveillance test-bed in the Southeast Texas/Mexico border region focusing on surveillance of insect, animal and human populations. Samples and data from this test bed and related scientific investigations are expected to lead to a better understanding of genetic, environmental and societal factors affecting disease spread and prevalence. This will enable improved prediction of vectorborne disease emergence and spread, along with objective assessment of diagnostic technologies and interventions. The focus of this project will be arthropod-borne viral diseases that are currently expanding into the United States - including Zika, Dengue, and Chikungunya. Funding is provided by LLNL.
3. 3B ELISA - In collaboration with industry, academia and government, this project developed and validated an foot-and-mouth disease (FMD) 3B non-starch polysaccharide (NSP) differentiating vaccinated from infected animals (DIVA) enzyme-linked immunosorbent assay (ELISA) which has demonstrated to be a faster, more robust, and more sensitive assay than the current gold standard. Testing bovine, caprine, porcine and ovine samples, U.S. licensure is currently in final stages u . If approved, it would be the only U.S. produced FMD NSP ELISA on the market. Additional swine testing is currently under discussion by the Canadian Food Inspection Agency (CFIA). Funding was provided by DHS S&T. Partners include VMRD, Inc., U.S. government (DHS Plum Island Animal Disease Center (PIADC), USDA-APHIS Foreign Animal Disease Diagnostic Laboratory (FADDL), and USDA-ARS PIADC) and the international community (CFIA, the Government of Mongolia's Ministry of Food and Agriculture's State Central Veterinary Laboratory, and the Pirbright Institute all performed testing).
4. AgConnect® Emergency exercise– Held in August 2016, this data-driven exercise focused on the technical function and utility of the AgConnect suite of tools, to provide for: planning, response and business continuity, biosurveillance, shared situational awareness, data and information sharing, operational coordination, and operational communications. The notional scenario was a high-consequence porcine disease affecting Kansas, Colorado, Indiana, Iowa and used real industry daily operational data from two major swine integrators. Over 60 participants from 18 organizations tested how the AgConnect® system would allow for more efficient communication and sharing of data to support informed decision making during an animal health emergency.

Throughout the two-day exercise, participants used AgConnect® to work through various commercial swine controlled movement requests necessary for business continuity during this hypothetical swine disease outbreak. Following each of the requested movement scenarios, state animal health officials and industry representatives came together for discussions to determine if the requested realistic movements could occur and how AgConnect® assisted with their decisions. The state veterinarians and industry representatives concluded that AgConnect was able to quickly translate information to visualization for situation awareness, and that an important aspect of success was the ability for the swine industry to directly share operational and geospatial information directly through the AgConnect system. The State Veterinarians were also able to inform each other by sharing geospatial visualizations of their outbreak control efforts and status through AgConnect and participants agreed on the tool's value of using live, real-time data and novel technology solutions to support decision-making.

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

Center of Excellence for Emerging and Zoonotic Animal Diseases Overview

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

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

Session 2: Models: Current and Future Role/ Needs of Disease Spread Models at the Research/ Academic, State, and Federal Levels to Support Federal Preparedness and Response Activities

Panelists Included:
Amy Delagdo, USDA-APHIS Center for Epidemiology and Animal Health
Jon Zack, National Preparedness and Incident Coordination (NPIC), USDA-APHIS-VS Surveillance, Preparedness and Response Services (SPRS)
Sasidhar Malladi, University of Minnesota and USDA-APHIS Center for Excellence in the Arts and Humanities (CEAH), University of Minnesota
Lindsey Holmstrom, Department of Diagnostic Medicine and Pathology, College of Veterinary Medicine, Kansas State University
Luis Rodriguez, Foreign Animal Disease Research Unit, USDA-ARS, Plum Island
Marianne Ash, Indiana State Board of Animal Health
Julie Helm, Poultry Veterinarian Clemson University Livestock Poultry Health, Clemson University

Emergency response planning continues to evolve to more strategically stop and prevent disease spread while maintaining business continuity and allowing as many animals as possible to reach their intended purpose. As a result, there is an increased need for scientific and analytical approaches to support emergency preparedness planning. Investments in epidemiologic modeling enhance our ability to evaluate trade-offs in investments in human and material resources, develop plans to quickly and accurately identify infected herds, develop plans to quickly assess animals and animal products for the presence of disease, explore options for more targeted approaches to depopulation and disposal, and to gage alternative control strategies for disease control. Investments in economic modeling allow us to estimate the fair market value of animals or animal products when data are limited; estimate economic impacts, including trade losses, associated with response options; and examine costs associated with response and potential trade-offs.

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

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

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

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

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

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

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

Benefits of Modeling Activities for State Animal Health Officials' Offices: A Kansas State University Pilot for Hosting USDA's Animal Disease Spread Model (ADSM) Within A University Environment

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

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

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

Session 3: Outbreak Reports, Analysis and Implications; Education

Food and Agriculture Organization of the United Nations: The Emergency Prevention System for Animal Health (EMPRES-AH), Crisis Management Centre – Animal Health (CMC-AH), and FAO-OIE Rinderpest Secretariat

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

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

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

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

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

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

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

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

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

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

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

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

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

Senecavirus A (SVA) – Swine Industry Experience

Harry Snelson, American Association of Swine Veterinarians

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

SENECAVIRUS A (SVA) – USDA Response

Ellen Kasari, United States Department of Agriculture

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

Emerging Animal Disease Preparedness and Response Plan

Dana Cole, CDC

Lee Ann Thomas, USDA-APHIS-VS

VS is seeking public comment on the draft *Emerging Animal Disease Preparedness and Response Plan* (available at https://www.aphis.usda.gov/animal_health/downloads/emerging-dis-framework-plan.pdf). VS will finalize the plan in December 2016 based on the stakeholder input received.

The framework for the plan was outlined in the 2014 VS concept paper, *Veterinary Services Proposed Framework for Response to Emerging Animal Diseases in the United States*. The plan provides strategic direction for VS at all levels to detect and respond to emerging animal diseases. It also defines

assessment, communication activities, and possible response measures for an emerging animal disease occurring in the United States. The plan will provide strategic guidance, as well as outline roles and responsibilities of Federal and SAHOs and industry partners for detecting, communicating, and responding to emerging animal diseases.

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

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

Farm Bill Provision to Fund Improvements to Protect Animal Agriculture

Liz Wagstrom, National Pork Producers Council

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

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

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

New World Screwworm Cases in Key Deer, Big Pine Florida

Samantha Gibbs, U.S. Fish and Wildlife Service

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

Joint Animal-Plant Health Criminal-Epidemiological Investigations Concept

Stephen Goldsmith, FBI Weapons Mass Destruction Directorate

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

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

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

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

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

Why Needed:

- An intentional bioterrorism attack against U.S. agricultural targets will be difficult to discern between the more common accidental or natural disease introductions and would be a National Security Event. The agriculture and veterinary communities have been slow to recognize that agriculture is a target of domestic and international terrorist individuals and groups. Agroterrorism has national security significance with potentially severe consequences to the U.S. economy, export markets, and the balance of trade.
- Evidence of intentional introductions of Foreign and Emerging Animal Diseases (FEAD), Exotic Plant Diseases, Pests, Noxius weeds is inherently fragile and difficult to recognize and detect so there is a limited window of opportunity to identify and report threats, initiate investigations, and prevent or disrupt an on-going act of terrorism.
- Key tools for Joint Criminal-Epidemiological Investigations include: establishing joint triggers, indicators, and tripwires for suspicious or intentional acts and disease
    - outbreaks, rapid notification, and early information sharing between LE and APH agencies of unusual disease investigations, intelligence threat assessments, reports of suspicious activities and criminal investigations, effective use of interagency Threat Credibility Evaluations (TCE), and joint Crim-Epi investigations and response operations.
- The Course is the key action element for the implementation of the Joint Memorandum of Understanding between FBI-WMDD – USDA-APHIS – USDA Office of the Inspector General (OIG) and is designed to assist LE and APH agencies to jointly detect and effectively respond to possible intentional APH disease introductions while maximizing resources and communication between operational, field level personnel.

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

Goals and Long-Term Vision:

- **Facilitate Threat and Operational Awareness:** Provide an overview of criminal and epidemiological investigational procedures and protocols for a response to a bioterrorism attack

against agricultural targets and to enhance the understanding of the roles and responsibilities of LE and Agricultural agencies.

  - Long Term Vision: LE understands the goals and techniques of animal and plant disease investigations. APH understands the LE priorities and procedures such as intelligence operations, the roles and duties of the FBI WMD Coordinator, crime scene preservation and investigations, chain of custody, and protecting sensitive information.

- **Develop Information Sharing Protocols:** Develop joint alert notification and information sharing techniques and procedures, develop jointly recognized triggers, indicators, and tripwires, develop communication plans and contact lists for LE and APH personnel.
  - Long Term Vision: Develop field level communication procedures for information sharing, joint threat assessments procedures, and joint investigations. Define the type of information that is of value, why, and establish effective and time sensitive protocols.
- **Foster State and Local APH-LE Contact Networks:** During the training, APH and LE personnel meet their counterparts and develop working-level relationships, identify resources and assets for joint operations, develop useful operational points of contact.
  - Long Term Vision: Strong professional ties are developed between APH and LE personnel, development of working groups and joint planning teams, and build timely information sharing protocols for suspicious and unusual disease investigations and outbreaks.
- **Personnel Requirements:**

FBI:

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

USDA-APHIS

Veterinary Services:

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

Plant Protection and Quarantine

- Lead Instructor: Plant Disease SME from PPQ, Riverdale, MD
  Additional PPQ SME's from field / District Offices to serve as training facilitators

State Departments of Agriculture:

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

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

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

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

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

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

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

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

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

The PPR global eradication program (GEP) aims to eradicate PPR by 2030, greatly contributing to small ruminant production for a growing world population, estimated to be 9.7 billion by 2050. Consumption of small ruminant meat and dairy products is forecast to increase by 1.7 million metric tonnes and 1.8 million metric tonnes per year respectively. In a recent benefit-cost analysis of global PPR eradication, the ratio is estimated at 33.8. Investing in PPR eradication will pay for itself many times over as a contribution to improving the lives of the world's most vulnerable pastoral and rural communities (over 300 million rural families). The PPR-GEP will contribute to the 2030 Agenda for Sustainable Development, supporting the achievement of many of the Sustainable Development Goals.

The PPR global eradication effort is framed as a 15 year process running through to 2030, divided into three five year phases. The first five years of activities are important catalysts to support and target the control and eradication achievements set forth in the Global Strategy, particularly in affected and at risk countries. The 62 countries (as of September 2016) that report infection with PPR and the 14 suspected of being infected or at risk are the major focus of the PPR-GEP (Total of 76 countries).

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

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

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

Key components of the program:

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

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

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

Contact: PPR-Secretariat@fao.org