Developing a National Bio-surveillance System for the U.S. Swine Industry

2017 Meeting Report

April 12-13, 2017
Dallas, Texas

Performer: Institute for Infectious Animal Diseases

Co-Sponsors: National Pork Board

Swine Health Information Center

U.S. Department of Homeland Security

Report Date: June 26, 2017

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1. Executive Summary

On April 12-13, 2017, more than twenty-six representatives from the U.S. swine industry, state animal health officials (SAHOs), federal animal health officials, and academia came together for a common priority to discuss protecting swine health and developing a national bio-surveillance system for the U.S. swine industry. The workshop was hosted by the National Pork Board (NPB), the Swine Health Information Center (SHIC), and the Institute for Infectious Animal Diseases (IIAD); with funding support from the Department of Homeland Security [DHS]).

The overall goal of the meeting was intended to be a focused, interactive discussion that builds upon previous and current industry and government efforts towards a nationally-coordinated bio-surveillance system (System) to rapidly deliver real-time data for analysis to improve foreign animal and emerging/re-emerging disease detection. While being cognizant of lessons learned, participants were encouraged to envision an innovative and flexible System, which is credible, workable, and affordable, and meets speed of commerce and trade needs. Speakers and participants were encouraged to approach discussions for defining an optimal systems without regard to difficulties or cost. Discussions for gaps, barriers and improvements incorporated realistic factors as participants developed key elements and priority action items to enable improvement and implementation of a sustainable successfully functioning, national rapid bio-surveillance system that meets the needs of the U.S. pork industry and state and federal animal health authorities.

This report summarizes main discussion points during the technical workshop. A full list of attendees may be found in Section 6 (Meeting Participants) and the meeting agenda may be found in Section 7 (Meeting Agenda).

2. Meeting Objectives

The objectives of the meeting were the following:

Objective 1: Identify gaps, tools, and research needs for a workable, credible, affordable, and robust national bio-surveillance system supporting coordinated early detection, rapid response, and efficient control of Foreign Animal Diseases (FAD), and enables improved prevention of FADs and emerging/re-emerging priority diseases to the U.S. swine industry. Such a system would additionally support trade and commerce surveillance information needs.
Specific outcomes included:
- review current capabilities for the national bio-surveillance system
- identify needed capabilities of a national bio-surveillance system for today's U.S. swine industry
- identify current gaps and barriers to improvements to the U.S. national bio-surveillance system
- provide recommendations on capabilities and implementation needs for a real-time surveillance system to trigger improved detection of known diseases

Objective 2: Develop a road map to address gaps, barriers, and research needs (identified in Objective 1) for improvement and implementation of the sustainable successfully functioning, national rapid bio-

surveillance system that meets the needs of the U.S. pork industry as well as state and federal animal health authorities.

Specific outcomes included:
- identify barriers for state, federal, and industry partners to successfully implement a bio-surveillance system.
- prioritized next steps
- identify resource needs, responsible parties, and realistic timeframe to accomplish roadmap creation

The meeting was designed as a way to meet current and future U.S. swine industry needs and took into account current United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS) and state programs and planning as well as Department of Homeland Security funded tools currently in development. Structure of the agenda provided speakers and panels across all stakeholder entities in attendance to provide a backdrop from which interactive discussions progressed. The 26 participants were divided into three groups to define key elements of an optimal system then each breakout group presented in an ensuing plenary session to merge key elements' lists. The priority action items were identified during the last plenary session on Day 2. A program development consultant was provided from USDA APHIS' Policy and Program Development (PPD) Planning, Evaluation and decision Support (PEDS) office as a facilitator.

3. Discussion Summaries

3.A   Identifying an Optimal System

USDA APHIS currently conducts active surveillance for regulatory diseases - swine brucellosis (SB), pseudorabies (PRV), classical swine fever (CSF), African swine fever (ASF) (pilot) – and passive surveillance for vesicular diseases such as Seneca virus A (SVA), foot-and-mouth disease (FMD) and swine vesicular disease (SVD). Since June 2014, swine enteric coronavirus diseases (SECD), such as Porcine Epidemic Diarrhea virus (PEDv) are federally reportable diseases. The agency also began an influenza A virus (IAV-s) surveillance program in 2009 to monitor the genetic evolution of endemic IAV-s in order to better understand endemic and emerging influenza virus ecology and monitoring IAV-s in the U.S. swine herd; make IAV-s isolates and associated epidemiologic data available for research and analysis; and select proper isolates for the development of relevant diagnostic reagents, updated diagnostic assays, and vaccine seed stock products. Targeted samples are obtained from case-compatible sick pig submissions at veterinary diagnostic laboratories, swine exhibiting influenza-like illness at first points of concentration or commingling (e.g. markets, fairs) and swine populations that are epidemiologically linked to confirmed humans cases involving IAV-s.

Regulatory program surveillance for SB, PRV and CSF is performed to enhance early detection and demonstrate disease freedom for commercial swine populations. Target populations include sick swine in commerce, commercial swine, transitional swine (non-commercial back-yard type operations) and feral swine. As part of APHIS efforts to monitor animal health and detect potentially emerging issues, weekly reports of condemnations at slaughter plants are also analyzed. APHIS is currently exploring looking at diverse data sources that might be used in unique ways for information (e.g. USDA Food Safety Inspection Service [FSIS] condemnation data, using Johns Hopkins-developed statistical algorithms) to pick up any anomalies (above baseline/"normal") that should be further investigated. Also under consideration is whether laboratory submission data – test order accessions in particular –can help identify trends or alert to health anomalies sooner than reports of the test results. Industry recommendations included active observational surveillance as a stream, focusing specifically on streams where the economy of scale can be leveraged to access samples (e.g. commingling points) and the inclusion of non-commercial farms as a stream.

It was noted that there is a difference between monitoring and surveillance. The private sector (swine industry and veterinarians) does not conduct surveillance, but rather contributes to state and U.S. government surveillance through daily monitoring at specific farms. Producers monitor primarily for production diseases and performance, as those have the potential for direct negative animal health and farm economic health impacts. Currently, integrated sharing of information from producer to producer is not routinely done; however, a new industry endeavor, the Swine Health Information Center (SHIC), was initiated in 2015 and some system-specific information is shared within the industry, with a focus on emerging diseases. SHIC's mission is to protect and enhance the health of the U.S. swine "herd" through coordinated global disease monitoring, targeted research investments that minimize the impact of future disease threats, and analysis of swine health data. SAHOs also contribute to the national surveillance picture through local implementation of federal regulatory programs as well as state-based surveillance and animal health initiatives. Infrastructure, laboratory diagnostics, information technology, and resources (personnel and financial) were just a few of the common needs identified by the speakers and participants.

The group discussions agreed that a national surveillance vision should be risk-based, real-time, reliable (accurate information), efficient, representative, and integrate data in a timely manner so disease events can be identified quickly. Particularly given the volume of daily U.S. swine movements, it was agreed that early detection would need to be within one week of disease introduction in order to minimize spread and limit negative trade impacts. An optimal system should be readily scalable for large disease events (which would require diagnostic resources/capabilities and an information sharing infrastructure), and include reliable, standardized information collected with each sample (date, location/premises identification number [PIN], animal information, history, etc.), as well as seamlessly integrate animal movement data. The capacity for forward forecasting and central analysis of multiple data sources to identify triggers is desired, as well as developing robust communication streams between veterinarians, laboratories, and animal health officials. The ability to utilize next generation sequencing to better identify emerging (mystery) diseases would be part of an optimal system that is also robust enough to quickly identify syndromes and food adulterations.

Given that risks change over time, some of the discussion revolved around whether methods by which surveillance is conducted need to change. Instead of developing a surveillance plan for every pathogen/disease source, a commonly shared goal was identified to transition away from specific, individual disease surveillance programs. It was agreed that effective surveillance programs should be comprehensive, integrated, and include a more proactive approach for evaluation and decision making. Towards this goal, being able to efficiently obtain information on multiple animals and diseases from the same source was desired by all (e.g. oral fluids diagnostic capability, slaughter plant samples and reports). Surveillance provides information for action and the actions should be transparently identified/defined from the outset. Another commonly shared goal was for robust risk analysis which can be used to develop improved strategies for both emergent and endemic diseases. Communication, data integration/sharing, and data confidentiality were consistently mentioned as important themes for the participants.

The swine industry previously identified the need for a nationally coordinated bio-surveillance system as a priority and noted that such a system would contribute to successful implementation of the Secure Pork Supply Plan, as well as facilitate pork producer business continuity in the face of a high consequence disease outbreak. This type of system would also build an "improved capacity" within the U.S. to prepare for, detect and rapidly respond to regulatory animal diseases as well as emerging and re-emerging diseases. Workshop discussions furthered previous efforts, clarifying that achieving a modern and robust national bio-surveillance system is a common goal and reinforced that such a system is a vital component of an optimal, risk-based, and comprehensive U.S. disease preparedness system. See Section 4 for the key elements that workshop participants agreed upon for an optimal risk-based comprehensive disease preparedness system for the U.S. and the priority action items identified to achieve progress towards this goal.

3.B   Gaps, Barriers and Improvements

Panelist and group discussion was interactive. Each panelist identified barriers for their sector (state, federal and industry) to successfully implement the optimal surveillance system identified on Day 1 and included any applicable lessons learned from H1N1, PEDv, SVA, avian influenza, etc. Discussion also included identifying how to improve prioritization of surveillance objectives, including the best mechanism to do so. Day 1 information presented by APHIS representatives included issues the agency identified as gaps, and areas they are currently working on, providing helpful insight for this dialogue.

Many of these sentiments were echoed across sectors/panelists and included discussion on the specific topics of disconnected data management systems, limited diagnostics, and budget/resources. For data management – electronic messaging of results and data systems development and integration were identified. Both technical and policy barriers related to the development of effective diagnostic assays were identified. Policy barriers include decisions on the use of new diagnostic tests, private laboratory certification and oversight related to NAHLN laboratories. Everyone agreed that a major technical gap is the limitation of current diagnostics and that there is a priority need surrounding the area of diagnostic test validation – especially for aggregate samples such as oral fluids. In addition to technical barriers to implementation, aggregate sampling (including oral fluids), faces policy barriers to implementation. APHIS is working on internal assessment processes (which tests/specimens and fitness for purpose) which will address some of these challenges, and the group urged a focus on advancing validation for the current oral fluids diagnostic assay (FMD, CSF and ASF) as well as advancements in use of those samples for identification of other diseases. Efficient and timely information sharing was another common theme requiring advancement in technical and policy solutions.

Specific components of information sharing included: 1) linking together information from various systems (dashboards), 2) developing a process to turn on/off information sharing, 3) identifying who is going to do this, and finally 4) discussing how such a process could be funded. Prioritizing what additional information is needed related to pathogen surveillance was another identified area for improvement.

4. Key Elements and Priority Action Items

There was a significant consensus among the stakeholders participating in the workshop regarding attributes of an optimal risk-based comprehensive disease preparedness system and that a modern robust national bio-surveillance system is a vital component. Among all participants there was a commitment to timely forward progress. The following are agreed upon key elements and priority actions.

Key Elements of an Optimal Risk-Based Comprehensive Disease Preparedness System

- ❖ Supports prevention, preparedness, response, mitigation, and recovery from foreign and emerging animal diseases of concern.
- ❖ Leverages the marketing chain to require specific data, such as premises identification associated with shipments or lots, for capture during sale
- ❖ Includes a process for prioritizing, evaluating, implementing and revising surveillance objectives
- ❖ Includes feed and other inputs common among pork production systems
- ❖ Utilizes standardized, electronic, real-time data capture for data that will support risk-based preparedness, like animal movements, premises identification, slaughter information, and veterinary diagnostic laboratory information
- ❖ Allows access-controlled information sharing from various permissioned levels to respect data confidentiality
- ❖ Relies on regularly validated and updated premises identification information
- ❖ Facilitates communication between existing industry, state, federal disparate response and database systems
- ❖ Leverages trained production personnel on farms to collect easily obtained, aggregate samples (i.e. oral fluids) for diagnostic testing
- ❖ Uses triggers to automatically identify anomalies for further investigation
- ❖ Includes inputs about multi species movements to facilitate risk based movement decisions

- ❖ Produces timely action oriented executive summary information for "rapidly digestible situational awareness"

<u>Priority Action Items to Achieve Progress toward an Optimal System</u>

- ❖ Identify a committee to establish timelines and monitor assignments of roles/responsibilities for activities
- ❖ Validate oral fluids based diagnostic assay for priority FADs and address policy barriers to support assay transition to, and use by, National Animal Health Laboratory Network (NAHLN) laboratories
- ❖ Establish a network of producers, SAHOs, and NAHLN laboratories in the core pork producing states to work together to (among others):
  - Review state capacities and resources with the goal to identify and ensure personnel, infrastructure, and resources to develop an animal health infrastructure that works seamlessly between core states
  - Determine data needs at the different levels to make decisions
    - o Identify and address barriers to garner state and federal acceptance of domestic animal movements from a NAHLN laboratory negative test result
    - o Establish and implement processes to incentivize or require a premises identification number to be associated with all veterinary diagnostic laboratory submissions
  - Ascertain systems currently being used to collect, store, message, and share data
  - Establish a standard protocol and training to allow accredited veterinarians and trained field staff, under the supervision of an accredited veterinarian, to collect diagnostic samples when federal FAD Diagnostician resources are exhausted
  - Establish a means to incentivize or require completed diagnostic laboratory submission forms to be submitted with diagnostic samples
  - Address barriers to enable more effective use of the NAHLN laboratories - some identified priorities include:
    - o Allow laboratories to run FAD tests for which they have proficiency tested personnel, with established protocols for communication of results
    - o Continue work to harmonize swine diagnostic test results messaging and analysis of these data from swine diagnostic laboratories to facilitate inter-laboratory and constituency communication.
    - o Deliver timely reporting of test results in an electronic format, directly into appropriate state, federal, or industry data management systems
- ❖ Transition Certificates of Veterinary Inspection and Interstate Movement Reports (Commuter Agreements) entirely away from paper and in to usable electronic formats
- ❖ Review progress and continue to evaluate priorities after one year

5. Acronyms

AASV	American Association of Swine Veterinarians
APHIS	Animal and Plant Health Inspection Service
ASAAHC	Avian, Swine and Aquatic Animal Health Center
ASF	African swine fever
CEAH	Center for Epidemiology and Animal Health
CSF	Classical swine fever
DHS	Department of Homeland Security
FAD	Foreign animal disease
FMD	Foot-and-mouth disease
IAV-s	influenza A virus
IIAD	Institute for Infectious Animal Diseases
NAHLN	National Animal Health Laboratory Network
NPB	National Pork Board
NPPC	National Pork Producer's Council
PEDS	Planning, Evaluation and decision Support PEDS
PEDv	Porcine Epidemic Diarrhea virus
PPD	Policy and Program Development
PRV	porcine respiratory virus
S&T	Science and Technology Directorate
SAHO	State Animal Health Official
SB	swine brucellosis
SECD	swine enteric coronavirus diseases
SHIC	Swine Health Information Center
SPRS	Surveillance, Preparedness and Response Services
STAS	Science, Technology and Analysis Service
SVA	Seneca virus A
SVD	swine vesicular disease
USDA	United States Department of Agriculture

6. Meeting Participants

Name	Organization
Dr. Celia Antognoli	Director of Surveillance Design and Analysis, Center for Epidemiology and Animal Health, STAS, APHIS
Dr. Lisa Becton	Director of Swine Health Information and Research, National Pork Board
Dr. Melissa Berquist	Director, Institute for Infectious Animal Diseases
Dr. Steve Brier	Hog Production Director, Smithfield Foods/National Pork Board Swine Health Committee member
Emily Byers	Veterinarian, Prestige Farms/National Pork Board Swine Health Committee member
Sarah Caffey	Program Manager, Institute for Infectious Animal Diseases
Dr. Michelle Colby	Agricultural Defense Branch Chief, Homeland Security Advanced Research and Projects Agency, Science and Technology Directorate, DHS
Dr. Dana Cole	Director, Risk Identification and Risk Assessment Unit, Center for Epidemiology and Animal Health, STAS APHIS
Dr. Dee Ellis	Project Manager, Institute for Infectious Animal Diseases
Dr. Steve Henry	Veterinarian, Carthage Veterinary Service/member of American Association of Swine Veterinarians
Dr. Clayton Johnson	Monitoring and Analysis Working Group, Swine Health Information Center
Dr. John Korslund	Swine Staff, ASAAHC-SPRS, APHIS, Veterinary Services
Dr. Dan Kovich	Deputy Director of Science and Technology, National Pork Producers Council
Dr. Bret Marsh	State Veterinarian, Indiana State Board of Animal Health
Dr. Doug Meckes	State Veterinarian, North Carolina
Dr. Deborah Millis	Program Development Consultant, APHIS Policy and Program Development, Planning, Evaluation and Decision Support
Dr. Dustin Oedekoven	State Veterinarian and Executive Secretary, South Dakota Animal Industry Board
Dr. Elizabeth Parker	Chief Veterinarian, Institute for Infectious Animal Diseases
Dr. Maryn Ptaschinski	Veterinarian, JBS/National Pork Board Swine Health Committee member
Brent Scholl	Producer/National Pork Producers Council
Dr. Harry Snelson	Director of Communications, American Association of Swine Veterinarians
Dr. Paul Sundberg	Executive Director, Swine Health Information Center
Dr. Mark Teachman	Director, Office of Interagency Coordination, STAS, Animal and Plant Health Inspection Service

Name	Organization
Nick Tharp	Producer/Co-Chair, National Pork Board Swine Health Committee
Dr. Beth Thompson	Executive Director/State Veterinarian, Minnesota Board of Animal Health
Dr. Bob Thompson	Veterinarian, PIC/National Pork Board Swine Health Committee member
Dr. Sarah Tomlinson*	Coordinator, National Animal Health Laboratory Network, Animal and Plant Health Inspection Service, USDA
Dr. Bruce Wagner*	Director, Center for Epidemiology and Animal Health, Animal and Plant Health Inspection Service, USDA
Dr. Patrick Webb	Director of Swine Health Programs, National Pork Board
Rachel Whisenant	Project Coordinator, Institute for Infectious Animal Diseases
Dr. Bob Wills	Mississippi State University
Dr. Jeff Zimmerman	Iowa State University/Scientific Advisor, National Pork Board Swine Health Committee member

*Participated via teleconference

Wednesday, April 12, 2017

11:30 am Lunch | Pick up outside of meeting room
12:00 pm Morning Session | Room: Made in Texas 9

    1. Welcome and Introduction of Facilitator | Patrick Webb, DVM, National Pork Board Director of Swine Health Programs; Paul Sundberg, DVM, Ph.D., DACVPM, Swine Health Information Center Executive Director; Michelle Colby, DVM, MS, Department of Homeland Security Science and Technology Directorate Chemical and Biological Defense Division Agriculture Defense Branch Chief; Deborah Millis, USDA APHIS Policy and Program Development (PPD) Planning, Evaluation and Decision Support (PEDS) Program Development Consultant

    2. Perspectives of Current and Needed Capabilities for Bio-Surveillance

    Federal:

        a) Review of Current and Needed U.S. Capabilities for a National Swine Bio-surveillance System | Celia Antognoli, DVM, U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) Science, Technology and Analysis Services (STAS) Surveillance Design and Analysis Director

        b) Current and Future Thoughts for U.S. Government Risk-based Data Analysis and Timely Information Sharing | Dana Cole, DVM, Ph.D., Director, USDA APHIS VS STAS Center for Epidemiology and Animal Health Risk Identification and Risk Assessment Unit

    State:

        a) State Surveillance Perspectives | Doug Meckes, DVM, North Carolina State Veterinarian

    Industry:

        a) Industry Surveillance Perspectives | Clayton Johnson, DVM, Carthage Veterinary Service Director of Health

    3. Panel: What is the Optimal System?

        Panelists: John Korslund, DVM, USDA APHIS VS Surveillance, Preparedness and Response (SPRS), Avian Swine and Aquatic Animal Health Center (ASAAHC); Dustin Oedekoven, DVM, South Dakota State Veterinarian; Jeff Zimmerman, DVM, Ph.D., Diplomate ACVPM, Iowa State University College of Veterinary Medicine Professor; Steve Brier, Smithfield Foods Hog Production Director; Harry Snelson, DVM, American Association of Swine Veterinarians (AASV) Director of Communications

3:00 pm Break
3:30 pm Afternoon Session

    1. Breakout Groups: Describe the Optimal System | Rooms: Made in Texas 9, Made in Texas 5

        Harry Snelson, DVM, AASV Director of Communications

        Mark Teachman, DVM, USDA APHIS Director for Interagency Coordination

        Deborah Millis, USDA APHIS PPD PEDS Program Development Consultant

    2. Plenary Discussion

6:30 pm Reception | Room: Enterprise 3

Thursday, April 13, 2017

7:00 am Breakfast
7:45 am Morning Session | Room: Made in Texas 9

    1. Goals for Day 2 | Deborah Millis, USDA APHIS PPD PEDS Program Development Consultant

    2. Panel and Plenary Discussion

        a) Panel: What are the current gaps and barriers to improvements towards achieving the wish list to the U.S. national bio-surveillance System?

        Panelists: Celia Antognoli, DVM, USDA APHIS VS STAS Surveillance Design and Analysis Director; John Korslund, DVM, USDA APHIS VS SPRA ASAAHC; Bret Marsh, DVM, Indiana State Veterinarian; Lisa Becton, DVM, National Pork Board Director of Swine Health Information and Research

        b) Plenary Discussion

    3. Breakout Groups: Solutions | Rooms: Made in Texas 9, Made in Texas 5

11:00 am Lunch
12:00 pm Group Reports and Plenary Discussion

    a) Discussion to Reconcile Lists of Solutions and Responsible Parties

    b) Prioritize Solutions and Next Steps for Parties

    c) Wrap-up and Conclusion

1:00 pm Meeting Ends