Identification and Response to Emerging Swine Production Diseases (ESPD)

Introduction

In 1998 USDA published a final report of the Swine Futures Project (SFP) which “represented a unique partnership between industry and government to develop a shared vision of future industry service needs and how to best address those needs collaboratively”\(^1\). The report included a chapter on identifying and responding to Emerging Animal Issues (EAI’s), defined as "any sudden, economic impact related to the appearance of a disease which could have direct impact upon productivity, present a real or perceived risk to public health, or present a real or perceived risk to a foreign country which imports from the United States"\(^2\). Emerging Animal Diseases were considered a subset of EAI’s and are defined as “infection with a new agent or a new manifestation of a previously identified agent that threatens animal or public health”\(^3\). This strategy document follows many of the recommendations identified in the (SFP) and describes a state-federal-industry cooperative structure to identify and address Emerging Swine Production Diseases (ESPD).

General Approach

The pork industry will benefit from a standardized process that coordinates state-, federal-, and industry cooperative efforts to identify, characterize, prioritize and respond to Emerging Swine Production Diseases (ESPD) of concern. Identification, characterization and prioritization of ESPD’s can currently be facilitated by the Swine Health Information Center (SHIC) and USDA’s Risk Assessment Unit (RIU) within the Center for Epidemiology and Animal Health.

The objective of the Swine Disease Response Council (SDRC) is to get state-federal-industry recommendations about possible responses to emerging diseases. The Council provides a mechanism for shared analysis and development of recommendations for actions. Recommendations do not carry regulatory authority however, development of the recommendations will occur with input from regulators familiar with the industry. This cooperative approach will standardize how ESPD’s of concern are handled in the U.S. Pork Industry.

Global Identification of Emerging Swine Production Diseases

The Swine Health Information Center (SHIC) and USDA’s Risk Assessment Unit (RIU) within the Center for Epidemiology and Animal Health serve complementary roles regarding global awareness, assessment, prioritization and preparedness (e.g. communications, research) for Emerging Swine Production Diseases (ESPD). These groups have formalized communications to harmonize information sharing and currently act as the eyes and ears for identification of emerging diseases globally. The RIU primary responsibility is to work with stakeholders to identify, describe and characterize ESPDs, recommend a priority status and alternative actions for consideration to stakeholders. The SHIC responsibilities are to receive and gather ESPD intelligence, monitor risks and vulnerabilities, share risk information and identify and fund research to increase preparedness to facilitate early detection of ESPD of concern in the U.S. Pork Industry. In the event that an ESPD of concern is detected, the SHIC and RIU will provide information to support the Swine Disease Response Council in developing response

\(^1\) Swine Futures Project, Final Report, page iii, USDA APHIS 91-51-048
\(^2\) Swine Futures Project, Final Report, page 114, USDA APHIS 91-51-048
\(^3\) Swine Futures Project, Final Report, page iii, USDA APHIS 91-51-048
recommendations. Note that this plan pertains to ESPD’s of no or low public health concern and that the cooperative approach will be used to develop an annex specific to high consequence emerging zoonotic diseases.

Domestic Detection, Identification and Characterization of Emerging Swine Production Diseases (ESPD)

Information regarding ESPD’s in the U.S. that affect swine can come from numerous sources. SHIC and RIU serve as a clearinghouse for information gathered through intelligence networks, submitted by industry or as a result of mandatory reporting. Intelligence on foreign ESPDs should be gathered and shared on a regular schedule, at minimum bi-annually, unless there are extenuating circumstances that require a shorter timeline. Reports of domestic ESPD’s may occur through field reports, and enhanced passive surveillance programs but are more likely to be reported by researchers and public/private veterinary diagnostic laboratories.

Rapid Response Teams (RRTs)

The detection of an ESPD of concern may warrant the mobilization of Rapid Response Teams (RRT), facilitated by the Swine Health Information Center. Rapid Response Teams will be tasked to complete the needed epidemiological investigations that will provide information on the outbreak. The Rapid Response Teams will follow a standardized guidance for the Investigation of potential Emerging Disease. Funding to mobilize these teams may potentially come from APHIS cooperative agreements with states and industry.

The SAHO(s) in the state(s) where investigations are being conducted will be involved with federal authorities and the state and national industry organizations in the coordination of the Rapid Response Team investigations. The National Pork Board, NPPC and AASV will help identify SME and industry experts. The investigation will be a cooperative effort with the farm owner and veterinarian of record for the herd. The most current RRT document is at http://www.swinehealth.org/

Emerging Disease Communications Plan

To effectively respond to emerging swine diseases, early communication about outbreaks with new or unexpected etiologies is needed. To facilitate this veterinarians and pork producers must know the actionables and contacts in the event of an emerging disease. Confidentiality of producer, veterinarian or site identifiers will be strictly maintained during the initial calls. Any actions because of those calls will maintain confidentiality to the level requested by the producer or veterinarian unless state or federal swine health regulations dictate otherwise. The most current communication plan is at http://www.swinehealth.org/

Developing Response Recommendations

The Swine Disease Response Council is an industry led cooperative effort between industry and state / federal animal health officials to facilitate development of response recommendations after the detection of an ESPD of concern to the pork industry. If the determination is made to activate the Swine Disease Response Council the members will be notified and regular communications initiated.
The Swine Disease Response Council is made up of representatives of pork producers, state animal health officials and USDA. The Response Council will facilitate the development of recommended response actions and identify the responsible parties, funding and mechanisms to carry them out. The Response Council will call on SHIC, RIU, subject matter experts, or form task forces, as needed to advise their consideration of appropriate recommendations.

The Swine Disease Response Council includes:

- **Pork producers**
  - One representative each of the NPB and NPPC Board of Directors
  - One representative of the NPB and NPPC Swine Health Committees
  - One ad hoc pork producer leaders named by the NPB and NPPC Board of Directors
  - One staff member from each of NPB and NPPC, named by their respective Board of Directors to serve a support function to the Council.

- **American Association of Swine Veterinarians**
  - The current president of the AASV or a representative named by their Board of Directors
  - 1 additional veterinarian from swine practice or production systems
  - One staff member of AASV, to serve as a support function to the Council

- **National Assembly of the Association of State Animal Health Officials**
  - Two State Animal Health Official from states with significant pork production

- **USDA APHIS VS**
  - Two representatives to serve as an advisory function to the US Swine Disease Response Council

The SHIC and other state, federal, diagnostic laboratory, academic, and industry subject matter experts will be included based on need. The Swine Disease Response Council will meet, at minimum, every year to consider emerging disease issues that are relevant to swine health in the United States, discuss and practice response scenarios or, as needed, to make recommendations for response to an ESPD suspected or identified in the United States.
In certain instances, especially in the case of information concerning domestic cases of a suspected ESPD of concern, the Response Council will be expected to meet quickly to provide recommendations about these cases. The SAHO from the state(s) in which cases have been identified will be included in the development of recommendations.

Additionally, the State Executive of the State Pork Producers Association in the state(s) will also be included on the Swine Disease Response Council. Figure 1 demonstrates how information would flow to the Swine Disease Response Council.

The industry staff persons providing support to the Swine Disease Response Council will coordinate the logistics of information flowing into the Response Council. Funding for meetings and calls of the Swine Disease Response Council will be provided by the industry organizations.
Response Options for ESPD’s

Once activated the Swine Disease Response Council will be charged with typing an ESPD incident and deciding on recommendations. Information used for typing will be provided by SHIC from intelligence gathered from subject matter experts, RIU or Rapid Response Team’s that are deployed for investigation purposes. Figure 2 highlights the pathway for the development of response options. Information on typing can be found in Appendix 1.

Once an outbreak is typed the Response Council will systematically review a list of passive, active and ancillary response options to determine which are applicable to the situation. The recommended options must identify the human and financial resources needed, potential sources of those resources, and leadership of the options. While one organization/entity may be tasked to take the lead an option, it should be a coordinated effort with others represented on the Response Council. A communication strategy for each option should be developed by the organization(s) leading that activity.

The Swine Disease Response Council would provide ongoing recommendations as the situation changes based on reporting back of progress on the response options recommended. Potential response options are listed below. These options represent a range of potential actions that could be taken, and the Response Council may recommend as many options as they feel would be valuable in addressing the emerging disease situation.

The Swine Disease Response Council has no regulatory authority, and will function as a collaboration between federal, state and industry. State and Federal regulatory authorities will not be legally compelled to accept the recommendations made by the Response Council on regulatory actions.
However, the collaborative process which will include state and federal regulatory agencies is expected to result in recommendations that the regulatory agencies will find valuable.

Communications for ESPD’s

Coordination of communications will be important for managing ESPD incidents. For each incident and response options chosen a communications plan will be developed and the responsibilities for carrying out and coordinating communications will be clearly assigned. This will ensure that all stakeholders that are involved in carrying out activities related to the incident will receive up-to-date and accurate information.

Passive Response Options

1. *No Response*

   The emergence of a swine disease globally or domestically may not be considered significant enough for action. Parameters should be developed which would trigger reassessment of the situation.

2. *Maintain/Expand Situational Awareness*

   The active or passive continuance of situational awareness for an emerging disease issue may be the only action recommended. If recommended a plan should be developed that outlines whom is to do the monitoring, how that information is gathered, analyzed, and when that information is communicated back to Swine Health Council for reassessment. Data sources, and funding for such data gathering, should be identified, e.g. NAHLN laboratory testing of cases without a diagnosis.

   Specific triggers for when an issue needs to be moved to the next level or monitoring stopped should also be included and the plan should identify the human and financial resources needed and where those resources will be acquired.

   The USDA Risk Investigation Group will lead this option in close collaboration with the NAHLN Laboratory Network.

3. *Referral*

   Referrals may be made to other agencies or groups for further study or action. If this is selected as the action then a plan should be developed for monitoring and communicating with the referral group or agency and parameters developed for when the issue must be re-addressed or monitoring discontinued.

   Swine Disease Response Council would determine whom the issue (or sub-issue) should be referred to.
**Active Response Options**

1. *Investigation of Epidemiological Distinct Cases*

   The detection of an ESPD of concern may warrant investigation of epidemiological distinct cases. To carry out this option teams will be tasked to complete the needed epidemiological investigations that will provide information to aid in informing the Swine Disease Response Council.

2. *Disease reporting for investigation purposes and situational awareness*

   In order for disease reporting, either voluntary or mandatory, to work effectively the following must be preplanned and in place so the process is seamless when needed. This includes:
   
   - Set disease reporting objectives
   - Determine reporting pathways
   - Determine the minimal epidemiological data needed with the report
     - Report at the premises level
   - Ensure the epidemiological data can be captured and communicated in real time
   - Develop needed permission forms for data sharing agreements
   - Communicate how the security of the information will be maintained

3. *Voluntary disease reporting/surveillance projects for research, investigation purposes and situational awareness*

   The Swine Disease Response Council could recommend that producers and veterinarians participate in voluntary disease reporting projects with the acknowledgment that that no regulatory action will be taken since the reporting is for situational awareness and epidemiological investigation purposes only. This information can feedforward and be used for nationally coordinated field investigative studies (*see field investigative studies below*).

   Voluntary reporting projects could function as research projects, industry led initiatives, or governmental activities.

   Voluntary disease reporting should be developed and led by the entities that have the infrastructure and funding to gather such information. The potential to set up such projects should be discussed by the Swine Disease Response Council to identify appropriate entities, and objectives, for such projects.
4. **Mandatory Disease reporting, for investigation purposes and situational awareness**

The Swine Disease Response Council could recommend that USDA mandate disease reporting (if not required by NLRAD) of an ESPD with the acknowledgment that no regulatory action will be taken since the reporting is for situational awareness and epidemiological investigation purposes only. This information can feedforward and be used for nationally coordinated field investigative studies *(see field investigative studies below)*.

Development of mandatory disease reporting should be led by USDA in close collaboration with the SAHOs and NAHLN laboratories.

The intent of this action is to help facilitate accurate reporting of cases without incurring other regulatory actions (stop movement, testing requirements, permitting etc.) which is outlined in *Disease control measures (regulatory)* section below.

5. **Diagnostic and biological development**

In the case of an emerging disease it will be important to collect biological samples that can be utilized to develop diagnostic tests, and potentially biologics. These samples should be made available to diagnostic laboratories and others who will develop such tests, or products. The USDA should work with industry to collect such samples and provide them to the laboratories via NAHLN or biologics manufacturers via CVB.

6. **Field Investigative Studies (nationally coordinated)**

Nationally coordinated field investigative studies can include one or various methods for accomplishing epidemiological investigations (e.g. on farm, county, regional or national surveys etc.) and can be accomplished by industry alone or cooperatively with animal health authorities.

In order for field investigative studies to be implemented the following must occur:

- Development of objectives for the epidemiological investigation
- Development of the epidemiological instruments to meet the objectives
- Development of an administration plan
  - Includes administration of the epidemiological instrument, collection of other epidemiological data, data storage, data sharing, data analysis and communications of results
- Development and communication of educational materials
The Swine Disease Response Council will assign a Federal-State-Academic-Industry working group to develop objectives of nationally coordinated field investigative studies and develop a plan for deployment, funding and administration of the investigation.

7. *Coordinated Surveillance in U.S. Swine*

Active or passive disease surveillance can be undertaken in the US swine herd. In order for surveillance to be implemented the following must occur:

- Development of surveillance objectives
- Development of a surveillance plan based on the identified objectives
  - Development of a case definition
  - Development of a sampling strategy, including sampling surrounding identified positive premises
- Development of a response plan
- Development of a communications plan
- Development and communications of educational materials
- Development / Deployment of diagnostic tests that are fit for purpose

The Swine Disease Response Council should assign members to a swine surveillance working group which will develop objectives and case definitions. Once objectives are identified the response, surveillance and communication plans can be developed by this, or an additional State-Federal-Industry working group and those plans vetted through industry leadership. The development and deployment of diagnostic tests can be addressed cooperatively between industry, USDA and the veterinary diagnostic labs and researchers (synergies)

8. *Disease control measures (voluntary)*

The Swine Disease Response Council could recommend that the pork industry voluntarily put in place on-farm, county, regional or national disease control measures to mitigate the effects of an ESPD in the United States.

The effectiveness of this approach is dependent upon multiple factors including:

- Characteristics of the disease agent
- Availability of diagnostic tools and diagnostic capabilities
• The quality of information from the field investigative studies, surveillance data, and research

• Estimates of producer compliance in a non-regulatory environment

• Probability of preventing spread through appropriate biosecurity and biocontainment protocols.

The above information is critical in order to determine the best course of action for implementation of voluntary disease control measures while limiting the adverse effects on animal welfare and business continuity.

The Swine Disease Response Council will name a working group to develop, communicate and implement a detailed plan that describes roles and responsibilities, funding pathways, time course and measures of success or failure.

9. Disease control measures (regulatory)

The Swine Health Council could recommend that state and/or federal animal health authorities take regulatory action and put in place on-farm, county, regional or national disease control measures to mitigate the effects of an emerging animal disease in the United States.

The effectiveness of this approach is dependent upon multiple factors including:

  o Characteristics of the disease agent

  o Availability of diagnostic tools and diagnostic capabilities

  o The quality of information from the field investigative studies, surveillance data, and research

  o Regulatory enforcement plan

  o Probability of preventing spread through appropriate biosecurity and biocontainment protocols.

The above information is critical in order to determine the best regulatory course of action for implementation of disease control measures while limiting the adverse effects on animal welfare and business continuity.

Disease control measures could include, but are not limited to, mandatory reporting, quarantine, controlled movement, required biosecurity and truck washing, managed marketing, depopulation and other control strategies.
The state and federal agencies leading this effort should develop a detailed plan that describes roles and responsibilities, funding pathways, time course and measures of success or failure. That plan must be vetted, communicated and implemented.

**Ancillary Activities to Support Response**

1. **Policy - Domestic**

   Policy recommendations can include, but are not limited to, allocation of federal dollars to address disease issue, changes in the reportability of the disease, and changes to the regulatory status of the disease. If recommended then policy would need to be developed and vetted. National Pork Producer’s Council should lead discussions on, and advocate for, changes in domestic policy and funding options for those changes.

2. **Education**

   The development and delivery of educational resources requires dedicated human and financial resources to accomplish in a timely manner. If recommended as an approach decisions should be made on the target audience, human resources and expertise necessary to develop the content, mechanism (s) of delivery, and timelines for each action to occur. The Swine Disease Response Council will recommend the member entities, or outside sources, best suited to lead development and distribution of materials for each target audience.

3. **Research**

   There are limited funding sources at the National and State level for research and the speed that dollars can be made available, proposals submitted and selected and the timeliness for the research can be completed and analyzed is variable. The National Pork Board should take a lead on the research coordination activities around ESPD, and work closely with USDA-ARS and NIFA to guide the development of those organization’s research activities.

4. **Certification Programs**

   Pork industry could work independently or cooperatively with state and federal animal health authorities to develop a certification program. For this approach to be successful the plan would need to be developed to determine the objectives of the certification program, the surveillance necessary for certification, the response plan for when the disease is found, and funding pathways necessary to maintain the program and measures of success and failure. The National Pork Board should take the lead on development of certification programs.
Appendix 1 – Response Phases for ESPD Outbreaks

Investigation Phase

The investigation phase is the period of time from the suspected, presumptive or confirmed presence of an ESPD in the United States until evidence is gathered to estimate the extent of the outbreak. During this phase the SHIC will coordinate the mobilization of Rapid Response Teams with State and Federal Animal Health Officials. The RRT’s will be mobilized quickly and complete their work with urgency so that results are rapidly communicated and that the Swine Disease Response Council has initial information on which to make recommendations within a goal of 4 days. The teams will work to identify the index case(s), identify the extent of geographical spread and attempt to determine source of the infection. During investigations movement restrictions or quarantines may be issued if necessary under the authority of the State Animal Health Official. The goal will be to remove Stop orders, movement restrictions or quarantines in enforcement within 4 days unless the evidence supports the decision to keep them enforced.

Decision Phase

The decision phase is the period of time where information from the investigation is analyzed, the incident is typed as 1, 2 or 3 and recommended actions are developed and implemented to mitigate the incident.

TYPE 1 – Short term disease control strategies warranted: The infection is of a known etiology and limited to a few premises and the epidemiologic investigation and/or surveillance indicates that it has not spread beyond the initial few premises and there is a high level of assurance that risk pathways for disease entry/exit are identified and can be mitigated.

TYPE 1 B - The infection is of an unknown etiology but resources exist that can be rapidly developed and deployed to aid in the epidemiologic investigation and/or surveillance to determine that the infection is limited to a few premises and there is a high level of assurance that all risk pathways for disease entry/exit are identified and can be mitigated.

TYPE 2 – Medium term disease control strategies warranted: The infection is of a known etiology and limited to a few focal areas and the epidemiologic investigation and surveillance indicate that it has not spread, or has the capability to spread, extensively. There is adequate knowledge about the disease, how it spreads, effective prevention and/or control measures, and risk pathways for disease entry/exit. There little to no likelihood to control the disease using quarantine, stop movements or depopulation. However, there is strong evidence that vaccine, treatment or control strategies can prevent infection, spread or reintroduction of the disease and reasonable expectation that the needed tools and information or other activities warranted will shortly be available, to mitigate negative effects of the disease on swine health, welfare and producer profitability.

TYPE 2 B - The infection is of an unknown etiology but resources exist that can be rapidly developed and deployed to aid in the epidemiologic investigation and/or surveillance to determine that the infection is limited to a few focal areas and adequate knowledge about the disease, how it spreads, effective prevention and/or control measures, and risk pathways for disease entry/exit can be determined in
short period of time to provide strong evidence that vaccine, treatment or control strategies can prevent infection, spread or reintroduction of the disease to mitigate negative effects of the disease on swine health, welfare and producer profitability.

TYPE 3 – Long term disease control strategies needed:  Widespread areas of infection, and/or infections that are geographically and epidemiologically distinct, with or without a known etiology are detected involving a large portion of swine production centers in the United States. There is inadequate knowledge about the disease, how it spreads, effective prevention and/or control measures, and risk pathways for disease entry and spread. There little to no likelihood of control the disease using quarantine, stop movement or depopulation, and no known or effective vaccine, treatment or control strategies. It is expected to take greater than one year to develop the needed tools and information to mitigate negative effects of the disease on swine health, welfare and producer profitability.