Swine Health Information Center 2025 Plan of Work

Improve Swine Health Information

1. **Domestic disease monitoring through veterinary diagnostic laboratory data collation**. A coordinated surveillance system across US pork production for endemic disease is beneficial. The Swine Disease Reporting System (SDRS) takes advantage of the willingness of the major veterinary diagnostic laboratories to share data through an infrastructure enabled by support from SHIC. Advisory members to SDRS provide feedback through periodic meetings regarding possible improvements or enhancements to the SDRS which would enable it to become more helpful, informative, timely and actionable. Expansion of reporting trends in pathogen or syndromic surveillance at VDLs will be explored. Epidemiological use of diagnostic data to further inform the pork industry of regional trends, future predictions, and emerging disease detection will be considered. Examples could include:
    a. Increasing bacterial disease monitoring through characterizing *Streptococcus suis* strain virulence, and/or identifying *Glaesserella parasuis* serotypes.
    b. Expanded reporting of *Mycoplasma* sp., including *M. hyorhinis*, including submitted case characteristics.
    c. Reporting the prevalence and trends of co-infections over time and expanding the VDLs which contribute to the confirmed disease diagnoses through histopathology and tissue evaluation by pathologists, such as diagnostic codes.
    d. Expanding the number of public and private veterinary diagnostic laboratories in the US and across North America which contribute data to domestic disease reports.
    e. Including Seneca virus A into the SDRS report to include regional detection and trends, expected prevalence, phase of production and sample type.
2. **Domestic disease monitoring through voluntary reporting to the Morrison Swine Health Monitoring Project**. As a voluntary reporting system enabled through infrastructure support from SHIC, MSHMP provides a foundation for industry capacity to report system level disease, respond rapidly, and maintain business continuity. The project will help to identify industry needs through participant input with a goal to make the data more actionable for enrolled participants and help in response to emerging health challenges. Increasing automation of reporting as well as investigating the potential to incorporate production data with health status reporting will be explored. Additional analysis projects using the MSHMP data will be pursued to enhance value to participants and encourage more producers to participate as voluntary reporting of data will translate to value across all producers.
3. **Strategic summary of SHIC swine health and disease work-to-date**. With new data and diseases emerging at a rapid pace, maintaining informative summaries of knowledge gained for stakeholders is a challenge. A strategic approach to ensure research questions address SHIC's mission and strategic pillars and that all research strategically builds upon previous foundational work is needed. Best practices for a long-term SHIC research strategy and clear organization of knowledge to show progression of funded research and results will be explored.
4. **Webinars to inform veterinarians and producers about emerging swine health issues**. Veterinarians are challenged to stay abreast of new technologies and emerging pathogens associated with disease. The goals of the webinar series are to 1) share experiences and management options to foster communication and inform discussion about emerging diseases and 2) keep pace with industry chatter about current health challenges. Webinars will be offered quarterly or as needed in response to emerging health topics.

5. **Maintaining up-to-date swine disease fact sheets**. The swine disease fact sheets are a commonly accessed information resource from the SHIC website. The content of each sheet, as well as the need for new sheets to be developed, will be monitored to ensure the latest information remains available. Fact sheets for revision could include Seneca virus A, porcine astrovirus 4, porcine circovirus 4, and porcine hemorrhagic tracheitis syndrome.
6. **Ensure timely and valuable communications across all stakeholder audiences**. Information sources may have disparate conclusions that require consolidation, validation and summarizing to help ensure producers are provided up-to-date and accurate information to make decisions. This analysis of information may require a panel of experts to help provide context to novel swine health technologies or advancements. Further, ensuring effective communication across different stakeholder audiences, such as state and federal animal health officials and state pork producer associations, may require tailored messaging platforms or targeted relaying of information.

Monitor and Mitigate Risks to Swine Health

7. **Real-time assessment of high-risk product importation and traveler entry at borders**. The risk of emerging or foreign animal disease introduction at the US border, including at seaports and airports, is due in part to importation of both legal and illegal products. Additionally, high-risk traveler entry, such as those individuals who have recently visited ASFV-positive farms, pose a risk to the US industry. Identifying high risk imports through analysis and interaction of product data, such as country of origin, disease status of region, likelihood of pathogen contamination, product type (such as a swine feed ingredient), processing and packaging protocols, risk of pests (such as rodents and insects), transport route and timeline, and potential exposures enroute is needed. Investigations may include evaluating the use of AI for modeling risk, identifying products originating from high-risk locations, secondary inspection or mitigation. Reporting to stakeholders metrics of product confiscation as a biosecurity alert should be considered.
8. **Global disease monitoring to identify and inform international swine disease risks**. The global disease monitoring reports relies on both official and unofficial verified sources of information to improve understanding of disease status in countries around the world. Continued efforts in validation and verification of reporting for inclusion to maintain timely and accurate reporting will be prioritized. Projects to enhance reporting will be considered, such as developing an international VDL network to provide standardized reporting from other countries and AI tools for mining online data for signals of unusual syndromes in swine or specific disease indicators. Investigate how to overcome barriers to swine disease information in countries or regions where outbreaks are unreported or unreliable. Engage and foster relationships with international stakeholder groups to build and compile a global information network in high and low volume pork production countries around the world. Individuals with international disease experience will be asked for their input and analysis of unofficial disease reports from other countries, including swine veterinarians, technical service veterinarians, pork producers, veterinary diagnostic laboratorians, and genetics or pharmaceutical company representatives.
9. **Foster information sharing with government and allied industry through international animal health organizations**. Understanding the origin and progression of emerging, re-emerging, and novel infectious diseases is critically important to preventing epidemic and pandemic outbreaks. The World Organization for Animal Health (WOAH) and Food and Agriculture Organization of the United Nations (FAO) facilitate international health information sharing through building and maintaining databases of diseases in member countries. Interacting with these entities and other swine disease centered programs could provide lessons for the US pork industry about monitoring, analysis, preparedness, and response for emerging diseases.
10. **Transport biosecurity through targeting a regional or production phase approach**. Pork production in the US is highly efficient in part due to highly specialized and segregated production which requires high volume transportation of pigs between production phases, packing plants, or secondary markets. Transport biosecurity is essential to reduce the risk of

disease introduction and transmission through this route. However, implementation of biosecurity practices across all swine transport movements (cull sow, market hogs, dead haul, rendering, nursery, weaned pigs) remains a challenge. Investigation of a targeted regional and/or production phase approach to improve transport biosecurity could include modeling the relative regional risk attributable to live haul trailers, truck wash locations, packing plants, and feed trucks for disease introduction on swine farms, including interventions with greatest risk reduction. Defining the return on investment for strategic or targeted transport biosecurity within different phases of production, and an assessment of the barriers to adoption will be explored.

11. **Designing effective cleaning and disinfection tools and practices for swine transport trailers**. Managing and consistently implementing validated trailer sanitation practices between hauls is a significant challenge for swine producers. Novel technologies will be investigated to identify time-reducing, cost efficient and biologically effective sanitation processes for swine transport trailers. Considerations should include potential for mobile deployment, practices that do not require water, and practices with low labor requirements. Investigating novel trailer designs to increase ease of cleaning and disinfection while maintaining safety, as well as the potential to use robotics for wash procedures to offset time and labor requirements will be explored.
12. **Packing plant biocontainment to reduce risk of trailer contamination at the dock.** Pathogen transfer back to the farm from first points of concentration continues to challenge producer's opportunities for disease control and profit. A collaborative approach to identify and validate best practices for enhanced biocontainment at packing plants will be pursued, including sanitation measures at the dock and other mitigations at the interface between the harvest facility and transport vehicles. Endemic pathogens may provide surrogate indicators of efficacy. Assessing the biological effectiveness of on-site transport sanitation measures, such as wheel wash or exterior disinfection strategies, will be explored. Inclusivity of innovative, cost-effective solutions for packing plants and the identification of barriers to widescale adoption will be critical.
13. **Packing plant tools for effective cleaning and disinfection of lairage for business continuity.** Contamination of packing plant lairage from multiple sources presents a disease transmission risk to trailers, transport vehicles and personnel that return to farms and are in contact with live pigs. Should an emerging swine disease be detected in lairage at a packing plant, effective cleaning and disinfection tools are necessary to confirm pathogen elimination on site. A collaborative approach to identify and validate best practices for enhanced biosecurity focusing on reduction of disease risk at lairage will be pursued using endemic diseases as indicators of pathogen risk and control.
14. **Personnel movement as a risk of disease spread between farms**. Previous studies have identified targeted personnel biosecurity protocols that can reduce disease transmission risks. Contemporary investigations to re-assess whether preventive measures are associated with reduced disease outbreak incidence are needed. The development of a "network model" for assessment of personnel movement risks within sites and across systems, including supervisors, animal caretakers, veterinarians, service providers, vaccination and loadout crews, will be explored to quantify network connections and assess impact during health or a disease outbreak. Further development of potential novel mitigation strategies to reduce risk should be included.
15. **Enhancing biosecurity of mortality management practices to reduce disease transmission back to farm**. Mortality management continues to be a source of risk for pathogen spread within the farm and to other sites, through wildlife exposure, and for disease spread through transport vehicles. Investigation and validation of cost-effective facility designs and protocols for mortality removal and management are needed to create "best practices" for reducing risks of pathogen spread. Investigating risk factors as well as entry and contamination mechanisms for all types of mortality management will be pursued, including rendering, incineration, and composting, with a goal of identifying tools or technologies for enhancing biosecurity within each type.
16. **Novel ventilation technologies for cost-effective bioexclusion and biocontainment**. Air filtration for sow farms is intended to bioexclude pathogens. However, traditional technology is generally considered too costly for installation on all sow farms and for most nursery or

grow/finish sites. Biocontainment of an aerosolized pathogen during a disease outbreak or for disease elimination programs is critical to prevent further transmission. Novel, outside-the-box, cost-effective approaches for aerosol pathogen mitigation and/or air filtration will be explored as a tool for bioexclusion and biocontainment. Alternative approaches for retrofitting older facilities for improved aerosol pathogen bioexclusion and biocontainment should also be explored.

17. **Cull sow and secondary market biosecurity and disease surveillance**. Monitoring pathogen surveillance and spread in the cull sow and secondary market swine populations presents an industry challenge for disease prevention and control. Assessing the relative contribution of cull markets for disease risk, identification of novel technologies for reducing risk, and the development of monitoring and surveillance strategies for rapid disease detection will be investigated. Best practices for detecting emerging pathogens, reducing the risk of disease transmission, and maintaining biosecurity through these channels will be investigated.
18. **Multi-species livestock operations and backyard farms as a risk for emerging disease spillover**. Disease transmission risks to swine may increase in the presence of multiple species reared together or in close proximity. For example, studies have shown that H3N2 influenza A viruses can transmit between swine and turkeys raised in close proximity and cause clinical disease. Risk factors associated with the potential for emerging diseases on these types of operations will be investigated, including proximity to and type of other species, shared housing/feed/water/equipment, implementation of existing biosecurity practices, shared personnel, mortality management strategies, and modes of disease transmission. Development of mitigation strategies for risk reduction are needed to reduce the likelihood of disease emergence.
19. **Role of rendering in emerging disease transmission and response**. Rendering of non-edible pork products and mortalities is a part of efficient swine production. However, rendering can pose a risk for disease transmission through the collection and transport of products to be rendered. Identification of methods to reduce the risk of disease transmission through biosecure rendering pick-up and biocontainment of product pre-rendering can support rapid response during an emerging disease or FAD outbreak. Alternative methods of product handling and conveyance should be investigated to develop the best practices for biocontainment, including sealed containers or mobile rendering systems. In addition, the development of best practices for cleaning and disinfection of rendering equipment should be considered.

Responding to Emerging Disease

20. **Emergency disease preparedness and response planning in coordination with state, federal and industry stakeholders.** Working in collaboration with the swine industry organizations as well as other stakeholder groups (US SHIP, NPB, NPPC, AASV, Meat Institute, USDA, CDC, FSIS, DHS) to collectively plan emergency response for emerging, foreign or transboundary swine disease incursion. Assist in filling gaps of research and information necessary to prevent, prepare and respond to diseases which impact the US pork industry. Identify needs for protecting the US pork supply chain and US food security in emergencies due to swine or human disease, such as the COVID packing plant shutdown or the H5N1 outbreaks in domestic livestock species. Prioritize gaps in preparedness for responding to an emerging disease, including the allocation of resources, response times, and all events from the initial suspicion of farm infection to status confirmation. PEDV or PRRS may be considered as a proxy for ASF to assess the resource needs and aid in further development of tools to reduce the time necessary for disease response. Through coordinating with the other pork industry organizations, SHIC will continue to participate with research and other activities to inform effective national prevention, response, and recovery programs to minimize impact on the US industry.
21. **Monitoring risk of African swine fever recombinant genotype I/II virus to US prevention and preparedness**. The recently identified genotype I/II ASF recombinant strains signal a potential change in risk for US planning on disease prevention, response and control. Monitoring ASFV strain surveillance for changes in ASF genotypes over time and by region will be explored.

Consideration of how surveillance programs are adapted for identifying these and other recombinant strains is needed. Further assessment on the impact of international development and use of vaccines, as well as vaccine protection against ASF, will help determine risks to US swine.

22. **Rapid deployment of research funds for a newly emerging disease**. There is no predicting when or where the next emerging disease will appear. SHIC needs to be prepared with funds in place that can be quickly mobilized to support filling the immediate research gaps following an outbreak. This research will provide producers and their veterinarians with critical information that they will need to effectively respond to the disease outbreak.
23. **Investigating production and swine health impacts of porcine sapovirus as an emerging pathogen.** Additional information is needed to fully characterize PSaV and its potential causative role in clinical disease, prevalence across US herds, and contribution to production losses. Targeted analyses of suckling and postweaning cases of enteric disease may be useful to enhance knowledge of this emerging virus. Further development of new diagnostic tools is needed to assess the potential for increased detection frequency in swine across the US industry.
24. **Hemorrhagic tracheitis syndrome (HTS) as a potential emerging disease in US swine.** Through routine diagnostic investigations, veterinary diagnostic laboratories have indicated a potential increase in hemorrhagic tracheitis syndrome cases which are negative for IAV. Understanding the clinical relevance, prevalence, production phase affected, epidemiology, and pathogens causing HTS would assist the US industry in further understanding this syndrome as a potential emerging production disease. Pathogenicity of porcine HTS associated with swine disease should be further investigated, including potential contributors to the syndrome and clinical impact on the industry. Correlating diagnosis with negative production impacts can help assess economic losses associated with the syndrome and help prioritize management actions.
25. **Utilizing standardized outbreak investigations to identify high risk events for pathogen entry**. Biosecurity hazards identified through standardized outbreak investigations help farms mitigate risk for introduction of emerging diseases. The web-based entry of outbreak investigation data provides the opportunity for standardized data capture online and enables utilization of data for machine learning and shared conclusions. Analysis of the generated and historical data from outbreak investigations will be pursued to identify the frequency of biosecurity hazards across the US industry over time. Frequency and mechanism by which routine automated outputs can be provided back to the broader industry will be determined. Incentives, barriers and adaptation of the standardized outbreak investigation process will be explored to enhance adoption and use by veterinarians and producers. Further utility of outbreak investigation data will be considered, such as methods to capture information from the Word-based form, use for new or novel disease outbreaks, database integration with programs such as AgView to leverage outbreak data with traceability, and leveraging biosecurity hazard data with laboratory diagnostic and production data.
26. **Identification of early disease outbreak warning signals from industry data**. Early warnings of an emerging disease provide the opportunity for early diagnostic confirmation leading to more effective containment and recovery. Analysis of currently accessible farm data sources, such as cough counters and water meter measurements, should be assessed for feasibility of use and effective disease detection across production phases. Development and validation of real-time, labor-saving early disease warning technologies will be explored to improve sensitivity of detection and disease outbreak prediction capabilities. Investigate how existing and novel technologies, such as the use of AI or Blue-tooth compatible systems, could be automated and developed for continuous outputs to reduce time to detection and improve accuracy of alerts.

Surveillance and Discovery of Emerging Disease

27. **Wastewater sampling for emerging disease surveillance**. Municipal wastewater sampling was extensively utilized for COVID19 detection and more recently for H5N1 surveillance. While not currently employed as a surveillance tool in swine, this novel environmental sample type could provide opportunities for broad diagnostic surveillance in an easy-to-collect sample that represents

a large population of pigs. Investigating the utility of this sample type for emerging disease detection will be conducted and compared to existing sample types for diagnostic test sensitivity and specificity. Sample types such as lagoon effluent or pipe sampling of deep pits will be explored. This may include utilizing an endemic disease to understand "fit for purpose" targeting pathogen detection in wastewater and development of guidance for surveillance use on-farm.

28. **Tongue tip fluids as a diagnostic sample to target risk-based mortality populations.** Tongue tip fluids enable mortalities to be screened at a population level in an easy-to-collect sample type. Continued exploration around potential use cases for tongue tip fluids when compared to current practices across all phases of production for emerging swine diseases, such as an objective comparison of tonsil scrapings and tongue tips with other sample types. Best practices will be developed (collection, handling, processing, submission), sensitivity/specificity for individual pathogen surveillance defined, as well as field and laboratory techniques identified for enhanced capability of virus isolation from tongue tip fluids.
29. **Genome-based diagnostic technologies for emerging disease detection and forensic analysis**. Rapid and accurate diagnosis of emerging swine pathogens is critical for response and effective mitigation strategies. Investigation of known and novel genome-based technologies (multi-plex PCRs, NGS, pan-diagnostic assays, RNA scope, TELSVirus) for emerging disease detection, lesion identification, co-infection diagnosis, and cost-effective utilization for broad-based disease surveillance should be explored. Investigation could include the use of NGS for identifying known versus unknown agents through targeted pathogen primer inclusion. Streamlining bioinformatic analysis for interpretation and application of results should be included. Diagnostic methodology to assess test availability, accuracy of detection, and application to multiple sample types.
30. **Diagnostic fee support to assist in early detection of emerging disease**. There continues to be incidents of increased morbidity/mortality where 1) an etiology is not identified, and the presumed etiology is negative on routine testing or 2) there is a strong supposition that the identified pathogen is not the primary causative agent of the outbreak. In these cases, it is beneficial to pursue a definitive diagnosis and support further diagnostic testing. Support for these follow-up diagnostic cases is offered after producers have funded the initial diagnostic testing. Diagnostic fee support helps to ensure that an emerging disease is identified quickly and accurately for rapid response and protection of the industry. Enhancing utility and overcoming barriers to broader use of this support program will be explored, such as expanding submissions to veterinarians and diagnosticians, increasing ease of submission, or incentivizing participation for adoption of compatible cases.
31. **Population and environmental surveillance technologies to improve and automate diagnostic testing**. Labor to perform sample collection for routine disease surveillance on individual pigs remains a consistent challenge across all phases of production. Sample types that provide opportunities for broad population-based surveillance using easy-to-collect methods are beneficial for the swine industry. Investigation into the expanded utility of currently collected sample types (oral fluids, processing fluids) will be explored for emerging disease detection. Novel methods and sample types, including automation and environmental samples, that reduce the labor necessary to conduct sampling should be investigated. Investigation into the use of alternative sample types, development of surveillance strategies to maximize disease detection and require reduced labor input should be considered. Cost-effective models for environmental sampling, such as spatially balanced surveillance, will be explored for potential use.
32. **Increasing utility of VDL submissions as an effective surveillance stream for detection of emerging disease.** Submissions to VDLs can be effective surveillance streams for detection of foreign or emerging diseases. Improvements in VDL submissions could assist in the coordination of a national swine health surveillance system to prepare, detect, and rapidly respond to emerging diseases. Working in cooperation with the pork industry organizations and VDLs, barriers will be investigated for submitting routine and necropsy sample types that may be case-compatible with foreign animal diseases or that could help identify domestic, endemic diseases that may be

emerging. Further understanding of potential incentives for VDL submissions to include accurate detailed information to accompany samples, such as clinical signs and premise identification numbers, would also provide value. This would facilitate a quick and effective US response.

33. **Investigate the clinical relevance and epidemiology of newly identified agents in VDL submissions associated with swine disease.** The VDLs may find novel bacteria and viruses that are associated with clinical signs of disease in swine. Having support available to increase understanding of the novel agent's epidemiology and pathogenicity is important to further clarify their role in clinical disease. Further, analysis of the potential production and economic impact to US pork producers will help prioritize actions.

Swine Disease Matrix

34. **Updating bacterial and viral swine disease matrices to prioritize swine pathogens**. Review and revise the swine virus and bacterial disease matrices. The investigation of a real-time updating scheme to accommodate changing pathogen distribution, risks and impact will be explored. A routine schedule will be maintained to evaluate and incorporate potential revision needs based on the changing global or US disease status. Diseases are assessed for scoring on the matrices based on risks to the US swine industry and production impact.
35. **Using the swine bacterial and viral disease matrices as guidelines for research to enhance swine disease diagnostic capabilities**. As new information on emerging bacterial or viral pathogens are discovered through SHIC's surveillance or other routes, there may be needs to support improved diagnostic capabilities. Needs for diagnostic sensitivity and specificity validation for prioritized viruses or bacteria in the swine disease matrices using clinical samples and tissues will be considered.