Request For Research Proposals
SHIC 2024 Plan of Work Research Program
January 21, 2024

The mission of the Swine Health Information Center, launched in 2015 with Pork Checkoff funding, is to protect and enhance the health of the US swine herd by minimizing the impact of emerging disease threats through preparedness, coordinated communications, global disease monitoring, analysis of swine health data, and targeted research investments. Activities of the Swine Health Information Center are guided by its annual Plan of Work detailing projects and programs to address its five strategic priorities, including 1) improving swine health information, 2) monitoring and mitigating risks to swine health, 3) responding to emerging disease, 4) surveillance and discovery of emerging disease, and 5) swine disease matrices. The Plan of Work is developed through stakeholder feedback, approved by the SHIC Board of Directors, and guides SHIC's activities while remaining nimble and responsive to industry needs.

Research provides critical information and resources to help pork producers as they face emerging disease challenges in their swine herds. Research priorities and topics identified in the Plan of Work help SHIC fulfill its mission to generate new knowledge for preventing, preparing, and responding to emerging swine disease threats. Through the formal request described in this document, SHIC is inviting proposal submissions to specifically address 11 of the 36 research priorities and topics published in the 2024 Plan of Work across three of SHIC's five strategic areas. Proposals will undergo a competitive review process for value to the pork industry by a SHIC working group who will provide funding recommendations.

The specific research priorities included in this RFP focus on monitoring and mitigating risks to swine health, responding to emerging disease, and surveillance and discovery of emerging disease. The intent of the RFP is to encourage researchers to develop and submit proposals that specifically address these identified priorities, broaden awareness of funding opportunities to advance SHIC's 2024 Plan of Work, and to expand the scientific network of researchers and institutions conducting critical research on emerging swine diseases. Funding timely research is an essential component of SHIC providing project outcomes that drive action for emerging disease prevention, preparedness, and mitigation.

Proposals are expected to address the SHIC 2024 Plan of Work priorities outlined below to improve US preparedness, prevent emerging disease entry, and enable rapid mitigation of pork production impacts. **Proposals should clearly state the targeted priority that will be addressed through the project.** Collaborative projects that include the pork industry, allied industry, academic institutions, and/or public/private partnerships are highly encouraged. Projects that demonstrate the most urgent and timeliness of completion, provide the greatest value to pork producers, and show efficient use of funds will be prioritized for funding. Projects are requested to be completed within a 12-month period with justification being required if the project duration extends beyond 12 months.

Funding available for the SHIC 2024 Plan of Work Research Program priorities outlined below is $1.1M. **Individual awards are anticipated to be between $50K to $150K.** Budgets exceeding this range require sufficient justification. Projects should strive to be unique, have a high impact, and industry-wide benefit.

The deadline for proposal submission is 5:00 PM CST on March 1, 2024. The proposal template and instructions for completion and submission can be found at www.swinehealth.org/call-for-research/. For questions, please contact Dr. Megan Niederwerder at mniederwerder@swinehealth.org or (785)452-8270 or Dr. Lisa Becton at lbecton@swinehealth.org or (515)724-9491.

Research Priorities as Included in SHIC's 2024 Plan of Work:

Monitor and Mitigate Risks to Swine Health

- **CBP and 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. SHIC will work with CBP and research partners to identify 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), risk of pests (such as rodents and insects), transport route and timeline, and potential exposures enroute. Investigations may include modeling risk, product confiscation and testing for pathogens, and identifying high risk products for inspection or other mitigations. Continued communication with CBP on high-risk travelers who lacked secondary screening will help inform risk and mitigation of ASFV introduction through travel.
- **Cull sow and secondary market biosecurity and disease surveillance.** Monitoring disease surveillance and spread in the cull sow and secondary market swine populations is an industry challenge. Best practices for detecting emerging pathogens, reducing the risk of disease transmission, and maintaining biosecurity through these channels will be investigated.
- **Engineering biosecurity controls through site construction design or strategic renovation.** Biosecurity which utilizes engineering controls as opposed to administrative controls removes the human error component to biosecurity compliance. There is a need for resources on evidence-based design for new farm site construction and strategic renovation of existing facilities that involves builders as part of the biosecurity team. Buildings could include swine barns, feedmills, packing plants, and truck washes. Building a library of strategic design considerations to increase biosecurity engineering controls is needed, including practical low-cost retrofitting of older facilities. For example, the ease of handwashing during flow of personnel entry and exit, a checklist of necessary deign components for staged loading or loading ramps, a process for routine maintenance of biosecurity hazards that develop as facilities age, and building finisher sites with a biocontainment focus for odor and virus emissions.
- **Defining spillover risks of emerging diseases from wean-to-market pigs to sow herds.** Data from the domestic swine disease monitoring reports revealed that 2 months prior to an increase in PRRSV prevalence in sow herds, there is a preceding increase in PRRSV prevalence in wean-to-market pigs. This data indicates a spillover risk from post-weaning pigs to breeding herds. Further epidemiological links and biosecurity hazards will be identified for routes of pathogen spread between these production phases.

Respond to Emerging Disease

- **Improving diagnostic tools, understanding of pathogenesis, and interpretation of test results for porcine circovirus types 2, 3 and 4.** PCV2 diagnostic testing has significantly increased through processing fluids and additional information is needed to interpret test results within the context of the clinical field setting. Investigations will evaluate rationale for increased PCV2 testing, interpreting high levels of PCV2 detection in the absence of histology, role of serologic testing, as well as vaccine compliance and association with protection to assist in interpretation. Questions have been raised around what PCR Ct value for PCV2 in different sample types and tissues can be a defined cut-off for vaccine failure. Further insight into a standardized PCV3 case definition for sows, pathogenicity in the presence of co-factors, use of processing fluids and other sample types for PCV3 surveillance, and the role of PCV3 co-infections with PRRSV and PCV2 would benefit the industry. Additionally, identification of novel circoviruses such as PCV4 may require investigation and confirmation that current circovirus diagnostics would detect a potential incursion.

- **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 farm and regional data from the MSHMP for early disease warning signals have been investigated. Further development and validation of early disease warning technologies will be explored to improve sensitivity of detection and disease outbreak prediction capabilities.
- **Diagnostic assay development for confirming efficacy of cleaning and disinfection protocols.** Protocols designed for cleaning and disinfection are designed to prevent pathogen transmission through contact with contaminated environmental surfaces, such as those on pens, trailers, ramps and other service equipment. Assessing the effectiveness of these protocols would be beneficial through diagnostic tests that have several characteristics, such as being cost-effective, easy to use with minimal required training, pen-side, and having the ability to distinguish between pathogen genome and infectivity. Validating C/D protocol efficacy through the development of these diagnostic assays could be important for containing an emerging production disease and in preparation for an effective FAD response.

Surveillance and Discovery of Emerging Disease

- **Population based sample types (oral fluids, processing fluids) for emerging disease testing.** These sample types provide opportunities for broad diagnostic surveillance in an easy-to-collect sample type representing a large population of pigs in the herd. Oral fluids are the predominant sample type for endemic disease monitoring in the US swine industry. Processing fluids are frequently collected on sow farms to survey litters and assess gestational transmission. Investigation into the expanded utility of these sample types for detection of emerging disease introduction will be conducted and compared to current practices. This may include modeling percent and frequency of US herd and premises represented in surveillance and determining the diagnostic sensitivity/specificity in experimental settings or in countries endemic for transboundary swine diseases not currently present in the US. An example could be investigating the possible utility of processing fluids for JEV surveillance on sow farms.
- **Pan-diagnostic assay development for co-infections or identifying unknown emerging diseases**. Genome-based technologies (multiplex PCRs, next-generation sequencing) for emerging disease detection and co-infections continue to be advanced to reduce costs per test and increase ease of bioinformatics analysis. Investigations into potential use and validation of genome-based assay technologies and analysis algorithms for rapid and early detection of new emerging swine pathogens, as well as simultaneous detection of multiple pathogens, will be pursued for cost-effective broad-based surveillance tools.
- **Environmental sample types for emerging disease surveillance and efficacy of cleaning and disinfection protocols.** Environmental dust has been determined to be a sensitive sample type representing an airspace such as a pig barn or feed bin. Further, testing insects such as flies has also been reported as a sample type representative of local environmental contamination. Further validation of environmental sample types are needed, such as validating standardized collection protocols, determining sensitivity and specificity for endemic pathogen surveillance, identifying techniques to improve virus isolation capabilities, and use for confirming efficacy of C/D on environmental surfaces. Cost-effective models for environmental sampling, such as spatially balanced surveillance, will be explored for potential use.
- **Investigate the clinical relevance and epidemiology of newly identified agents in VDL submissions associated with swine disease.** The veterinary diagnostic laboratories 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.