

## OUR LATEST INFORMATION ON PROTECTION OF US SWINE HERD HEALTH

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### SHIC Receives Second Round of Research Proposals for Wean-to-Harvest Biosecurity Program

The Swine Health Information Center received research proposals in response to a now closed call for a second round of submissions related to its Wean-to-Harvest Biosecurity Program. The program's objective is to investigate cost-effective and innovative technologies, protocols, or ideas to enhance biosecurity during the wean-to-harvest phases of pig production. Researchable priorities of this call included personnel biocontainment and bioexclusion, mortality management, efficiencies and alternatives to truck washing, and packing plant biocontainment. Funding for this round totals \$1.3 million and is provided by SHIC, the Foundation for Food & Agriculture Research, and Pork Checkoff.

The competing proposals will be evaluated for their return on investment to pork producers and overall value to the swine industry via a review conducted by an industry-wide task force convening soon. SHIC anticipates proposals will be selected for funding by the end of June 2023 with commencement of research projects during the summer of 2023. An initial round of 10 research proposals were funded in February 2023 with projects now underway.

SHIC, FFAR, a non-profit organization established in the 2014 Farm Bill to build public-private partnerships that fund bold research addressing big food and agriculture challenges, and Pork Checkoff anticipate

release of all research project results as they are made available.

Foundation for Food & Agriculture Research

The Foundation for Food & Agriculture Research (FFAR) builds public-private partnerships to fund bold research addressing big food and agriculture challenges. FFAR was established in the 2014 Farm Bill to increase public agriculture research investments, fill knowledge gaps and complement US Department of Agriculture's research agenda. FFAR's model matches federal funding from Congress with private funding, delivering a powerful return on taxpayer investment. Through collaboration and partnerships, FFAR advances actionable science benefiting farmers, consumers and the environment. Connect: @FoundationFAR

### SHIC Diagnostic Fee Support Provides Answers for Nebraska Practitioner

From early 2017 to early 2019, Dr. Tom Petznick knew his client's 4500-head farrow-to-wean swine herd had a new disease not previously seen by him or his colleagues. "We did our homework, did diagnostic testing, and found out we had something different here," he explained. When diagnostics ruled out transboundary and emerging diseases in the herd, staff at the Iowa State University Veterinary Diagnostic Lab encouraged additional testing and

suggested contacting the Swine Health Information Center to access the SHIC Diagnostic Fee Support program. With the additional funding and continued scrutiny, porcine sapovirus was discovered.

Dr. Petznick, practitioner with ArkCare in Omaha, Nebraska, knew about the Swine Health Information Center's Diagnostic Fee Support Program from reading about it in SHIC's newsletter and hearing about it on swine industry committees where it has been promoted. He was working with Dr. Phil Gauger and Dr. Eric Burrough at ISU's Veterinary Diagnostic Lab who were advising further analysis.

Pursuing Diagnostic Fee Support from SHIC went well for Dr. Petznick. "If you have an underlying question that needs answered and are determining who pays for additional diagnostic testing, do your homework and make a compelling case and present it," he explained. "That's what SHIC's Diagnostic Fee Support is set up for. It was seamless on my end."

Dr. Petznick encourages producers and practitioners to keep this program in the back of their minds. "When something doesn't smell right, go with that gut feeling and do more investigation," he said. "This is what SHIC is about – helping us with both prevention and mitigation of new bugs."

Dr. Gauger shares Dr. Petznick's view of SHIC's Diagnostic Fee Support program and its value when looking for new and emerging diseases. "When veterinarians have looked at a clinical presentation of a respiratory or enteric disease and completed a workup as they would typically do up front so that it rules out the normal diseases and still have no answers to what is affecting the animals, then this program becomes a great go-to to help the veterinarian and producer find answers," he commented.

While diagnostic labs have improved the sensitivity of detection techniques, allowing identification of pathogens at low levels in samples and increased techniques such as next generation sequencing, which helps identify co-infections or multiple pathogens, diagnostic questions can remain. "I hope producers, veterinarians, and diagnostic labs remember this program as they are looking for the new and emerging diseases," Dr. Gauger remarked.

From his perspective at the ISU VDL, Dr. Gauger sees SHIC's Diagnostic Fee Support program as easy to use. After routine diagnostics from a clinical presentation are completed and the results for expected diseases are negative, the next step is filling out SHIC's Diagnostic Fee Support submission form that includes a plan for follow-up diagnostic testing. The submitting practitioner shares all the case details, including current results from the diagnostic lab involved, and additional samples are submitted after approval through the SHIC Diagnostic Fee Support program. This allows a more extensive and thorough diagnostic work-up of the case that will hopefully lead to a diagnosis.

A great example is the sapovirus diagnosis that was ultimately achieved through this program with Dr. Petznick. Dr. Gauger emphasizes the importance for the practitioner to work with the diagnostic lab to apply for the SHIC Diagnostic Fee Support and to develop a diagnostic plan so the correct samples are submitted. As a result, the practitioner and lab can build the story leading to a valid diagnostic result for the producer.

"My message to producers is to learn about the support available," Dr. Gauger recommended. "If you have a case that needs additional support, don't be afraid to ask because diagnostics can be expensive; be sure you do your due diligence first." He also points out that the program has yielded publications and papers on unusual pathogens to inform the greater swine industry.

"There is so much value in the veterinarian working with the diagnostician at the lab," Dr. Gauger concluded. "The practitioner often has more knowledge than they realize and sharing that with the diagnostician can really help the case. And the diagnostician can really help the practitioner and producer, through additional funding with the SHIC Diagnostic Fee Support Program, with frustrating cases that have remained undiagnosed."

## **SHIC-Funded JEV Risk Assessment Update in Progress**

Following the outbreak of Japanese encephalitis virus in Australia in early 2022, the Swine Health Information Center funded a study to reassess the risk of JEV introduction and establishment in the US.

Dr. Natalia Cernicchiaro, Kansas State University, is leading the efforts to build on a 2018 qualitative risk assessment to estimate the risk of emergence of JEV into the US. The updated risk assessment will add information regarding transmission, establishment, and spread by incorporating the latest scientific information, and elements contributing to the risk, to improve upon the previous work.

As part of these efforts to update the risk assessment, three objectives are in progress, including 1) updating the systematic review of the literature on JEV (Oliveira et al., 2018) to inform risk assessment model parameters, 2) reassessing the risk assessment models to estimate the risk of JEV emergence into the US by incorporating the latest scientific information, and 3) soliciting expert opinion via questionnaire to members of an advisory board on JEV and swine production.

To support the updated risk assessment and provide guidance on model parameters, an advisory group has been formed consisting of US and Australian swine producers, veterinarians, researchers, and other stakeholders with knowledge on commercial swine production and JEV.

For the systematic literature review, a total of 282 abstracts (from 2016 to 2022) were retrieved from the initial search, with 99 abstracts being deemed relevant. Of the relevant abstracts, 37 were excluded due to no host and vector competence data or not being related to JEV at the level of the full text review. Data was extracted from a total of 62 relevant articles of which 20 (32.3%) were experimental, 41 (66.1%) observational and one (1.6%) displaying data from both experimental and observational study designs. With regards to vector and host competence, 22 (35.5%) articles reported on vector competence, 28 (45.2%) articles reported on host competence, and 12 (19.3%) articles reported on both vector and host competence. Results for vector competence across all observational studies show the proportion of JEV infection across all 43-mosquito species ranges from 0 to 63.6%. *Culex* species were the most common species showing competence to JEV, with an 5.9% positive proportion of samples tested (337/5,744). Among the *Culex* species, *Culex tritaeniorhynchus* (319/3577, 8.9%) was identified as the most common species with positive samples. The host species in which mosquitoes mostly fed consisted of cattle,

pigs (mostly wild boars), and birds (mostly chickens). With regards to the host competence for JEV infection, various host species were identified to exhibit JEV infection and/or antibodies across all observational studies. This included birds (171/1,462, 11.7%), dogs (65/188, 34.6%), feral horses (177/242, 73.1%), monkeys (62/167, 37.1%), rats (44/96, 45.8%) and pigs (3,349/11,335, 29.5%), which include both feral pigs (101/183, 55.2%) and domestic pigs (3,248/11,152, 29.1%). Overall, the proportion of JEV infected hosts varied between 0 and 96.6%.

In pigs, the duration of viremia and duration of infectivity in host species across all experimental studies varied between 1 to 14 days and 4 to 10 days, respectively. New data is being gathered on other potential competent hosts, which may have a role on JEV spillover into amplifying hosts and/or mosquito vectors. All information on vector and host competence for JEV transmission is currently being used to inform parameters for the risk assessment models and insight for development of JEV models for transmission and spread.

In meeting with the advisory group, researchers redefined some of the original study questions and elicited expert opinion on certain parameters pertaining to JEV introduction, transmission, and establishment. Based on the advisory group recommendation, Alaska and Hawaii are being incorporated as additional regions considered in the risk assessment models.

Advisory group members have also completed a questionnaire designed by Dr. Cernicchiaro and her team to facilitate successful achievement of the projects' objectives. The questionnaire was divided into three sections, including 1) assessing the different JEV introduction pathways to the US, 2) assessing the different paths or mechanisms of JEV transmission after a potential incursion while considering regional differences, and 3) assessing the prioritization of factors for evaluating the role of pigs (domestic and feral) in the transmission of JEV in US. For each of the factors evaluated, advisory group members were asked to assess the level of risk (evaluated in risk categories from very low to very high) and the level of uncertainty about the risk scoring (low to high).

As the reassessment proceeds, updates will be provided for preparedness and prevention efforts for the health of the US swine herd regarding JEV.

## **National Bio and Agro-Defense Facility Tour Informs Pork Industry Representatives**

Presentations by the National Bio and Agro-Defense Facility directors and research leaders, in addition to touring the facility, provided important insight into potential collaboration opportunities to pork industry representatives who share a mission to protect US swine herd health. “Seeing the facility firsthand provided a valuable opportunity to learn about future capabilities, capacity, and priorities relating to US swine health,” remarked SHIC Associate Director Dr. Megan Niederwerder. The group also visited the Biosecurity Research Institute at Kansas State University and heard from leadership there before receiving a tour.

In early April 2023, NBAF provided the facility and research update to staff leaders from the American Association of Swine Veterinarians, National Pork Board, National Pork Producers Council, and the Swine Health Information Center. USDA will own and operate the Manhattan, Kansas, state-of-the-art NBAF facility they term a national asset, intended to help protect the nation’s agriculture industry, farmers, and citizens against the threat and potential impact of serious animal diseases.

“With the mission of NBAF to protect the US against animal diseases that threaten our food supply, agricultural economy and public health, the pork industry has significant interests in the science planned for this world-class facility,” commented Dr. Lisa Becton, director of swine health, National Pork Board.

Per the USDA website, NBAF will replace the Plum Island Animal Disease Center, a biosafety level-3 facility that is more than 68 years old. When complete, USDA Agricultural Research Service and Animal and Plant Health Inspection Service will transfer their research and diagnostic missions to NBAF and will jointly operate the facility. In December 2022, contractor construction and commissioning were

completed. The USDA team at NBAF currently has access to the facility and started a phase of transition from Plum Island Animal Disease Center to the new site.

Comprehensive research, development of vaccines and antivirals, as well as enhanced diagnostic and training capabilities will all occur at NBAF to protect the nation from foreign or transboundary animal diseases. Emerging (new or increasing) and zoonotic (able to infect animals and humans) diseases will be a focus.

The NBAF Frequently Asked Questions web page includes information from the World Health Organization which states more than 70% of new and emerging infectious diseases in humans are zoonotic. The FAQs also say, USDA will expand its scientific work at NBAF and be the first in the US to provide maximum biocontainment (biosafety level-4) laboratories capable of housing veterinary diagnostics, countermeasures and vaccines. Through these initiatives, USDA will be able to expand its support of global health and food security.

Presentations by leadership at the Biosecurity Research Institute detailed its missions and objectives. The BRI conducts comprehensive infectious disease research to address threats to plant, animal, and human health, including food-borne pathogens. The ability to perform multidisciplinary research on multiple pathogens and host species within a single facility stands out as a unique feature of the BRI. In addition to highly trained staff and research support, the BRI provides training for the next generation of scientists who will study recurring and emerging infectious diseases. The facility’s high biosecurity lab spaces offer a diverse range of research and educational opportunities.

# SWINE DISEASE MONITORING REPORTS

**As the world deals with the COVID-19 pandemic, SHIC continues to focus efforts on prevention, preparedness, and response to novel and emerging swine disease for the benefit of US swine health.**

## DOMESTIC

This month's Domestic Swine Disease Monitoring Report brings information about the increased detection of PRRSV in the states of Ohio and Kansas. Regarding PRRSV ORF sequence, Missouri continues to have high PRRSV Lineage 1C variant detections (313 sequences assigned as L1C variant in 2023). For enteric coronaviruses, PDCoV positivity continues above the expected for the second consecutive month, with 60% of the positive cases coming from the wean-to-market category while PEDV had an increased percentage of positive in South Dakota, Missouri, Nebraska, and North Carolina. Regarding PCV2, the percentage of positive submissions from adult/sow farms is still high at 50% (309 of 618). *Mycoplasma hyopneumoniae* had a moderate increase in the percentage of positive submissions from the wean-to-market category. Lastly, in the confirmed tissue diagnosis, there were spikes for an increased number of digestive cases from the end of March through the first week of April. In the podcast, the SDRS hosts talk with Dr. Amy Maschhoff about *Mycoplasma hyopneumoniae*, describing tips and pitfalls for eliminating this pathogen from a large production system.

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## GLOBAL

In the May Global Swine Disease Monitoring Report, read about the first African swine fever outbreak in a commercial farm in Greece since a case was confirmed on a smallholder's premises in 2020. The UK and Hungary are set to lift regionalization restrictions related to ASF. France joins the ASF vaccine race as their ANSES's laboratory reports promising results of an ASF vaccine candidate. A *Streptococcus suis* outbreak in Bali is raising concern with at least 38 human cases of meningitis caused by it identified on the island. In Brazil, the government has banned the use of FMD vaccine in seven states. The Australian government confiscated almost 40 tons of high-risk foods, including pork, beef, and other items from overseas, from a Sydney warehouse. Risk associated with movement of pork products within The Philippines includes discovery of \$23,250 worth of pork and related products from Cebu and Panay islands at ports in northern Negros. And Singapore has suspended live pig imports from Indonesia following the detection of ASF in a shipment of live pigs.

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