Swine Health Information Center
2025 Annual Progress Report
To the National Pork Board

January 1, 2025 – December 31, 2025

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Executive Summary of SHIC and 2025 Activities

Mission and Scope of Work

The mission of the Swine Health Information Center (SHIC), 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. SHIC began operation as a 501(c)(3) corporation on July 4, 2015.

When SHIC was formed in 2015 by a grant of Checkoff funds from the National Pork Board (NPB), it was with the understanding that it was a five-year project. The proposal language surrounding the Center's formation stated, "Funding of the Center past its five-year life will depend on it being able to demonstrate a sufficient return on the investment to justify keeping it running." In 2021, the NPB Board of Directors voted to provide $15M to continue to fund SHIC's work through the end of 2027. In 2025, SHIC celebrated a decade of existence working to mitigate emerging swine disease threats on behalf of US pork producers.

As outlined in the NPB grant, the scope of work to be performed by SHIC includes global swine health and issues identification, targeted swine disease research, and swine health data analysis and monitoring for trends. To fulfill SHIC's mission and scope of work, the annual plan of work and progress report are developed around five strategic priorities:

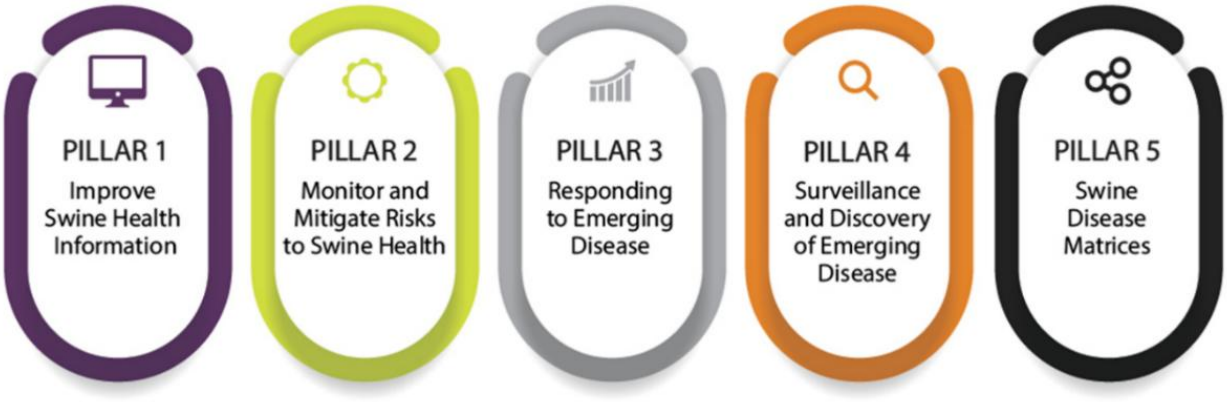


Figure 1. Strategic priorities of SHIC.

Board of Directors, Working Groups and Staff

SHIC is governed by a Board of Directors consisting of nine members, of which six directors are appointed, and three directors are elected. The NPB, National Pork Producers Council (NPPC) and the American Association of Swine Veterinarians (AASV) have each appointed two members to the SHIC Board of Directors. Three directors are elected by the appointed directors and must be active pork producers or representatives of producing companies that have an interest in the mission of SHIC. The Board approved a 2025 operating budget, a 2025 Plan of Work and a plan for FDIC insured investments, that is modeled after that of the NPB.

Two directors initiated their terms on the SHIC Board of Directors during the summer of 2025, including Alayne Johnson (NPB appointed) and Sarah Pillen (elected) while two directors concluded their terms, including founding board member Mark Schwartz (elected) and Gene Noem (NPB appointed). In June 2025, the new SHIC Board of Directors held an election of officers with Dr. Paul Ruen, EHF Consulting, chosen to lead the SHIC Board as its chair, Joseph Dykhuis, Dykhuis Farms, elected to be the vice chair for the organization, and Kent Bang, Bang Ag Consulting, selected to again serve as secretary/treasurer.

Current members of the SHIC Board of Directors:

A. NPB Appointed
    1. Dr. Seth Krantz, Veterinarian, Tosh Pork, Tennessee
    2. Alayne Johnson, Pork Producer, Shady Grove Farms, Indiana
B. NPPC Appointed
    3. Joseph Dykhuis, Pork Producer, President of Dykhuis Farms, Inc., Michigan
    4. Dr. Jeremy Pittman, Senior Director, US Vet Services, Smithfield, Virginia
C. AASV Appointed
    5. Dr. Jay Miller, President and CEO, The Maschhoffs, LLC, Illinois
    6. Dr. Paul Ruen, EHF Consulting and AASV past-president, Minnesota
D. Elected Directors
    7. Kent Bang, Bang Ag Consulting/Compeer Financial – retired, Nebraska
    8. Dr. Pete Thomas, Director of Health Services, Iowa Select Farms, Iowa
    9. Sarah Pillen, Co-CEO, Pillen Family Farms and DNA Genetics, Nebraska

Two Working Groups are active in providing program oversight and assisting in decision-making to fulfill the SHIC mission, including the Monitoring and Analysis Working Group and the Preparedness and Response Working Group. Working Groups are comprised of practitioners, allied industry partners, pork producers, academic researchers, diagnosticians, federal and state animal health officials, packer/processors, and industry association veterinarians from AASV, NPPC and NPB. Each Working Group meets regularly through virtual calls to fulfill their respective objectives by reviewing and selecting research projects and engaging in SHIC programming activities to carry out the Plan of Work.

The Monitoring and Analysis Working Group is responsible for assessing domestic and foreign or transboundary production disease risk using information from a variety of sources. The outcome of this assessment is the on-going prioritization of the Swine Viral Disease Matrix and the Swine Bacterial Disease Matrix. It is also responsible for monitoring and advising the use of diagnostic technologies to improve the health of the nation's swine herd, development and oversight of on-going projects to monitor diseases affecting swine health, and analysis of swine health data to support on-farm, prospective producer decision making.

The Preparedness and Response Working Group is responsible for oversight of research to assist in US prevention, preparedness, mitigation and response to priority swine diseases outlined in the Swine Viral and Bacterial Disease Matrices. It helps advise on research investment needs and SHIC's role in the response to an emerging swine disease. That includes identifying the appropriate SHIC response to help provide the information and analysis necessary to support the proportional pork producer and pork industry response to these emerging swine diseases.

Three Task Forces convened for meetings in 2025 with specific objectives to review, prioritize and recommend proposals for funding in the Wean-to-Harvest Biosecurity Research Program, the 2025 Plan of Work Research Program, and the H5N1 Risk to Swine Research Program. Task Forces are comprised of SHIC Working Group Members, SHIC Board of Directors Members, funding partner representatives from FFAR and NPB, and other subject matter experts.

In 2025, Megan Niederwerder, DVM, PhD continued her role as SHIC Executive Director with Lisa Becton, DVM, MS, DACVPM continuing to serve as SHIC Associate Director. Rhea Schirm was selected by the SHIC Board of Directors to fill the position of SHIC Grant and Contract Administrator effective April 22, 2025, after previously serving as consultant to AASV.

Plan of Work and Operating Budget Projection

The 2025 Plan of Work process was initiated in Fall 2024 to identify research priorities and topic areas that align with the SHIC mission. Milestones of the process include inviting feedback via online survey across the five strategic priorities (**Figure 1**), conducting a series of stakeholder listening sessions to request input on topic areas, soliciting Working Group prioritization of project ideas, estimating a budget projection for each proposed topic, and SHIC Board of Director review, revision and approval of the 2025 Plan of Work. Publication of the 2025 Plan of Work was completed in January 2025 for stakeholder awareness of upcoming activities. Although the 2025 Plan of Work guides SHIC's activities throughout the year, SHIC adapted to continuous input, striving to be nimble and responsive to emerging priorities as they arose.

The SHIC Board of Directors approved a projected budget for 2025 and regularly reviewed and modified the budget throughout the year to best meet the SHIC mission. The approved projected budget addressing the 2025 Plan of Work was $4,064,400. An evaluation of funds needed for the operating budget was conducted monthly to guide investments in securities with Wells Fargo and modeled after NPB's investment plan. The investments are a series of FDIC insured Certificates of Deposit, laddered to provide on-going operating funds as the certificates reach maturity.

Targeted Research Investments

Across all SHIC research program areas in 2025, there were 116 proposals submitted to SHIC that underwent a competitive review process with a total request for funding of $17,673,781. Overall in 2025, 32 research projects were awarded funding for a total of $4,434,466 contracted (**Figure 2A**). Since SHIC's inception in 2015, this is the greatest number of proposals received by SHIC and the highest dollar amount contracted by SHIC for research projects in a single year.

From 2022 – 2025, SHIC was awarded $5,041,094 in matching funds and external grants, equaling $0.49 of Non-Checkoff funds for every $1.00 of Checkoff funds received during this time (**Figure 2B**). By leveraging Pork Checkoff dollars with matching funds and external grants, SHIC expands the scientific network of research breadth, driving innovation in swine health and growing funding capacity to increase the return on investment for US pork producers.

In the fall of 2022, SHIC formed the "Wean-to-Harvest Biosecurity Research Program" in collaboration with the Foundation for Food & Agriculture Research (FFAR) and the Pork Checkoff. The total dollar allocation of $2.5M was comprised of $1.1M contribution from SHIC, $150K contribution from NPB, and $1.2M contribution from FFAR. The final research project

was awarded in 2025 for $157,414. From 2023 – 2025, a total of $2.5M was awarded across 24 projects in the Wean-to-Harvest Biosecurity Research Program, including 13 site biosecurity projects focused on farm and 11 transportation biosecurity projects focused on pig movements.

In November 2024, SHIC announced the "H5N1 Risk to Swine Research Program" in partnership with FFAR and the Pork Checkoff. The total budget allocation for the Program is $4M, with $1.8M being contributed by SHIC, $200K being contributed by NPB, and $2M being contributed by FFAR. Since SHIC's inception in 2015, this is the highest dollar amount committed to a SHIC-led research program. A total of 51 proposals were received by the deadline of December 31, 2024. In 2025, proposals underwent a competitive review process, and 10 projects were awarded funding in this Program for a total of $2,169,621. A second RFP is planned for 2026 targeting H5N1 Risk to Swine research priorities not yet adequately addressed.

In March 2025, SHIC announced the "2025 Plan of Work Research Program" request for proposals, with a goal to address the research priorities and topics that had been identified through stakeholder engagement and published as the SHIC Board-approved 2025 Plan of Work. A total of 57 proposals were received in response to the RFP while an additional 7 proposals were received throughout the year in the general rolling call. In 2025, a total of 21 SHIC Plan of Work Research Projects were awarded funds for a total of $2,107,431. Six of these 21 projects were co-funded by FFAR at a 1:1 match by SHIC with each organization contributing $359,708.

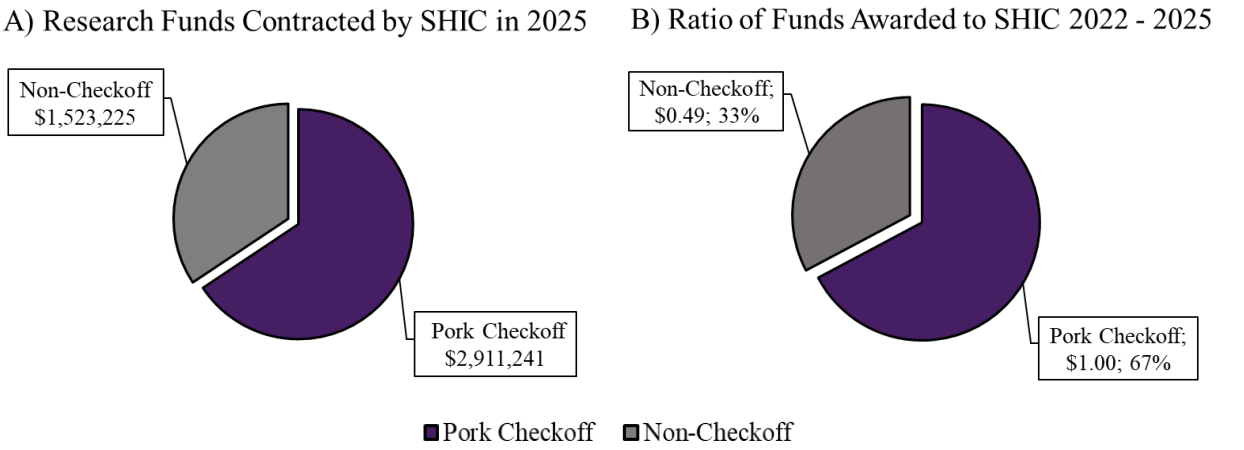


Figure 2. SHIC leverages Pork Checkoff funding with Non-Checkoff funds to increase the return on investment for pork producers, as shown through research projects contracted in 2025 (A) and the ratio of total dollars received between 2022 – 2025 (B).

Coordinated Outreach and Communications

There has been personal outreach to pork producers, veterinarians, academics, researchers, allied industry, state and federal animal health officials to foster collaboration, develop projects, increase understanding of SHIC's mission and inform them about SHIC's research and programs. Their feedback has helped focus and refine SHIC's responsibilities, research, and programs. Presence and participation in national and international meetings as well as international organizations have helped to monitor swine diseases and issues around the world.

In 2025, listening sessions were conducted with diverse stakeholder groups to solicit input for the Plan of Work topic areas and research priorities. Stakeholders included state pork associations, pork producers, state swine health committees, national pork organization veterinarians, national packer/processor organizations, swine disease researchers, swine pathologists, veterinary diagnosticians, and swine veterinary practitioners.

SHIC had targeted outreach to all 42 state pork associations through two virtual calls in 2025 in which all 42 association leaders were invited to hear SHIC activity updates and provide SHIC with feedback. To amplify information sharing with producers across each state, SHIC offers to provide written swine health articles directly to state pork associations. In 2025, 27 individuals representing 14 state pork associations received 19 articles for reprinting in state publications.

Sharing swine health information with a diverse body of stakeholders requires a variety of tools and processes. Communication routes employed by SHIC to disseminate information include the SHIC website, monthly e-newsletters, timely e-blasts, weekly articles, news releases, media interviews with Drs. Niederwerder and Becton, social media, SHIC Talk podcast, SHIC sessions at industry meetings, and SHIC/AASV webinar series. SHIC also participates in industry events to provide access to information essential to the protection of US swine herd health. Google Analytics data of SHIC website traffic is used to measure the impact of media efforts.

SHIC Activities and Communication Channels	2025
Individual swinehealth.org Website Visitors	35,659 Visitors
Total Website Page Views	95,179 Views
Articles Prepared for Partners	63 Articles
SHIC Monthly E-Newsletters	12 E-Newsletters
SHIC Timely E-Blasts	4 E-Blasts
Number of Individuals Receiving SHIC E-Newsletter	3,359 Individuals
SHIC Talk Podcasts	5 Podcasts
SHIC Sponsored Webinars	3 Webinars
SHIC Research Proposals Received	116 Proposals
SHIC Research Projects Contracted	32 Projects
SHIC Research Dollars Contracted	$4,434,466
SHIC Final Research Results Posted	22 Research Reports
Domestic Swine Disease Monitoring Reports	12 Domestic Reports
Global Swine Disease Monitoring Reports	12 Global Reports
Media Interviews	61 Interviews
WHO Radio Weekly Animal Health Updates	27 Episodes
Media Press Releases	5 Releases
SHIC Presentations at Industry Meetings	15 Presentations
Allied Media Publication of SHIC Information	439 Publications
Federal Grant Applications Submitted	2 Grants

Details of 2025 Activities and Accomplishments

Board of Directors, Staff, and 10-year Anniversary

Rhea Schirm Joins Swine Health Information Center

May 8, 2025 – Pork industry veteran Rhea Schirm joined the Swine Health Information Center as grant and contract administrator on April 22, 2025. “I’m looking forward to this opportunity, learning the role, and engaging with this fast-paced organization,” Schirm said. She joins Executive Director Dr. Megan Niederwerder and Associate Director Dr. Lisa Becton on the SHIC staff.

“We are thrilled to have Rhea join the SHIC team as grant and contract administrator,” remarked Niederwerder. “Her experience in the pork industry and knowledge of the grant lifecycle will help our organization grow in efficiency.”

Prior to joining SHIC, Schirm was a consultant working primarily with the American Association of Swine Veterinarians as journal and publication manager, advertising coordinator, and foundation coordinator. From 2011 to 2021, Schirm worked at the National Pork Board. After earning a bachelor’s degree in anthropology, Schirm worked in the human medical field and earned a certificate in global health. Starting the new role, she looks forward to applying her breadth of health and swine experience towards the SHIC mission.

While a recommendation from a friend in 2011 led Schirm to seek employment with the National Pork Board, her experience with the organization, people, and related entities kept her in the swine industry. “Chance brought me to the pork industry, and I never left,” she said. “The diverse opportunities I have had working with producers, universities, and now three different swine organizations have been incredibly rewarding.”

Schirm appreciates SHIC’s role in being on the cusp of new research for the industry as well as its success in getting that information out to producers and veterinarians. She was on staff at NPB when SHIC was conceptualized and launched in 2015, following the organization’s growth since.

“It was really intriguing to see the industry create SHIC in response to an unmet need following the PEDV outbreak. SHIC provides a framework for research and communication of results faster than the industry could otherwise,” she said. “Getting involved and being able to help make SHIC even more effective and efficient, and assisting in getting information out to producers is exciting to me. I look forward to adding to the dynamic operation of SHIC and contributing to the day-to-day activities focused on emerging swine diseases. Collaboration and making processes easier are one of my skills.”

Schirm and her husband, Ryan, live in southern Iowa. They are the parents of Hayden, who keeps them busy at all sporting events, and Kirstin, who is married to Chace, and welcomed a granddaughter in 2025.

Celebrating 10 Years of the Swine Health Information Center's Enduring Mission: Protecting the US Swine Herd

July 2, 2025 – The Swine Health Information Center marks a significant milestone with its 10th anniversary on July 5. Launched in 2015 with funding from the Pork Checkoff, SHIC has dedicated a decade to its core mission: to protect and enhance the health of the US swine herd by minimizing the impact of emerging disease threats. This commitment involves a multifaceted approach encompassing preparedness, coordinated communications, global disease monitoring, analysis of swine health data, and targeted research investments.

From inception, SHIC was envisioned not merely as a reactive entity but as a proactive force, anticipating animal health challenges. The US swine industry, a cornerstone of the nation's agricultural economy and food supply, faces constant pressure from emerging novel pathogens, re-emerging endemic diseases and transboundary diseases of swine. Recognizing this vulnerability, industry leaders and researchers formulated the idea of a dedicated center focused solely on anticipating and mitigating these threats before they could inflict widespread damage.

"It was the foresight of the National Pork Board to form the Swine Health Information Center after the introduction of porcine epidemic diarrhea virus in 2013," SHIC Executive Director Dr. Megan Niederwerder said. "Producers were really interested in having an organization focused on looking over the horizon for the next emerging disease risk. We didn't want to be caught again with a disease introduction that we weren't prepared for, and so that's the mission and our continued existence today."

SHIC's Pillars

At the heart of SHIC's enduring success lies its foundational mission, a robust framework that guides every initiative and investment. Each pillar of this mission is critical to the comprehensive defense strategy SHIC employs.

Minimizing the Impact of Emerging Disease Threats: Within this pillar, SHIC focuses on strategies limiting the spread, severity, and economic fallout of new, foreign, or re-emerging diseases. Strategies include rapid identification, effective containment protocols, and swift dissemination of information to enable producers to act decisively. Over the past 10 years, this focus has driven a culture of surveillance and readiness across the industry.

Preparedness: SHIC's emphasis on preparedness includes active collaboration to develop robust response plans, identify gaps in existing defenses, and through targeted research, ensures the industry has the tools and knowledge to quickly address unforeseen health crises. SHIC's involvement in preparedness includes participation in scenario planning for high-consequence diseases, facilitating diagnostic readiness, and developing educational materials that empower producers and veterinarians to implement effective biosecurity measures. The focus on preparedness is to ensure when a new threat emerges, the US swine industry is armed with information and tools for rapid response to minimize disease impacts to producers.

Coordinated Communications: Clear, consistent, and timely communication is paramount for disease detection, awareness and education. SHIC acts as a central hub for sharing vital information among producers, veterinarians, researchers, government agencies, and allied

industries. This coordinated approach ensures that stakeholders involved in swine health have access to critical information, preventing misinformation and enabling a unified response. Whether it's an alert about a new global disease trend or an update on research findings, SHIC's communication channels are designed for maximum impact and clarity, fostering trust and collaboration across the sector.

Global Disease Monitoring: SHIC maintains surveillance for changes in global swine health trends, identifying potential threats as they arise. This involves tracking disease incidence, analyzing transmission patterns, and understanding the characteristics of emerging pathogens internationally. By monitoring global landscapes, SHIC provides an early warning system, allowing the US industry to fortify its defenses and prepare for potential incursions. Maintaining disease surveillance is critical due to a globally interconnected world.

Analysis of Swine Health Data: SHIC invests heavily in collecting, synthesizing, and analyzing swine health data from various sources. This includes diagnostic lab submissions, production records, and epidemiological studies. By identifying patterns, trends, and anomalies in swine health data, SHIC can identify areas of concern, evaluate the effectiveness of control measures, and direct resources to where they are most needed. This data-driven approach ensures that SHIC's strategies are evidence-based and continuously optimized for maximum efficacy.

Targeted Research Investments: Understanding emerging, re-emerging, and foreign animal diseases, and developing new tools for detection and mitigation requires cutting-edge research. SHIC strategically invests in research projects that directly address critical knowledge gaps and provide practical solutions for the industry. These investments cover a wide range of topic areas, from developing new diagnostics and vaccines to understanding pathogen epidemiology and improving biosecurity practices. By funding targeted research, SHIC accelerates the development of innovations that directly enhance the health and resilience of the US swine herd.

Collaborative Success
SHIC is far from insular in its operations. Partnering with other entities leverages SHIC funding from Pork Checkoff, expands reach, and represents the collaborative view of staff and directors. Recent joint efforts with the Foundation for Food & Agriculture Research have included Japanese encephalitis virus research, the Wean-to-Harvest Biosecurity Research Program, and H5N1 influenza research initiatives.

A quote from FFAR's 2024 annual report, "In the U.S., where pork is a major industry, the health of the nation's swine herd is crucial. As the third-largest producer and consumer of pork in the world, the U.S. relies heavily on its swine population, and threats to swine health can harm producers, consumers and the economy. To protect this vital industry, FFAR partnered with the Swine Health Information Center (SHIC) to develop innovative, cost-effective technologies and practices that improve biosecurity, particularly in the critical wean-to-harvest phases of swine production. This partnership has funded 23 projects, many of which have already delivered valuable insights and tools. These findings are transforming the way pork producers and veterinarians manage the health of swine herds, with immediate, practical applications for farms and transportation systems alike."

SHIC's mission focus on emerging disease is unique among other livestock industry organizations. "SHIC fulfills a unique need to constantly evaluate emerging disease trends and focus on finding unique solutions to address these needs. The use of multiple reporting programs to monitor and track diseases objectively through the Morrison Swine Health Monitoring Program, the swine disease reporting system, and the global disease reporting system, are unique to our industry. These programs are a cornerstone to many of our swine health actions, because if we aren't aware of what's going on in the field, then it makes it very hard for the industry to respond. These disease monitoring systems inform us of research needs and provide alerts for potentially emerging challenges. I think that's something unique and very valuable," said SHIC Associate Director Dr. Lisa Becton.

Building a successful organization able to move quickly, react appropriately, and broadly disseminate critical information requires vision, focus, and resiliency. "Among SHIC's strengths are nimbleness and having a very specific focus and mission. Nimbleness allows SHIC to adjust research priorities to emerging threats as they arise. Having a very specific mission allows us to remain focused on emerging disease threats, whether these are occurring within the US or internationally," said Mark Schwartz, outgoing SHIC founding board member and chair. "Although there is a long list of SHIC projects that I am proud of, I would say that the work that SHIC directed and funded in response to emerging situations are at the top of my list. These include the work in Vietnam with ASF and with CFIA in Canada, and the response to highly pathogenic avian influenza."

Telling SHIC's Story

Sharing SHIC's work involves a complex assortment of communications tools. This includes the SHIC website, a monthly e-newsletter, e-blasts, webinars, podcasts, articles shared with industry, events, presentations, interviews and work with media. Each project, research results, program, and disease monitoring report are deployed to stakeholder audiences so SHIC's work is amplified and reaches those it's designed to benefit.

"We want to ensure that any of our knowledge of swine health and disease outcomes is communicated back to producers so it can provide value to pork producers, to the US pork industry, and allow for utilization of that information to protect the health of their herd," Dr. Becton said. "SHIC has both a veterinary and producer audience. We incorporate direct feedback received from swine producers and their veterinarians during active listening sessions into our day-to-day activities and ensure that the information that is generated is always communicated with that audience."

SHIC Staff Drive Mission

Dr. Paul Sundberg was SHIC's founding executive director and served in the role until his retirement in December 2023. "The goal of the original board of directors of SHIC was to find that perfect individual to oversee the entity. Someone who was passionate about protecting the North American swine population from an introduction of any foreign animal disease, was respected and extremely well connected with all facets of the industry and had knowledge and experience in swine health and research," said Daryl Olsen, DVM, AMVC and former SHIC board member and chair.

In April 2022, Dr. Megan Niederwerder joined SHIC as associate director. Upon her hiring, Olsen said, “SHIC continues to deliver beyond expectations to the swine industry. As the scope of our efforts in prevention, preparedness, and response to emerging and potential foreign swine disease issues grows, so does our need for qualified leadership for the organization. Megan will be an outstanding addition to SHIC with her experience, passion, and knowledge.”

When Dr. Sundberg announced his retirement, Dr. Niederwerder was tapped to become executive director and the search for a new associate director culminated in the hiring of Dr. Lisa Becton who began her position with SHIC in January 2024. At the time, Dr. Niederwerder said, “Lisa is an outstanding addition to the SHIC team who brings a wealth of knowledge from directing producer-led swine health initiatives during her tenure at the National Pork Board. Her vast experience will enable her to hit the ground running as the new associate director and immediately start advancing mission-focused objectives to help lead SHIC into the future.”

As SHIC’s effort, reach, and mission continue to grow, the need for an additional staff person became clear in 2024. After a wide search and careful consideration, Rhea Schirm was hired as SHIC’s grant and contract administrator in April 2025. In announcing the position and Schirm’s hiring, Dr. Niederwerder said, “We are thrilled to have Rhea join the SHIC team. Her experience in the pork industry and knowledge of the grant lifecycle will help our organization grow in efficiency.”

Volunteers Inspire and Encourage

Along with staff, SHIC has been guided by industry stakeholders sharing their time, expertise, and passion for the health of the US swine herd. The SHIC Board of Directors consists of nine members; six directors are appointed and three directors are elected. The NPB, National Pork Producers Council (NPPC), and the American Association of Swine Veterinarians (AASV) each appoint two members and three are elected by the appointed directors. The three elected directors must be active pork producers or representatives of producing companies that have an interest in the mission of SHIC. Responsible for SHIC governance, the following have served or are serving on the SHIC Board of Directors:

Matt Anderson, DVM
Kent Bang*
Joseph Dykhuis*
Mark Greenwood
Howard Hill, DVM
Alayne Johnson*
Brett Kaysen, PhD
Seth Krantz, DVM*
Bill Luckey
Jay Miller, DVM*
Gene Noem
Russ Nugent, PhD
Daryl Olsen, DVM
Sarah Pillen*
Jeremy Pittman, DVM*

Paul Ruen, DVM*
Mark Schwartz
Mike Terrill, DVM
Pete Thomas, DVM*
Matthew Turner, DVM
*Current board members

Two working groups also provide stakeholder input into SHIC's operations: Monitoring and Analysis Working Group and Preparedness and Response Working Group. These groups include practitioners, allied industry partners, pork producers, academic researchers, diagnosticians, federal and state animal health officials, packer/processors, and industry association veterinarians from AASV, NPPC and NPB. Each working group meets regularly to review and select research projects as well as engage in SHIC programming activities.

A Decade of Service, Growth, and Value
Over the past decade, SHIC's core pillars have evolved over time to address current challenges and strengthened the industry's response to a dynamic disease landscape. SHIC has played an instrumental role in fostering a proactive mindset within the US pork industry, shifting the paradigm from purely reactive measures to a more anticipatory and prepared stance. The goal for proactive surveillance continues to include prevention of potential outbreaks, safeguarding the livelihoods of producers and ensuring a stable supply of pork for consumers.

The challenges to swine health will continue to change and new diseases will emerge. Coupled with novel disease emergence, the complexities of global trade and travel will demand sustained surveillance and response. As the Swine Health Information Center embarks on its second decade, it does so with a proven track record, a robust mission, and the unwavering support of the US pork industry. SHIC's dedicated efforts ensure that the health and vitality of the US swine herd remain protected, allowing the industry to thrive and continue its essential contribution to the nation's food security.

In reviewing SHIC's first 10 years, gratitude comes to the fore. "We want to thank everyone who has been involved in SHIC activities. Whether that's board members, board officers, staff, working group chairs, working group members, task force members, all the producers that have supported the organization through the Pork Checkoff – thank you. We are only here because of the individuals who have supported the organization, who helped us carry out our mission over the last 10 years, who helped provide us with input and insight to ensure our activities are directed towards providing producers the most value, and really the service of the industry enabled SHIC to maintain its focus on emerging diseases," Dr. Niederwerder said. "I offer a big thank you to all of those people who have been involved in SHIC's formation and existence over the last 10 years."

SHIC Announces New Board Appointments and Officer Elections

July 2, 2025 – The Swine Health Information Center welcomed two new board members during their meeting June 23-24, 2025. Alayne Johnson of Shady Grove Farms, Churubusco, Indiana, and Sarah Pillen, co-CEO of Pillen Family Farms and DNA Genetics, Columbus, Nebraska, began their terms. Founding board member Mark Schwartz of Schwartz Farms, Sleepy Eye,

Minnesota, and Gene Noem of Ames, Iowa, concluded their tenures and were honored for their service.

The SHIC Board of directors also held an election of officers. Paul Ruen, DVM, Lanesboro, Minnesota, was chosen to lead the SHIC Board as its president. Joseph Dykhuis of Dykhuis Farms, Hamilton, Michigan, will assume the role of vice president, and Kent Bang will continue his service as treasurer. Other board members include veterinarians Seth Krantz, Jay Miller, Jeremy Pittman, and Pete Thomas. Organization staff includes Megan Niederwerder, DVM, PhD, executive director, Lisa Becton, DVM, MS, DACVPM, associate director, and Rhea Schirm, grant and contract administrator.

New Voices on the Board: Forward-Looking Perspectives

The addition of Alayne Johnson and Sarah Pillen brings fresh insights and experience from diverse segments of the pork production industry to the SHIC Board of Directors.

Johnson, with her background as a director on the National Pork Board, brings a deep understanding of the industry's broader strategic priorities. "My interaction with SHIC began as I served as a director on the National Pork Board. It was then that I learned the history of the organization and the importance of the work that they have done for our industry," Johnson said. She emphasized SHIC's critical role, "The research SHIC pursues on behalf of producers allows the industry to have a direct impact on both monitoring emerging diseases across the globe as well as looking for solutions that will reduce the impact on our US producers."

Johnson lauded SHIC's established reputation and leadership. "SHIC has built a reputable brand that is recognized amongst those working in the pork industry as well as veterinarians," she said. "SHIC has tremendous leadership who are passionate about the research mission and dedicated to deploying producer dollars in a meaningful way." Johnson's tenure on the Pork Board included chairing the Strategic Planning Task Force, equipping her with comprehensive industry knowledge.

Sarah Pillen, an attorney, brings the perspective of a co-CEO from a prominent family farming operation, underscoring the direct impact of SHIC's work on producers. "SHIC is a well-respected organization within the pork industry. It has served as a critical resource for our team and enables us to stay updated on emerging diseases and how to best respond to any potential emerging diseases," Pillen said. She highlighted the practical nature of SHIC's research, "SHIC's research projects are focused on providing real tools for the industry to help navigate the viruses we face today, as well as the potential viruses we could face in the future."

Pillen underscored SHIC's unique value proposition. "SHIC is unilaterally focused on emerging diseases. It's a critical focus for our industry given the potential implications on supply and demand both domestically and internationally." She attributes SHIC's effectiveness to its strong ties with leading academic institutions, "SHIC has garnered the respect of leading research institutions. As a result, the deliverables from these leading institutions help guide producers' decisions and enable our industry to be more pro-active against future threats."

Vision and Enduring Impact of Outgoing Directors

The departure of Mark Schwartz marks the end of an era, as he served as a founding board member since SHIC's inception in 2015. Schwartz provided a clear articulation of SHIC's purpose, "The Swine Health Information Center was created in 2015 through the efforts of industry leaders, with funding from the Pork Checkoff, first to direct research and analyze data, monitor emerging diseases around the world and enhance preparedness, with the unwavering mission to protect and enhance the health of the US swine herd, and secondly, to communicate the results of the research, monitoring and analyses to stakeholders."

Schwartz identified SHIC's core strengths as its nimbleness and having a very specific focus and mission. He said, "Nimbleness allows SHIC to adjust research priorities to emerging threats as they arise. Having a very specific focus allows us to remain focused on emerging disease threats, whether these are occurring within the US or internationally."

He recounted the tangible outputs SHIC has provided, including domestic and global disease monitoring reports, viral and bacterial disease matrices, timely webinars on emerging disease, and research reports from over 40 areas of investigation. Schwartz believes SHIC has profoundly influenced the industry, making it more able to respond to an emerging disease than it was 10 years ago.

Reflecting on SHIC's evolution during his tenure, Schwartz said, "While the mission of SHIC has remained unwavering, the footprint of SHIC has increased through partnering with the Foundation for Food & Agriculture Research, allowing us to leverage the investment of the producers we serve." Among the many achievements, he expressed particular pride in SHIC directed and funded work in response to emerging situations. These include the work in Vietnam with ASF and with CFIA in Canada, and the response to highly pathogenic avian influenza. His personal contribution, he said, was to, "…always keep in mind that we have been tasked with making decisions and directing the resources of the stakeholders, to protect and enhance the health of the US swine herd." Schwartz will continue to follow key initiatives like the highly pathogenic avian influenza and wean-to-harvest biosecurity projects, offering a final reflection.

Schwartz served as board chair and was honored for his role with the presentation of a plaque during the recent SHIC Board of Directors meeting.

Noem, a pork producer and retired swine industry professional, has experience in many facets of pork production including working for large operations to contract feeding in his own buildings. A former director and president of the National Pork Board, Gene represented the organization on the SHIC Board of Directors during his tenure.

Sustaining the Mission

As SHIC transitions its board composition and leadership, the consistent theme from both incoming and outgoing members is a steadfast commitment to the organization's mission. The combined experience and perspectives of the board are poised to strengthen SHIC's strategic initiatives in disease preparedness, global monitoring, and targeted research, ultimately enhancing the resilience and profitability of the US swine industry.

Plan of Work Priorities and Projects

2024 Progress Report Reveals Record Year for SHIC

February 7, 2025 – The Swine Health Information Center, launched in July 2015 with Pork Checkoff funding, maintains a mission to protect and enhance the health of the US swine herd. The 2024 Progress Report provides pork producers, swine veterinarians, and industry stakeholders with a review of SHIC's activities and accomplishments to carry out its mission over the past year. SHIC's scope of work focuses on five strategic pillars encompassing projects that cover domestic and global emerging disease monitoring, targeted swine disease research, swine health data analysis and coordinated communications. The Center's progress can be found in the recently released 2024 Progress Report, including details on the 32 research projects SHIC funded to achieve their objectives on behalf of US pork producers, for a record total of $3,990,689 contracted.

"SHIC received the greatest number of proposals and awarded the highest dollar amount for research projects in a single year in 2024," said SHIC Executive Director Dr. Megan Niederwerder. "Matching funds and external grants allowed SHIC to leverage Pork Checkoff investment and at the same time, expand both research breadth as well as funding capacity to increase return on investment."

SHIC's Board of Directors consists of nine members who work with Dr. Niederwerder and Associate Director Dr. Lisa Becton. Two Working Groups are active in providing program oversight and assisting in decision making to fulfill SHIC's mission. The Monitoring and Analysis Working Group is responsible for assessing domestic and foreign swine production disease risk. The Preparedness and Response Working Group is responsible for oversight of research to assist in US prevention, preparedness, mitigation and response to priority swine diseases.

SHIC formed the Wean-to-Harvest Biosecurity Research Program in collaboration with the Foundation for Food & Agriculture Research and the Pork Checkoff. The total dollar allocation of $2.3 million was comprised of $1 million contribution from SHIC, $150,000 contribution from NPB, and $1.15 million contribution from FFAR. This program was ongoing through 2023 and 2024 with a rolling deadline for proposal submission. In 2024, seven Wean-to-Harvest Biosecurity Research projects were funded with results being delivered and shared with stakeholders.

"When it comes to the Wean-to-Harvest Biosecurity Research Program, it has yielded actionable outcomes that SHIC has shared with producers to strengthen biosecurity on the farm," Dr. Becton said. "Wean-to-Harvest Biosecurity Research Program results are practical and usable. They provide objective scientific data to identify and validate biosecurity practices to prevent emerging diseases from entering and impacting herd health."

In January 2024, SHIC announced the Plan of Work Research Program request for proposals to address the research priorities and topics that had been identified through stakeholder engagement and published as the SHIC BOD approved 2024 Plan of Work. As a result, 19 projects were funded and are now underway.

Then in February 2024, SHIC announced the Japanese Encephalitis Virus Research Program in partnership with FFAR. The total budget allocation for the research program was $1.3 million with $650,000 from SHIC and $650,000 from FFAR. As a result, six projects were funded that address the stakeholder-developed research priorities for JEV.

In November 2024, SHIC announced the H5N1 Risk to Swine Research Program in partnership with FFAR and the Pork Checkoff. The Request for Proposals has a total budget allocation of $4 million, with $1.8 million being contributed by SHIC, $200,000 being contributed by NPB, and $2 million being contributed by FFAR. Proposals were due December 31, 2024, with a record 51 proposals received. Those proposals are now undergoing a competitive review process for value to US pork producers.

SHIC uses a variety of communication tools and processes to broadly share swine health information with stakeholders, including the SHIC website, monthly e-newsletter, timely e-blasts, article development and distribution, news releases, media interviews, social media, SHIC Talk podcast, coordinating SHIC sessions at industry meetings, and SHIC/AASV webinar series. Find more information on these resources on the SHIC website.

SHIC Makes Strategic Investment with 2025 Plan of Work RFP

March 4, 2025 – Research provides critical information and drives innovation to help pork producers as they face emerging disease challenges in their swine herds. Now available, the Swine Health Information Center has released its 2025 Plan of Work Research Program Request for Proposals, allocating $1.5 million to fund targeted research addressing critical swine health priorities. This initiative fulfills SHIC's mission of mitigating emerging disease threats through strategic investments in research aligned with its five strategic priorities: improving swine health information, monitoring and mitigating risks to swine health, responding to emerging diseases, surveillance and discovery of emerging diseases, and swine disease matrices.

The SHIC 2025 Research Program RFP, a strategic investment in swine health, fosters innovation and collaboration to protect the US swine herd. By addressing critical research priorities, SHIC provides tools to enhance preparedness, prevent disease introduction, and ensure the long-term sustainability of the swine industry. Researchers are encouraged to submit proposals that contribute to the advancement of swine health and the protection of this vital agricultural sector.

SHIC's Strategic Priorities and the 2025 Plan of Work

The 2025 Plan of Work, developed with stakeholder feedback and approved by the SHIC Board of Directors, provides a framework for targeted research investments. The SHIC 2025 Research Program RFP invites qualified researchers to submit proposals that specifically address targeted research priorities outlined in the Plan of Work. With $1.5 million in funding available, individual awards are anticipated to range from $50,000 to $150,000. Proposals exceeding this range require strong justification.

Proposals are expected to clearly address at least one of the identified priorities and demonstrate the project's urgency, value to US pork producers, and efficient use of funds. Collaborative projects involving industry, academia, and public/private partnerships are highly encouraged.

Projects should be completed within 12 months, with sufficient justification required for longer durations. Proposals will undergo a competitive review process by a Review Task Force, who will provide funding recommendations to the SHIC Board of Directors.

Funding timely research is essential for SHIC to provide novel project outcomes that drive action for producers and veterinarians. This initiative aims to enhance US preparedness, prevent emerging disease entry, and enable rapid mitigation of pork production impacts. The SHIC 2025 Plan of Work Research Program RFP represents a significant commitment to funding research that directly addresses industry needs and strengthens the US swine herd's resilience.

SHIC Receives 57 Responses to 2025 Plan of Work Request for Research Proposals

May 2, 2025 – The Swine Health Information Center released its 2025 Plan of Work in January, outlining key priorities to protect the health of the US swine herd in the current year. The Plan of Work emphasizes a proactive approach to addressing emerging disease threats and enhancing biosecurity measures within the US swine industry. On March 5, 2025, SHIC issued a request for 2025 Plan of Work research proposals with a submission deadline of April 30, 2025. A record 57 proposals were received from 19 organizations (14 universities, one government entity, and four private companies). Proposals will undergo competitive review for funding recommendations based on value to US pork producers.

Research priorities and topics identified in the 2025 Plan of Work help SHIC fulfill its mission to generate new knowledge for preventing, preparing, mitigating and responding to emerging swine disease threats. SHIC’s five strategic pillars guide efforts to ensure the well-being of the US swine herd.

The 57 proposals are expected to address the specific research priorities described in the March RFP, including topics such as transport biosecurity, reduction of disease risk at the packing plant lairage and unloading docks, investigation of novel technologies for trailer sanitation, assessment of biosecurity risk for cull sow and secondary markets, identifying early disease outbreak warning signals, evaluation of wastewater as a surveillance tool, environmental sample types with low labor requirements for emerging disease surveillance, genome-based diagnostic technologies for emerging disease detection and forensic analysis, and investigating the clinical relevance of newly identified agents from veterinary diagnostic lab submissions.

Upon completion of the competitive review process, project awards are expected to be announced in late summer 2025. Projects demonstrating the most urgent and timeliness of completion, providing the greatest value to US pork producers, and showing efficient use of funds are prioritized for funding. Results will be shared with producers and veterinarians as soon as they become available. The intent of this RFP was to encourage researchers to develop and submit proposals specifically addressing identified priorities, broaden awareness of funding opportunities to advance SHIC’s 2025 Plan of Work, expand the scientific network of researchers and institutions conducting critical research on emerging swine diseases, and drive innovation to help protect the health of the US swine herd. Funding timely research is an essential component of SHIC providing practical and applicable project outcomes that drive action for producers and veterinarians to prevent, prepare, and mitigate emerging swine diseases.

SHIC Encourages Input for 2026 Plan of Work

August 25, 2025 – The Swine Health Information Center annually solicits input for its Plan of Work which guides its activities each year. The 2026 Plan of Work is currently under development and will be built around SHIC's five strategic priorities: 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. These priorities, developed through stakeholder input, will guide the 2026 Plan of Work, implemented by Executive Director Dr. Megan Niederwerder and Associate Director Dr. Lisa Becton with input from the SHIC Board of Directors and SHIC Working Groups.

Stakeholder input for SHIC's 2026 Plan of Work can be submitted here and is requested by December 1, 2025. Input may include topic areas, research priorities, and/or identified industry needs that will focus SHIC's programmatic and research efforts in 2026, such as an emerging swine disease or an emerging swine health issue. Broad input is encouraged and invited to help inform priorities for broad producer value and benefits to swine health.

While SHIC's activities are guided by the Plan of Work, the organization remains nimble and responsive to industry needs as they arise throughout the year. As challenges to swine health and production continuously change, stakeholders are encouraged to provide input and ideas year-round to address newly identified needs.

As a recent example, the development of the H5N1 Risk to Swine Research Program highlights how SHIC adapted its Plan of Work to directly address needs associated with this emerging disease. This aligns with SHIC's mission, which is to protect and enhance the health of the US swine herd by minimizing the impact of emerging disease threats through preparedness, coordinated communication, global disease monitoring, analysis of swine health data, and targeted research investments.

SHIC Funds 12 Plan of Work Projects to Advance Emerging Disease Mission

December 4, 2025 – The Swine Health Information Center recently funded 12 new projects addressing research priorities and topics published in its 2025 Plan of Work. This effort helps the organization fulfill its mission to generate new intelligence for preventing, preparing for, and responding to emerging swine disease threats. Funded research areas span across the Center's five strategic priorities: improve swine health information, monitor and mitigate risks to swine health, responding to emerging disease, surveillance and discovery of emerging disease, and swine disease matrices. The new projects were initiated in fall 2025 and range from nine to 15 months in duration. Research outcomes from the funded projects will provide critical information and resources to help pork producers as they face emerging disease challenges in their swine herds.

Newly funded projects addressing SHIC's research priorities include enhanced monitoring of swine diseases, mitigation strategies for emerging disease preparedness and response, novel biosecurity practices for reducing disease risks, diagnostic assay development for emerging diseases, whole genome sequencing as a forensic diagnostic tool, clinical relevance of newly identified agents from veterinary diagnostic lab submissions, and modernization of swine pathogen prioritization.

The SHIC 2025 Plan of Work Request for Proposals received 57 proposals from 19 institutions with available funds totaling $1.5 million. Funding timely research is an essential component to SHIC providing project outcomes that drive action for emerging disease prevention, preparedness, mitigation, and response for the US swine industry.

SHIC 2025 Plan of Work projects funded and initiated in response to the RFP include:

Improve Swine Health Information

▪*Expand the Domestic Swine Disease Surveillance laboratory networking – Include Illinois Veterinary and Diagnostic Laboratory*

- **Principal Investigator:** Giovani Trevisan, Iowa State University
- **Objective:** Expand the SDRS laboratory network and regional representativeness by incorporating historical and prospective data from the Illinois Veterinary Diagnostic Laboratory.

▪*ISU technological transfer and implementation at OH ADDL of confirmed tissue disease diagnosis codes and prospective reporting to the SDRS*

- **Principal Investigator:** Giovani Trevisan, Iowa State University
- **Objective:** Transfer and implement the current ISU VDL disease diagnosis Dx code matrix to OH ADDL for expanded data collation in monthly reports.

Monitor and Mitigate Risks to Swine Health

▪*Investigating trailer contamination rates and related factors at the cull sow harvest plant*

- **Principal Investigator:** Cesar Corzo, University of Minnesota
- **Objective:** Determine the seasonal probability of PRRSV, PEDV, PDCoV, TGEV, and SVA trailer contamination at the cull sow harvest facility-trailer interface and investigate factors that contribute to contamination probability.

▪*Evaluation of harvest plant dock protocols to reduce viral transfer to market hog trailers*

- **Principal Investigator:** Cesar Corzo, University of Minnesota
- **Objective:** To determine whether transfer of viruses from the dock to the trailer occurs when using disposable plastic boots and/or a surface powder sanitizer and assess the unloading interventions that prevent the next load of pigs and farm from becoming infected.

▪*Assessing pathogen contamination in dead boxes of PRRSV-negative swine farms*

- **Principal Investigator:** Igor Paploski, University of Minnesota
- **Objective:** Assessing the viral contamination around dead animal disposal structures in PRRSV or PEDV negative farms and investigate if rendering vehicles can spread infectious agents between farms.

▪*Bridging industry data and disease risk: movement and biosecurity insights into PRRSV outbreaks*

- **Principal Investigator:** Gustavo De Sousa E Silva, Iowa State University
- **Objective:** Assess the association of movement types with the timing and frequency of PRRS outbreaks; identify the roles of highly connected sites, trucks, and personnel associated with outbreaks, describe high-risk movement patterns.

Responding to Emerging Disease

▪*Determining the diagnostic test characteristics of Japanese encephalitis virus RT-rtPCR assay using clinical samples in Australia*

- **Principal Investigator:** Rahul K Nelli, Iowa State University
- **Objective:** Develop and evaluate the diagnostic specificity and sensitivity of pan-JEV RT-rtPCR assay using field samples of known status from Australia.

Surveillance and Discovery of Emerging Disease

▪*Characterization of a PEDV variant strain associated with the recent outbreaks in Illinois and Iowa*

- **Principal Investigator:** Jianqiang Zhang, Iowa State University
- **Objective:** Characterize the PEDV 6-nt deletion variant in comparison with a 2013 non-S INDEL PEDV using a pig challenge model for their virulence, duration of virus shedding, and cross protection.

▪*Improving molecular surveillance of PRRSV-2: Quantifying global and domestic risks of PRRSV-2 variants of concern*

- **Principal Investigator:** Kimberly VanderWaal, University of Minnesota
- **Objective:** Expand lineage-variant classification to other countries to monitor transboundary introductions of PRRSV-2, inform international swine disease risks, and improve the quality of swine health information for PRRSV-2 by enabling PRRS-Loom dashboard end-users to visualize their own sequences.

▪*Optimizing the TELSVirus workflow for improved surveillance and characterization of swine respiratory viruses*

- **Principal Investigator:** Noelle Noyes, University of Minnesota
- **Objective:** Increase the sensitivity of the TELSVirus workflow for low-abundance respiratory viruses in oral fluid samples, modify the workflow to accommodate low-input samples, improve the utility of WGS analysis from TELSVirus data.

Swine Disease Matrices

▪*Evaluating PEDV non-S INDEL and S INDEL spike gene-based differential PCRs and determining the detection frequency of these two PEDV strains*

- **Principal Investigator:** Jianqiang Zhang, Iowa State University
- **Objective:** Evaluate four PEDV non-S INDEL and S INDEL gene-based differential real-time PCR assays and determine the detection frequency of non-S INDEL and S INDEL PEDV strains in PEDV screening PCR-positive samples.

▪*Modernizing Pathogen Prioritization for US Swine Health: A Risk-Based Framework for 2025 and Beyond*

- **Principal Investigator:** Eric Neumann, Epi-Insight USA
- **Objective:** Develop a harmonized, multi-criteria framework with transparent definitions to prioritize both viral and bacterial swine pathogens and deliver reproducible tools and documentation to allow future updating of the matrices.

In addition to these 12 projects, six projects addressing the SHIC 2025 Plan of Work have been selected for awards through a co-funding partnership with the Foundation for Food &

Agriculture Research. Aligning across both organizations' priorities, these six projects will be announced in the coming weeks.

List of Research Projects Funded Through SHIC 2025 Plan of Work

1. Principal Investigator: Cesar Corzo, University of Minnesota
    - Title: Developing the Morrison Swine Health Monitoring Project (MSHMP) to build capacity and enable the Swine Health Information Center
    - Start Date: January 1, 2025; Project Duration: 12 months
2. Principal Investigator: Derald Holtkamp, Iowa State University
    - Title: Ongoing support and expansion of the Standardized Outbreak Investigation Program
    - Start Date: April 1, 2025; Project Duration: 12 months
3. Principal Investigator: Jianqiang Zhang, Iowa State University
    - Title: Evaluating PEDV non-S INDEL and S INDEL spike gene-based differential PCRs and determining the detection frequency of these two PEDV strains
    - Start Date: September 1, 2025; Project Duration: 9 months
4. Principal Investigator: Rahul K. Nelli, Iowa State University
    - Title: Determining the diagnostic test characteristics of Japanese Encephalitis Virus RT-rtPCR assay using clinical samples in Australia
    - Start Date: September 1, 2025; Project Duration: 12 months
5. Principal Investigator: Giovani Trevisan, Iowa State University
    - Title: Expand the Domestic Swine Disease Surveillance laboratory networking – Include Illinois Veterinary and Diagnostic Laboratory
    - Start Date: September 1, 2025; Project Duration: 15 months
6. Principal Investigator: Giovani Trevisan, Iowa State University
    - Title: ISU technological transfer and implementation at OH ADDL of confirmed tissue disease diagnosis codes and prospective reporting to the SDRS
    - Start Date: September 1, 2025; Project Duration: 12 months
7. Principal Investigator: Gustavo De Sousa E Silva, Iowa State University
    - Title: Bridging industry data and disease risk: movement and biosecurity insights into PRRSV outbreaks
    - Start Date: September 1, 2025; Project Duration: 12 months
8. Principal Investigator: Eric Neumann, Epi-Insight USA
    - Title: Modernizing Pathogen Prioritization for U.S. Swine Health: A Risk-Based Framework for 2025 and Beyond
    - Start Date: September 1, 2025; Project Duration: 9 months
9. Principal Investigator: Cesar Corzo, University of Minnesota
    - Title: Investigating trailer contamination rates and related factors at the cull sow harvest plant
    - Start Date: September 1, 2025; Project Duration: 12 months
10. Principal Investigator: Noelle Noyes, University of Minnesota
    - Title: Optimizing the TELSVirus workflow for improved surveillance and characterization of swine respiratory viruses
    - Start Date: September 1, 2025; Project Duration: 12 months
11. Principal Investigator: Jianqiang Zhang, Iowa State University

- Title: Characterization of a PEDV variant strain associated with the recent outbreaks in Illinois and Iowa
- Start Date: September 1, 2025; Project Duration: 12 months

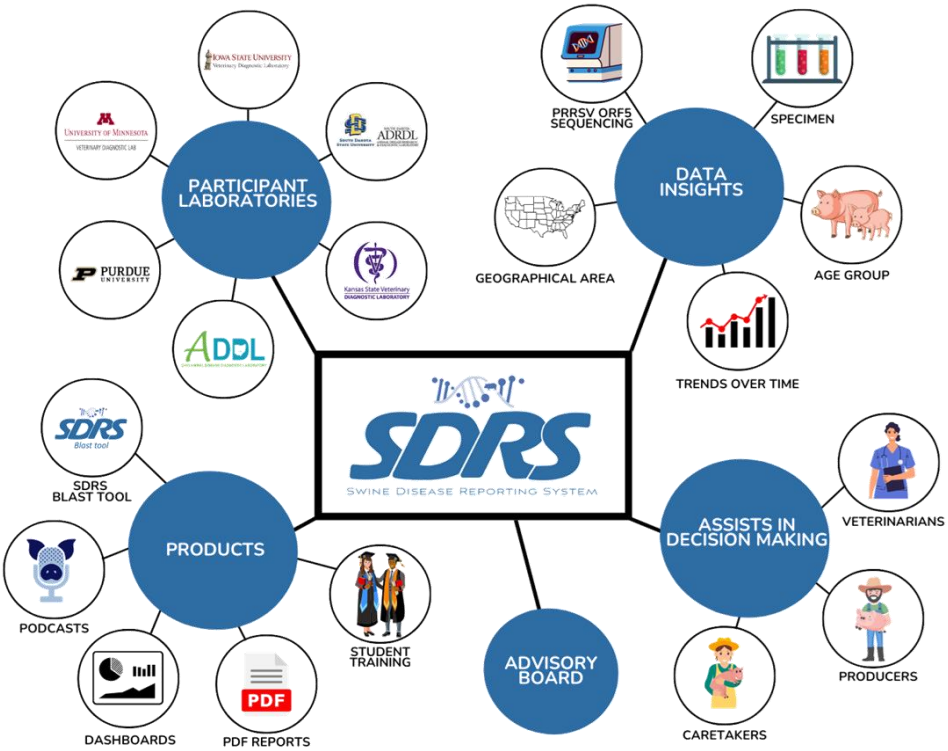
12. Principal Investigator: Igor Paploski, University of Minnesota
    - Title: Assessing pathogen contamination in dead boxes of PRRSV-negative swine farms
    - Start Date: September 1, 2025; Project Duration: 12 months
13. Principal Investigator: Cesar Corzo, University of Minnesota
    - Title: Evaluation of harvest plant dock protocols to reduce viral transfer to market hog trailers
    - Start Date: September 1, 2025; Project Duration: 12 months
14. Principal Investigator: Kimberly VanderWaal, University of Minnesota
    - Title: Improving molecular surveillance of PRRSV-2: Quantifying global and domestic risks of PRRSV-2 variants of concern
    - Start Date: September 11, 2025; Project Duration: 12 months
15. Principal Investigator: Giovani Trevisan, Iowa State University
    - Title: Domestic Swine Disease Surveillance monthly report updates until September 2026
    - Start Date: October 1, 2025; Project Duration: 12 months
16. Principal Investigator: Igor Paploski, University of Minnesota
    - Title: Improving Detection and Understanding of Viral Pathogens in Swine Wastewater
    - Start Date: November 1, 2025; Project Duration: 12 months
17. Principal Investigator: Montserrat Torremorell, University of Minnesota
    - Title: Real-time monitoring of performance indicators of filters and an electrostatic precipitator (ESP) to advance the control of airborne diseases in swine
    - Start Date: November 1, 2025; Project Duration: 12 months

Monitor Domestic Swine Diseases for Emerging Trends

2024 Highlights from SHIC Domestic Swine Disease Monitoring

January 8, 2025 – The Swine Health Information Center recently renewed funding for the Domestic Swine Disease Monitoring Reports through September 2025. Drs. Giovani Trevisan and Daniel Linhares, Iowa State University, lead the program which was initially funded by SHIC in 2017 and continues to focus on the analysis and reporting of collated veterinary diagnostic laboratory data to identify emerging endemic disease trends. Monthly reports provide an early warning system for veterinarians and producers to prompt preventative actions such as increasing monitoring and heightening biosecurity measures. Highlighted from 2024, new analysis tools and additional pathogen data helped enhance the value of the reports to the US swine industry.

The SDRS is the only publicly available source of swine health information from 6 US veterinary diagnostic laboratories representing >96% of all swine samples submitted for testing in the National Animal Health Laboratory Network. With a database containing information for nine endemic porcine pathogens and more than 1.5 million cases, SDRS is one of the largest US and international databases for veterinary diagnostic information. The SDRS has provided science-based spatiotemporal information on pathogen activity in all age categories, from boar studs to breeding herds to finishing with great representation of the US swine industry.



Incorporated in 2024, an SDRS Blast tool for PRRSV allows veterinarians, producers, and other users to compare their ORF5 sequences with those in the SDRS database, identify when and where similar sequences in the database have occurred before, and define their genetic nomenclatures by lineage, RFLP, and variant. Further, new SDRS dashboards with revamped

information debuted in 2024, improving navigation and providing new tools such as the influenza A virus state-level monitoring. Weekly monitoring of influenza A virus (IAV) PCR detection was added in the PDF reports.

Also added in 2024 is a new PRRSV ORF 5 sequence page in the PDF report. This page includes charts with information about the total number of PRRSV ORF5 sequences performed, the total number of sequences with less than 95% similarity within the SDRS database, the top Lineage and RFLP detected in the US, and the most frequent sequences detected across US states. Implementation of the PRRSV ORF5 variant classification system and display in the SDRS Blast tool also occurred.

PEDV genotype data was included in 2024 to provide new information on variant data that can be classified based on specific genetic characteristics of the spike protein as INDEL and Non-INDEL variants. Moreover, SDRS is one of the sources of information supporting the AASV PEDV Elimination Task Force established in 2024, providing data to aid the US swine industry in tracking PEDV activity in the field.

In 2024, SDRS project website pages including the dashboards and Blast tool had 2,215 unique IP visitors. Across the calendar year, 12 editions of PDF, audio, and video reports were shared via email to 474 registered receivers from 195 organizations from 15 different countries. On the FieldEpi LinkedIn page, the SDRS videos achieved more than 51,395 visualizations. SDRS hosted 12 podcast editions with 11 special guests. The SDRS YouTube channel achieved 5,162 views of video reports and education material. Audio reports were shared through podcast platforms, achieving 3,206 downloads from 23 different countries.

SDRS has shown its utility as a monitoring and early warning system that can identify and track significant and unexpected changes occurring for swine pathogens. During fall 2024, PRRSV had the highest historical percentage of PCR-positive submissions in the wean-to-market category (42.3% of positive cases) since fall 2020. The wean-to-market category represented 56% of the L1C.5 detections, with much of this activity being related to a record detection of PRRSV lineage 1C.5 within a single month (501 in November 2024).

The most frequent wild-type PRRSV-2 strains detected in 2024 were L1C.5 (L1C variant) 1-4-4, L1A 1-7-4, and L1C.2 1-2-4. Of all wild-type strains detected in 2024, over 50% (3,144) were L1C.5, breaking the record of detection within a year since its first emergence in 2020. Most of the sequences were detected in Iowa (1,873), followed by Minnesota (524), Missouri (309), Nebraska (160), and Ohio (40).

During summer 2024, PEDV had the lowest historical percentage of positive submissions in the adult/sow farm category (4.42% of positive cases). March 22, 2021, marked the last field sample received at an SDRS laboratory with a PCR positive result for TGEV. Up to December 2024, more than 165,000 submissions, including more than 400,000 samples, have been tested for TGEV with no TGEV-positive result being detected.

M. hyopneumoniae percentage of PCR-positive submissions from breeding herds have decreased substantially from 2021 (21.75%) to 2022 (13.5%) and continued to decrease in 2024 (12%). In

contrast, in the wean-to-market category, *M. hyopneumoniae* positivity reached the highest levels (27%) since the fall of 2020. However, using ISU VDL data, the number of cases with a confirmed tissue diagnosis indicating lesions for *M. hyopneumoniae* decreased over time, reaching a record low number in 2024 (203 cases).

In 2024, PCV3 maintained its detection trend as being the only pathogen with higher positivity in adult/sow farms compared to the wean-to-market category across all months. Yearly average PCV2 positivity in the adult/sow farm category decreased from 39% in 2023 to 33% in 2024. Also, PCV2-confirmed tissue diagnosis decreased in 2024 (399 cases) compared with 2023 (540).

Influenza A virus bi-seasonality pattern of PCR detection continued to occur in the spring and fall of 2024 as expected. However, the peaks of overall positivity were slightly higher in 2024 compared with 2023. In 2023, the peaks of overall IAV positivity occurred in May (34% positivity) and November (33% positivity). In 2024, the peaks of positivity occurred in March (38%) and November (35%).

In 2024, there were fewer influenza A virus subtyping and PEDV genotype tests. The majority of this decrease was attributed to testing strategies by some participant VDLs that started to offer the screening PCR separate from the subtype/genotype PCRs that were previously offered together. Also, some production systems started to test PEDV genotype in-house.
At the ISU VDL, PRRSV had the highest number of confirmed diagnoses (2,566) followed by *Streptococcus suis* (1,735) and influenza A virus (935) in 2024. Pathogens including PRRSV, influenza A virus, *P. multocida*, *Actinobacillus suis*, *Streptococcus suis*, and *Salmonella* have given increased signals for diagnosis in October and November 2024.

The information gathered and reported for the SDRS project serves as a vital resource for producers and veterinarians to monitor and identify changes in swine health. Early identification of diagnostic trends in targeted pathogens can support actions geared towards disease prevention such as increased monitoring and increased focus on biosecurity and supports SHIC's mission to reduce the threat and impact of emerging diseases.

SHIC Monitoring Emerging PRRSV-2 Lineage 1C.5 Clonally Expanded Clade

January 8, 2025 – First reported in the Swine Health Information Center June 2024 domestic disease monitoring report, an emerging PRRSV Lineage 1C.5 subclade has continued to expand, with increased detection through the fall and winter months of 2024. A team of diagnosticians at Iowa State University have led the investigation into the changing diagnostic trends of the detection of an emergent and clinically significant PRRSV-2 Lineage 1C.5 clonally expanded clade. Investigative team members Rabsa Naseer, and Drs. Jianqiang Zhang, Phillip Gauger, Giovani Trevisan and Michael Zeller have provided an update on the current situation herein.

Since its emergence in 2020, the PRRSV-2 Lineage 1C.5 has become the dominant lineage in circulation, replacing the prior dominant Lineage 1A in the US. The ISU Veterinary Diagnostic Laboratory has sequenced over 6,000 unique Lineage 1C.5 cases to date, accounting for approximately 72% of the total Lineage 1C cases sequenced at their facility from January 2020

to mid-December 2024. Many of these cases are associated with clinical disease in production systems experiencing PRRS outbreaks. The ISU VDL regularly tracks the diversity of circulating PRRSV strains using both phylogenetic and epidemiological methods, which led to the discovery of an emerging divergent clade within Lineage 1C.5. This clade was notable due to a surge in genetically similar sequences detected over a short period of time and was deemed to be clonally expanding through the swine population. Here, the ISU team has tentatively called it Lineage 1C.5 clonally expanded clade.

From July 2023 to December 2024, 945 cases of PRRSV with ORF5 sequences belonging to this clade have been identified. The ORF5 sequences of this clade exhibit high genetic similarity, with an average nucleotide difference of seven nucleotide bases (98.8% nucleotide similarity), though the entirety of the clade is within 96%. The index case was detected from a grow-finish farm in Iowa on July 20, 2023, and the majority of subsequent cases have been detected in Iowa swine farms (838), indicating a regional outbreak. This Lineage 1C.5 clonally expanded clade was first detected outside Iowa in March 2024, signaling its potential for national spread. To date, this clade has been detected in the states of Minnesota (36 cases), Illinois (17), Missouri (15), Indiana (1), Nebraska (1), South Dakota (1), and Wisconsin (1), highlighting its transmission within the swine population. This clade has been detected primarily in grow-finish farms (464), with fewer cases from breeding farms (101) and nurseries (62); however, this distribution may reflect sampling biases rather than the true prevalence across farm types.

The detection frequency of cases related to this clade of Lineage 1C.5 steadily increased throughout the fall months (**Figure 1**). After a modest but noticeable rise in cases during November and December of 2023, a significant surge occurred in early 2024. Case numbers climbed from 13 in February to 110 detections by April, nearly a tenfold increase. Although detections declined during the summer months, the strain persisted and resurged in the fall of 2024. By October, case numbers rose to 154, followed by 145 in November, and 110 as of December 26. Notably, an increasing proportion of these detections were reported outside Iowa, suggesting the strain's expanding geographic reach.

As no swine studies have yet been conducted on this clonally expanded clade of Lineage 1C.5, cycle threshold (Ct) values were used to assess potential differences that might suggest changes in the virus's clinical impact. The Ct value, a diagnostic measure from real-time PCR, indicates whether a sample is positive and semi-quantitatively reflects the amount of virus present. Median Ct values for the entire Lineage 1C.5 are dependent on sample type, with Ct’s of approximately 17.3 being observed in lung specimens and 28.9 in oral fluid specimens. The emergent Lineage 1C.5 clonally expanded clade shows a similar pattern, with Ct values of 16.8 for lung and 27.9 for oral fluid. Average Ct values for lung and oral fluid specimens from Lineage 1C.5 as a whole are generally lower than those of Lineage 1A, indicating higher viral loads. The median Ct values for Lineage 1A are 18.4 for lung specimens and 31.4 for oral fluid specimens. This indicates a higher viral load on average in the samples positive for Lineage 1C.5 compared to Lineage 1A.

Bayesian phylodynamic analysis revealed that the genetic diversity of Lineage 1C.5 peaked in February 2023 but declined steadily throughout 2024, with a sharp drop in November 2023. This pattern of decreasing genetic diversity paired with persistent high levels of detection, suggests

genetic selection favoring a strain with a transmission advantage. The effective reproduction number, which reflects the expected number of new cases generated from a single positive case, was estimated with phylogenetic methods. During the first wave in November 2023, each detected case led to about 2.7 new cases (point A, **Figure 2**). The rate dipped temporarily but climbed to 2.7 by March 2024 (point B) and rebounded to around two by October 2024 (point C) after a summer decline.

Ongoing monitoring of PRRSV genetic diversity, including the emergent Lineage 1C.5 and other strains, is crucial for effective management of PRRSV. The emergence of a new, divergent Lineage 1C.5 clonally expanded clade in Iowa, followed by its spread to other states, highlights an outbreak that warrants close attention, particularly regarding its potential to become dominant nationwide. Genetic analysis revealing a clonal expansion within Lineage 1C.5 suggests heightened transmissibility, while lower median Ct values and a higher effective reproduction number emphasize the clade's potential increased virulence and spread; but these features based on sequence analysis remain to be confirmed by experimental inoculation studies. These findings underscore the importance of continued surveillance to mitigate the impact of PRRSV outbreaks on swine health, particularly when new strains are emerging in the swine population.

Questions regarding the information contained in this article can be directed to Dr. Michael Zeller (mazeller@iastate.edu) at the ISU VDL.

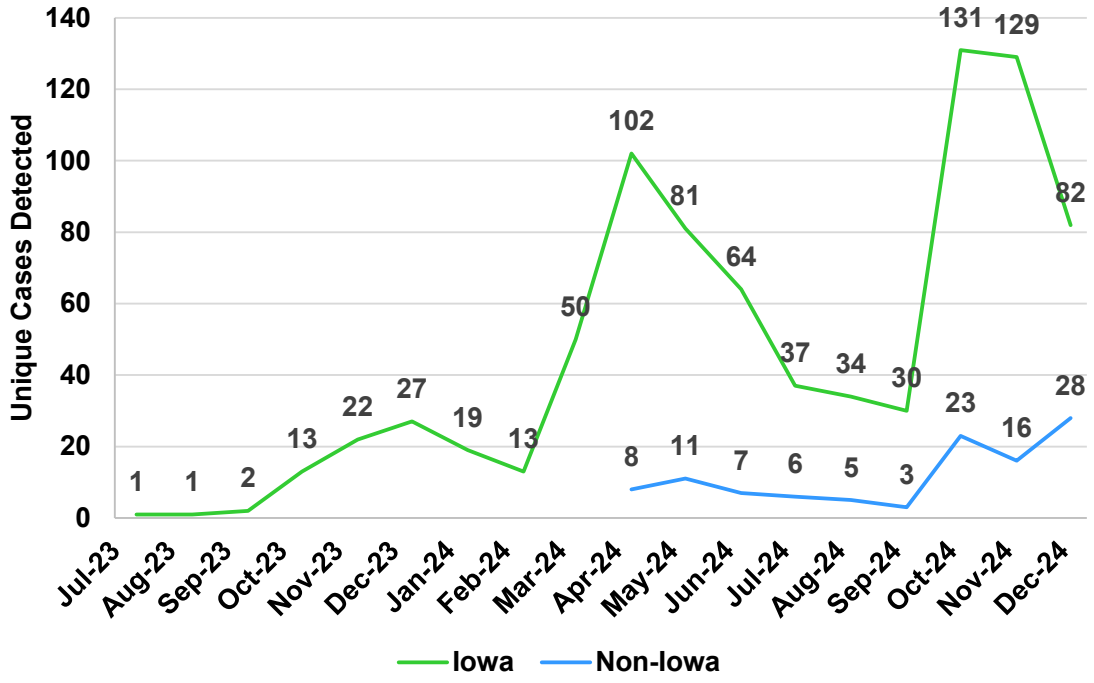


Figure 1. The number of Lineage 1C.5 clonally expanded clade cases detected each month from July 2023 to December 2024, represented with two lines: one for Iowan cases (green) and another for non-Iowan cases (blue).

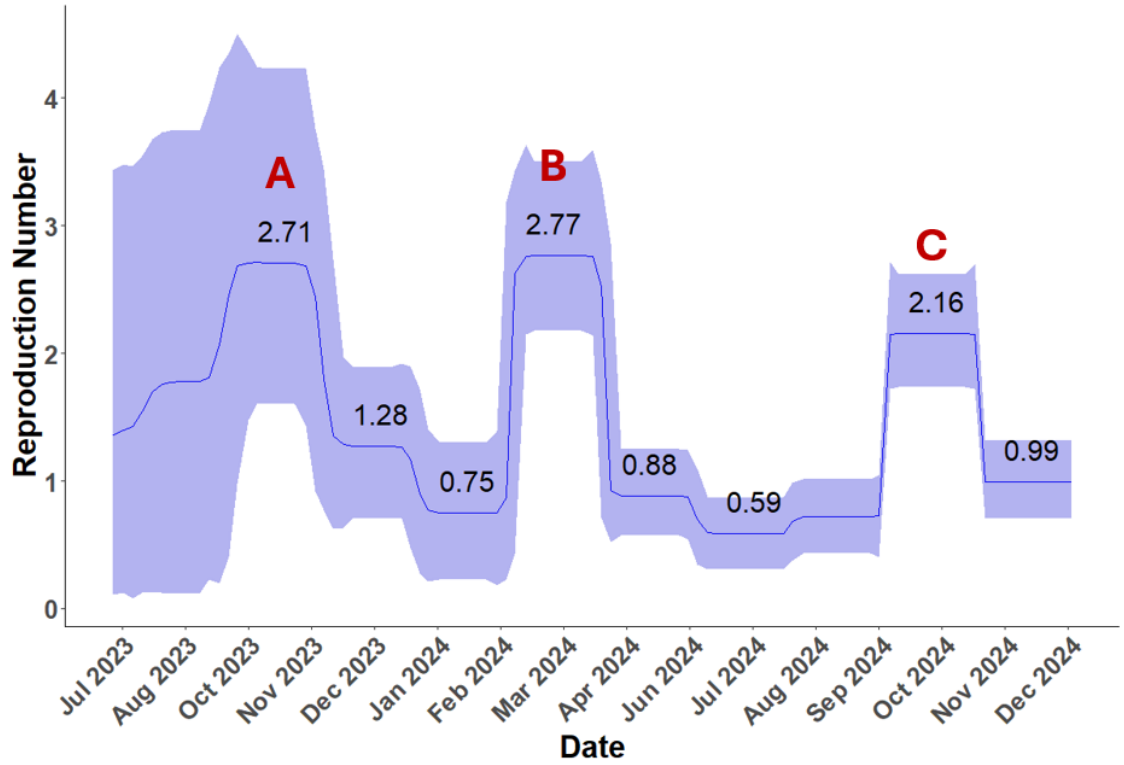


Figure 2. Effective reproduction number, measure of how many additional pigs are likely to be infected from an initial sick pig, for Lineage 1C.5 clade from July 2023 to December 2024.

SHIC-Funded MSHMP Assesses Evolutionary Dynamics of PEDV in US Throughout Last Decade

February 7, 2025 – In April 2013, porcine epidemic diarrhea virus emerged in US pigs for the first time and since then has been an endemic pathogen causing significant production impacts to the swine industry. Team members including Drs. Joao Paulo Herrera da Silva, Nakarin Pamornchainavakul, and Kimberly VanderWaal partnered with the SHIC-funded Morrison Swine Health Monitoring Project ream members Drs. Mariana Kikuti, Xiaomei Yue and Cesar Corzo of the University of Minnesota, to assess the long-term evolutionary dynamics of PEDV in US pigs a decade after its initial introduction to help guide practitioner strategies for future PEDV control.

PEDV causes acute enteric disease in nursing and post-weaning pigs with severe clinical signs in neonatal piglets, leading to significant economic losses. After the introduction of PEDV to the US in 2013, it spread rapidly and quickly emerged across 31 states. Two strains, indel and the more virulent non-indel, have been identified in the US to date. However, the current evolutionary status of PEDV in the US over the last 10 years remains largely unexplored. This MSHMP study provides an overview of PEDV evolution over the past decade.

Following PEDV introduction in the US, a high number of cases were reported through the MSHMP network during the first two years (gray bars in **Figure 1**), declining in the third year, and stabilizing thereafter with slight fluctuations. An exception was noted in 2021 when the incidence of PEDV was higher compared to all remaining years during the endemic period.

Sequencing surveillance was also more intense during the epidemic phase (blue line in **Figure 1**), decreasing afterward with a consistent trend. During the endemic period, approximately one sequence was generated for every 10 infected sow farms in MSHMP (red line in **Figure 1**).

To assess the evolutionary dynamics of PEDV, the MSHMP team analyzed 556 spike protein sequences, focusing exclusively on the non-INDEL strain, which is predominant in the US. Although PEDV spike protein sequences exhibit high similarity (average nucleotide identity = 99.7%), a strong pattern of genetic differentiation was detected across time. Most sequences generated after 2017 clustered into two small sub-clades (red boxes, **Figure 2**). Circulation of these clades is restricted to specific geographic regions, suggesting compartmentalized circulation within those regions and limited spread between sow farms in different regions. This insight helps determine the risk of re-introduction of PEDV if it were regionally eliminated. No descendants derived from other clades present during the epidemic period were detected, suggesting that these clades are no longer circulating in the US (**Figure 2**).

Continued sequence surveillance is vital for the swine industry to advance toward disease eradication and is key to a) confirming the extinction of older clades, b) mapping the distribution of recent clades, and c) understanding PEDV's evolutionary diversification. Taken together, this information can guide the strategies adopted by practitioners for PEDV control.

Find the MSHMP report here.

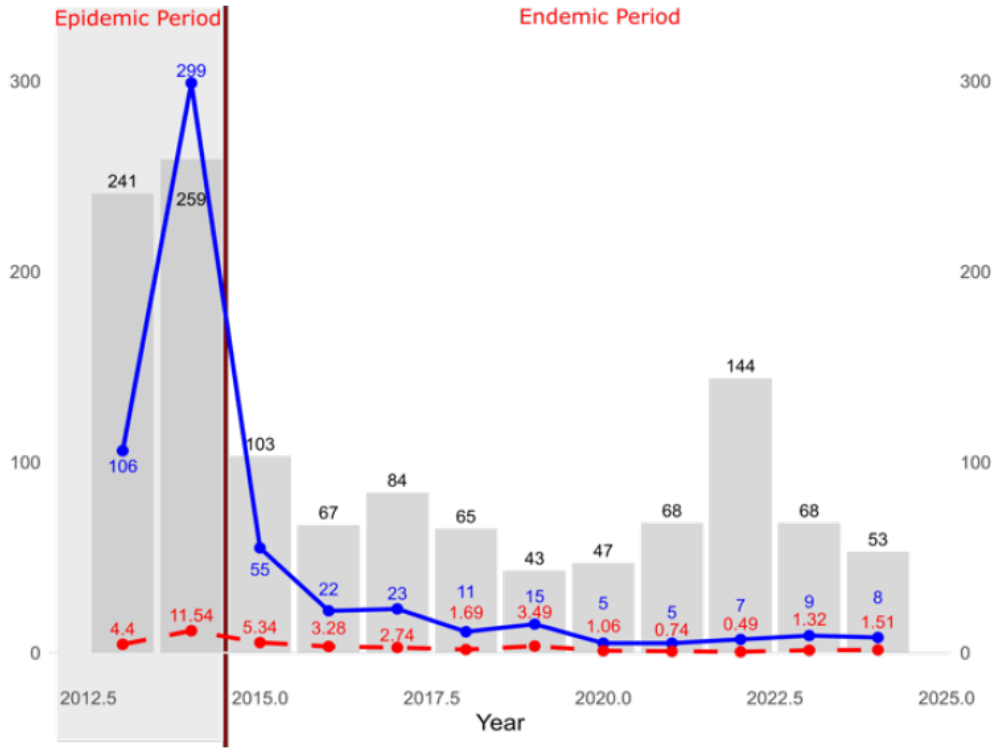


Figure 1. Bars represent the number of cases per year reported to the MSHMP. The solid blue line represents the number of spike protein sequences available. The dashed red line represents the number of sequences per 10 reported outbreaks. The brown line marks the boundary between the endemic and non-endemic periods.

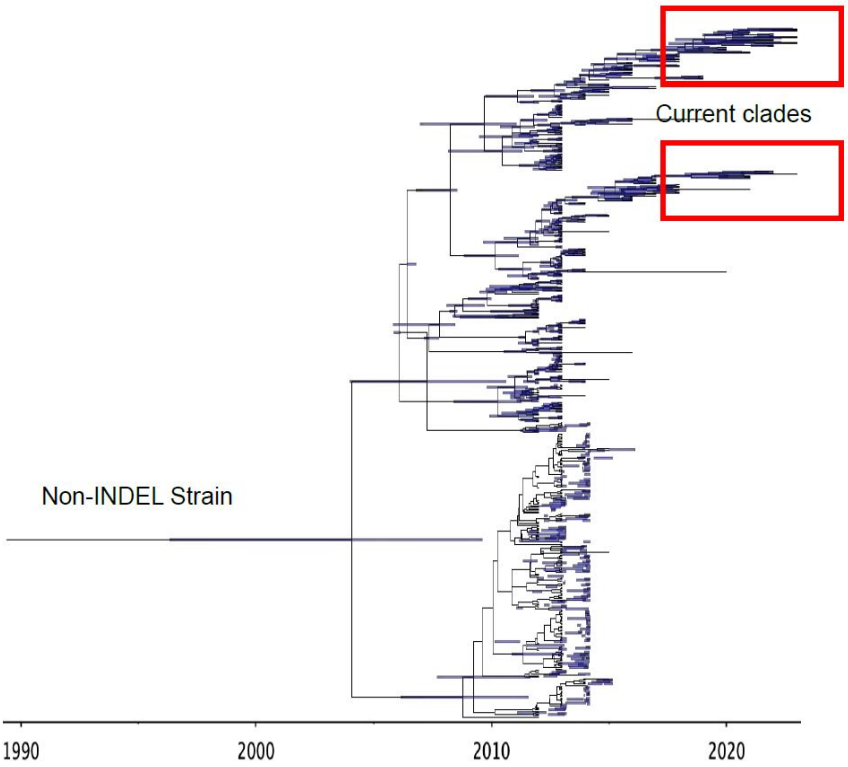


Figure 2. Time-scaled tree of PEDV spike protein for non-indel strains.

SHIC-Funded SDRS Analyzes VDL Data to Identify Trends for PCV2 and PCV3

February 28, 2025 – Porcine circoviruses, including porcine circovirus 2 and porcine circovirus 3, have been associated with clinical syndromes in swine, resulting in significant economic losses. To better understand the epidemiology and clinical relevance of PCV2 and PCV3, the Swine Health Information Center helped fund a study to analyze diagnostic data collected between 2002 – 2023 for PCV2 and PCV3 from six US veterinary diagnostic laboratories. The research, led by Drs. Giovani Trevisan and Daniel Linhares at Iowa State University, aimed to evaluate the macroepidemiological trends of aggregated PCV2 and PCV3 PCR data over time, establish the real-time capacity to rapidly identify changes in PCV2 and PCV3 detection patterns, and investigate the association between PCV-positive PCR cycle threshold (Ct) values and confirmed PCV disease diagnosis in tissues.

Guilherme Cezar, the graduate student working with the team, reported a decrease in the percentage of PCV2-positive submissions after introducing a commercial PCV2 vaccine in 2006 and a resurgence in positivity after 2018. The 2018 resurgence was primarily in breeding herds associated with an increased number of processing fluid sample submissions. PCV3 detection was more frequent in adult/sow farms, while PCV2 was more frequently detected in the wean-to-market category. An interpretative Ct cutoff of 22.4 for PCV2 was associated with a high probability of confirming a PCV2 disease diagnosis through histopathology. For PCV3, the interpretative Ct cutoff with the highest performance was 26.7.

See the published study with references here. Visit the SDRS site here.

Porcine circovirus-associated disease (PCVAD) can cost producers an average of $3–4 per pig in economic losses, demonstrating the importance of monitoring and controlling these pathogens in swine farms. Due to the complexity of monitoring PCV clinical cases, there is a need to develop tools to reveal and monitor changing patterns of PCV2 and PCV3 detection in swine farms. This study used aggregated PCR cases reported by VDLs for PCV2 and PCV3 detection to unravel the megatrends of these viruses in the US over the last two decades.

PCV2 and PCV3 submissions from 2002 to 2023 were collated using distinct accession IDs. PCR results reported by the VDLs (positive, negative, suspect, or inconclusive) were used to establish the final case result in the database. For cases to be considered positive, at least one sample within the case was required to be PCR-positive. Alternatively, negative cases had to have negative PCR testing results across all samples. Suspect and inconclusive cases were reported according to each laboratory criteria.

A variable age category was created based on the farm type, age unit, and age variables provided by VDL submissions. If the farm type was provided, the age category was assigned based on this variable (e.g., suckling piglets, breeding herd, nursery, grow-finish, replacement, boar stud). When the farm type was not provided, the age category was established based on the age of the animals (0–21 days as suckling piglets; 22–63 days as nursery; 64–200 days as grow-finish; >200 days as adults). Then, the age categories were aggregated into phases: adult/sow farm (breeding herds, replacement, boar stud, suckling piglets, and adults) and wean-to-market (nursery and grow-finish). Submissions lacking information regarding farm type, age, or age unit were categorized as unknown.

The Ct values of the PCR results were aggregated using the positive samples within a laboratory submission to calculate the average, minimum, and maximum PCR-positive Ct values. For example, a submission with three positive samples for PCV2 with Ct values of 34, 33, and 23 had an average, minimum, and maximum Ct value assigned as 30, 23, and 34, respectively. The number of positive samples was assigned based on distinct sample IDs within a case. In cases where the sample ID had more than one result, such as retesting the same sample, the most recent reported result date was retained.

The final PCR database comprised 154,984 PCV2 cases from 2002 to 2023. The first PCV3 PCR data was recovered in 2016 and had a total of 49,975 cases tested up to December 2023. The generated and aggregated information was made publicly available in an online visualization platform at the SDRS website. Data analysis of PCR test results, sample type, and age group revealed several key findings. PCV2 cases averaged nearly 6,000 annually from 2002 to 2017, rising to over 10,800 annually from 2018 to 2023. While the percentage of PCV2 positive cases peaked in 2006 (75%), it dropped significantly by 2011 (27%) and then rose again, averaging around 41% from 2018 to 2023. PCV3 testing became more frequent after 2018, with positive case percentages averaging around 50% per season. The study also noted an increasing trend of concurrent PCV2 and PCV3 detection since the introduction of multiplex PCR testing, which also contributed to the increase in the frequency of PCV3 cases reported after 2018.

Sample types submitted for testing also changed over time. While tissue samples were initially the most common for PCV2, processing fluids became the most frequently submitted sample

type for both PCV2 and PCV3 after 2018. The age category unknown decreased significantly over time due to improved data capture.

Further, tissue diagnostic data from one VDL between 2019 and 2023 was used to correlate PCR Ct values with confirmed PCV2 and PCV3 disease diagnoses. The analysis, which considered only cases with tissue evaluations by diagnosticians, aimed to establish interpretative Ct cutoffs. Using a logistic regression model, a Ct cutoff of 22.4 for PCV2 and 26.7 for PCV3 was associated with a high probability of confirming a disease diagnosis through histopathology. These cutoffs represent the point where the likelihood of disease, despite a positive PCR result, decreases significantly. Specifically, Ct values above these cutoffs suggest that while the virus may be present, it is less likely to be contributing to clinical disease.

This study unraveled the macroepidemiological aspects of PCV2 and PCV3 in the US swine population. Additionally, a PCV2 monitoring tool based on the interpretative Ct cutoff results was implemented into the SDRS project and added to monthly PDF reports for continuous updates. Monitoring average Ct values of PCV2 tissue cases in the US helps to alert the industry when the average Ct of submissions is below 22.4 and can aid producers and veterinarians in recognizing higher PCV2 activity in the field. The study also sheds light on PCV3 detection trends, contributing to further investigations regarding virus dynamics. Detection megatrends revealed under this work can be used to further guide research questions and design experimental or field-based trials to explore and clarify root causes of secular trends in PCV2 or PCV3 detection.

This information will help pork producers and their herd veterinarians understand these pathogens and aid in disease management decision making. This research provides valuable insights into the evolving epidemiology of PCV2 and PCV3 in US swine herds. The established Ct cutoffs offer a practical tool for interpreting PCR results and may aid in disease management decisions. The study also highlights the importance of ongoing surveillance and data analysis to understand the complex dynamics of these economically significant swine pathogens.

MSHMP Funding Renewed by SHIC with Deliverables Outlined in Annual Report

April 28, 2025 – The Morrison Swine Health Monitoring Project, funded by the Swine Health Information Center, submitted its annual report containing updates on their three primary objectives. Dr. Cesar Corzo, MSHMP principal investigator, and colleagues at the University of Minnesota, monitor trends in pathogen incidence and prevalence, conduct prospective monitoring of PRRSV sequence evolution and impact, and support producer participants to increase relevance and deliverables to the swine industry. During their January 2025 meeting, the SHIC Board of Directors renewed MSHMP funding, further enabling the voluntary project designed to survey, detect and facilitate timely response to emerging infectious swine diseases in the US.

Find the industry summary of the MSHMP annual report, project #23-078, on this page.

MSHMP's first objective is to monitor trends in pathogen incidence and prevalence, focusing on PRRSV, PEDV, PDCoV, Senecavirus A, and central nervous system associated viruses. During

2023-2024, MSHMP developed a method to estimate the cumulative incidence of Senecavirus A in the US breeding herd. Fortunately, the SVA cumulative incidence remained below 2.5%, with most of the years remaining below 0.5%. Another objective was to estimate the time herds required to eliminate PEDV and explored associated factors. A significant reduction in time to consistently wean PEDV negative piglets was observed when comparing epidemic (i.e., 24 weeks) versus endemic (i.e., 13 weeks) stages of the disease in the US. Factors such as previous immunity, herd size, and season when the outbreak occurred were associated with the time to wean PEDV negative piglets.

Conducting prospective monitoring of PRRSV sequence evolution and impact is MSHMP's second objective. During 2023-2024, MSHMP continued to curate its PRRSV ORF5 database. This database has enabled multiple collaborations, including outbreak investigations and, most recently, the development of the new PRRSV classification system. Thanks to this new classification system, MSHMP was able to identify a new variant of concern PRRSV L1H.18, allowing the team to communicate this finding to the industry in a timely manner. Fortunately, the L1H.18 variant does not seem to have the same transmissibility as L1C.5; however, vigilance remains necessary. MSHMP also developed a mechanism to identify herds with a prolonged time-to-stability post PRRSV-outbreak and is currently beta testing this methodology.

MSHMP's third objective, expanding participation of producers to allow for all to be involved, continues to show progress. One production system was added in 2023-2024 and enrollment of a second system is expected soon. The MSHMP website continues to be finetuned and updated with the information readers are requesting with over 4,400 views measured in 2024. The most visited section is related to reports, totaling 1,400 views. Interestingly, MSHMP is seeing website visitors that are located around the world, with the US and China as the main consumers. During 2024, the team and collaborators published a total of nine peer reviewed manuscripts which speaks to the relevance and versatility of the dataset.

Altogether, MSHMP provides swine disease knowledge and tools that support crucial information for the industry, particularly as discussions about disease eradication and other health management strategies arise. The comprehensive data and analyses play a vital role in guiding informed decision-making and strategic planning for disease management and eradication efforts for US swine producers and veterinarians.

SHIC-Funded SDRS Yields Valuable Influenza Surveillance Data

May 28, 2025 – Influenza A virus is a significant respiratory pathogen affecting various species, including swine. The dynamics and diversity of IAV require ongoing surveillance to enhance understanding and generate solutions for control. A recent publication, led by PhD student Dr. Daniel Moraes under mentorship of Swine Disease Reporting System Principal Investigators Drs. Giovani Trevisan and Daniel Linhares at Iowa State University, reported influenza surveillance data gathered from the SDRS, a project funded by the Swine Health Information Center. Published in Frontiers of Veterinary Science in April 2025, results detail 20 years of compiled veterinary diagnostic laboratory data on IAV and provides unique insight into understanding its epidemiology.

Using a comprehensive approach, this study aimed to characterize the macroepidemiological patterns of IAV detection utilizing PCR assays, including subtype identification, over the last 20 years. The findings offer valuable insights into IAV dynamics across the US, detailing its distribution by age category, specimen type, and seasonal trends. Specifically, samples submitted between January 2004 and December 2024 to VDLs participating in the SDRS were analyzed and revealed a substantial 31% of the 372,659 samples tested positive for IAV RNA.

Regarding sample types tested for IAV, oral fluids (44.1%) and lung tissue (38.7%) emerged as the most frequently submitted sample types, indicative of their utility in surveillance. Notably, the wean-to-market category exhibited a higher positivity rate at 34.4% compared to the adult/sow farm category's 26.9%, emphasizing the importance of this age group in IAV ecology. A similar phenomenon has been previously reported for PRRS and PED viruses. The study also revealed a consistent seasonal pattern, with IAV detection peaking in spring and fall and decreasing during the summer months.

Further insight into IAV diversity was gained through subtyping of 118,490 samples. The most prevalent subtypes identified were H1N1 (33.1%), H3N2 (25.5%), and H1N2 (24.3%), with H3N1 detected at a much lower rate of 0.2%. Interestingly, mixed subtypes were identified in 5.4% of samples, with partial subtype detection in 11.5%. The presence of mixed IAV subtypes in individual samples, including lung tissue, nasal swabs, and bronchoalveolar lavage, provides evidence of co-infection with multiple IAV strains. For forecasting IAV trends, improved modeling methods were established to inform stakeholders of weekly changes in IAV detection patterns and enhance accuracy in predictive capabilities.

This work underscores the importance of IAV as a major respiratory pathogen in swine and highlights the ongoing need for monitoring to understand its epidemiology. Specifically, this study highlights the indispensable role of laboratory submission data in robust IAV surveillance and macroepidemiological analysis. The consistent detection of mixed IAV subtypes in lung tissue further emphasizes the complex nature of IAV infections.

As an outcome of the study, the authors recommend the establishment of standardized monitoring systems within VDLs, which will enhance the understanding of IAV in swine populations and enable more timely identification of surveillance trends. Overall, the collation of IAV detection data over 20 years within this study assists in informed decision-making based on the generated macroepidemiological information. Real-time updated IAV monitoring information is available in the SDRS website dashboards, and through SHIC's monthly Domestic Disease Monitoring Reports.

SHIC-Funded MSHMP Study Sheds Light on Senecavirus A Incidence in US Swine Herds

July 18, 2025 – Senecavirus A is an endemic pathogen that remains an ongoing concern to the US swine industry. Its clinical presentation is characterized by vesicular lesions on the snout and feet, closely mimicking those caused by economically devastating foreign animal diseases such as foot-and-mouth disease. A recent publication, led by Drs. Mariana Kikuti, Cesar Corzo, and the Morrison Swine Health Monitoring Project team at the University of Minnesota, examines how frequently new SVA outbreaks occur in breeding herds. This work helps to understand virus

spread, as well as when and where it is most detected, and estimates the cumulative incidence of SVA in the US to quantify disease burden. Published in the journal *Animals* (2025,15,1650), results provide epidemiologic insights into SVA across US breeding herds from January 2015 to December 2024 through analysis of data gathered from the SHIC-funded MSHMP.

As an endemic pathogen, SVA impacts animal health through causing vesicles as well as lameness and lethargy. Further, SVA is clinically indistinguishable from FMD, making investigations for every suspected case necessary to rule out a foreign animal disease and placing a significant burden on state and federal animal health agencies. A major SVA outbreak in 2015 raised concerns across the US swine industry. However, since then, there has been a gap in comprehensive research on how often SVA occurs across US pig farms.

Data included in this study is comprised of SVA PCR results originating from production systems participating in MSHMP as well as the type of specimen submitted and the official Premises Identification Number. Currently, the sow population participating in MSHMP represents approximately 60% of the total US breeding herd. As MSHMP involves a dynamic cohort, the number of breeding herds monitored throughout the study period varied, ranging between 1063 and 1183 sites per calendar year. Through the laboratory surveillance, a total of 36,400 SVA PCR submissions were provided by the University of Minnesota and Iowa State University VDLs from January 2015 to December 2024. This robust dataset allowed for the assessment of SVA incidence, identification of temporal fluctuations, and characterization of regional patterns.

Despite its clinical significance, the cumulative incidence of SVA in US breeding herds remained low, generally less than 2.5% per year across the 10-year study period. This suggests that while SVA continues to circulate, it affects a relatively small proportion of breeding herds annually. For sites experiencing more than one SVA outbreak, the median time interval between outbreaks was approximately 402 days, highlighting the potential for re-introductions and/or persistent circulation within herds.

A notable temporal pattern was observed, with peak SVA incidence occurring during the third and fourth quarters of the calendar year (July to December). This suggests seasonality influences disease transmission dynamics. A compilation of reports from multiple VDLs further supports this observation, with a consistent increase in the frequency of SVA cases during summer months. This seasonality requires further investigation, particularly given the limited understanding of between-farm transmission risk factors for SVA.

Regional patterns were also identified, with SVA outbreaks more frequently reported in the Midwest region of the US. Though this finding is confounded with the high density of swine production in the Midwest, efforts to better assess disease distribution are still needed. The temporal and regional patterns suggest seasonal fluctuations and a regional disease burden, emphasizing the need for continued surveillance to better understand SVA dynamics across the country.

As discussed in the study, the potential role of factors like personnel and animal movement, dead animal management, fomites (e.g., trailers) and even potential vectors (e.g., flies) in SVA

transmission reinforces the importance of stringent biosecurity protocols. Further, the study highlighted the ongoing gap in knowledge for SVA epidemiology in growing pig populations, which were not the primary focus of this study but are known to be affected.

Overall, this study provides valuable, data-driven insights into the current epidemiology of SVA, enabling veterinarians and producers to enhance prevention and control strategies. It underscores the ongoing need for robust and collaborative surveillance systems that integrate on-farm observations with laboratory diagnostics to provide a comprehensive picture of SVA dynamics. Specifically, the observed seasonality and regional concentration suggest opportunities for more targeted biosecurity enhancements and surveillance efforts, particularly in the Midwest during the latter half of the year.

While SVA's overall incidence in US breeding herds remains low, continued awareness of SVA as a differential for vesicular lesions is paramount to promptly trigger an FAD investigation to rule-out trade-limiting diseases such as FMDV. This decade-long surveillance data from MSHMP, a project supported by SHIC, serves as a crucial resource for the US swine industry, informing strategies to safeguard animal health and ensure industry stability. Ultimately, this work underscores the importance of collaborative data sharing among producers, veterinarians, and academic institutions to improve the management of SVA and other swine diseases in the US.

Reference

Kikuti, M.; Yue, X.; Melini, C.M.; Vadnais, S.; Corzo, C.A., Senecavirus A Incidence in U.S. Breeding Herds: A Decade of Surveillance Data, MDPI Animals (2025, 15,1650). https://doi.org/10.3390/ani15111650

New Monthly PRRSV Variant Report Launches with SHIC Support

September 4, 2025 – A new national surveillance effort enhances decision-making in swine health by identifying and communicating emerging PRRSV variants. Dr. Mariana Kikuti, recently appointed assistant professor at the University of Minnesota, is leading the development of the PRRSV Variants Under Monitoring (VUMs) Monthly Report in collaboration with the SHIC-funded Morrison Swine Health Monitoring Project and the PRRS-Loom analytical platform. The report, launched in August 2025, is designed to give producers and veterinarians an early warning of potential threats, improving preparedness and coordinated response across the industry.

This initiative utilizes the PRRS-Loom tool, a machine-learning model that analyzes 603 ORF5 bases to classify viruses by lineage, sublineage, and variants. These classifications are combined with a forecasting algorithm that anticipates whether a variant is likely to expand significantly, defined as more than a 20% increase in the next year, based on retrospective data with 77% accuracy (Pamornchainavakul et al., 2024). When integrated with the near real-time MSHMP data, the approach allows the new report to identify where specific PRRSV variants are already present and estimate their potential for wider spread.

PRRSV variants are defined as closely related viruses based on ORF5 gene similarity, typically differing less than 2.5% within a variant and 5% from the nearest related variant. VUMs

specifically represent PRRSV-2 variants circulating in the US that show genetic and epidemiologic indicators of wider transmission. To highlight urgency and guide responses, VUMs are categorized into four levels according to the number of sites impacted over the past six months:

- Level 1 involves up to 30 sites
- Level 2 involves 31–50 sites
- Level 3 involves 51–100 sites
- Level 4 involves >100 sites

Reports for Level 2 or higher VUMs will include expanded epidemiological discussion, examining affected sequences, sites, systems, and states. These summaries will be accompanied by epidemiological curves showing variant dynamics over time and situation reports that provide context for ongoing industry response. Together, these tools give stakeholders greater situational awareness, helping veterinarians and producers adjust strategies before a variant reaches wider distribution.

Dr. Kikuti and her team are committed to making this information broadly accessible and focused on actionable information for producers. The VUM reports will be circulated to MSHMP participants, shared in SHIC's monthly e-newsletter, and made publicly available on both the MSHMP website and the PRRS-Loom platform.

Incorporating *E. coli* into the SHIC-Funded Swine Disease Reporting System

October 7, 2025 – The recent addition of *E. coli* PCR genotyping to the SHIC-funded Domestic Swine Disease Monitoring Report continues to show support towards evidence-based herd health decision-making across the US pork industry. *E. coli* is a significant pathogen in swine, most frequently associated with neonatal and post-weaning diarrhea. With the inclusion of *E.coli* in the Swine Disease Reporting System published in monthly SHIC communications, producers, veterinarians, and researchers now gain access to real-time surveillance data on one of the most important and complex pathogens affecting pigs today.

Find the industry summary for Swine Health Information Center project #24-017 here.

Dr. Giovani Trevisan, co-principal investigator with Dr. Daniel Linhares for the SDRS at Iowa State University, explained, "The decision to add *E. coli* was in response to requests from the SDRS Advisory Board and multiple stakeholders in the industry. *E. coli* is a significant and complex pathogen affecting swine health, responsible for a wide range of diseases. The SHIC Swine Bacterial Disease Matrix ranks *E. coli* as the 5th most prioritized and clinically important bacterium for the US pork industry, with a score of 21.7, second only by a narrow margin to the 21.8 score for *M. hyopneumoniae*. That ranking underscores how concerning it truly is."

Understanding and Reporting on this Significant Pathogen

E. coli remains a challenge for bacterial disease management within swine populations because of its diverse pathotypes and its capacity to cause severe economic loss. Its clinical manifestations range from post-weaning diarrhea to edema disease, conditions that can undermine welfare while also inflating production costs. For years, stakeholders have recognized the value of broader surveillance of this pathogen. With the integration of *E. coli* into the SHIC

monthly reports, this information is now available for producers and veterinarians to use in the management of *E. coli* challenges.

According to Dr. Trevisan, building the infrastructure necessary to add *E. coli* to SDRS was a complex process. “The efforts to add *E. coli* started in February 2024, with a learning journey on how to report a complex pathogen such as *E. coli*. The data organization and hub development began shortly after SHIC funded the proposal. What became clear was the need for extensive standardization across participating veterinary diagnostic labs.”

This process of data organization reflected the inherent complexity of the pathogen. Unlike many viral targets characterized in SDRS, *E. coli* behaves both as a benign commensal organism and as a highly pathogenic agent. To interpret results meaningfully, the surveillance network needed to account for genotypes, virotypes, and virulence factors that define pathogenic potential. Harmonizing submissions across laboratories to achieve this level of granularity requires significant cross-institutional collaboration.

The inclusion of *E. coli* data in SDRS now provides unprecedented insight into bacterial disease dynamics on a national scale. As Dr. Trevisan described, “With this expansion, producers, practitioners, researchers, and other stakeholders have access to centralized, near-real-time data on testing results, including *E. coli* genotyping PCR targets, virotypes, and pathotypes being detected. The advantages are multifaceted.”

Insights Gained in Developing the *E. coli* Report

The process of integrating *E. coli* into SDRS was championed and became part of the master of science degree thesis of Elisa de Conti and has already yielded important learnings that further highlight the complexity of this pathogen. Dr. Trevisan observed, “We learned that *E. coli’s* complex ecology demands a reporting system that is both comprehensive and flexible. Reporting must occur at the sample level, understanding what was detected within each isolate or sample submitted for genotyping PCR. This approach enabled us to classify submissions as potentially pathogenic or not, which is fundamental for epidemiological interpretation.”

Several findings have surfaced during this preparation. Approximately one-third of tested samples lacked pathogenic potential, demonstrating the need for nuanced reporting. Since 2017, detections of fimbriae have shifted, with F18 steadily increasing while K88 (F4) declined. Among virotypes, the combination of F18:LT:STa:STb:Stx2e emerged as the most frequently found across multiple states. Specifically, this F18:LT:STa:STb:Stx2e virotype was the most frequently detected in 2024, representing 37.8% (389/1,030) of the virotypes. Perhaps most notably, since 2021, hybrid ETEC/STEC pathotypes have been detected more frequently than classic ETEC strains, signaling a significant epidemiological shift in circulating *E. coli* populations.

These trends provide actionable intelligence. For veterinarians, recognizing a rising prevalence of certain virulence factors can inform vaccine and treatment strategies tailored to herd needs. For the broader industry, an understanding of regional patterns supports collaborative approaches to mitigation and control.

The benefits are highly practical. Diagnostic decision-making can be enhanced, especially considering emerging pathotypes such as the hybrid ETEC/STEC strains. These variants, increasingly documented in SDRS since 2021, present new challenges in field diagnosis and require close monitoring. On a herd level, veterinarians can use SDRS data to identify regional or age-specific trends, allowing them to proactively adapt herd health plans to shifting disease pressures.

Economic implications are also significant. Targeting interventions—such as adjusting vaccine selection in response to shifts in fimbriae types like the growing prevalence of F18 over the declining K88 (F4)—can reduce unnecessary costs while improving effectiveness. For epidemiologists and researchers, the new system facilitates clearer distinctions between pathogenic and non-pathogenic sample findings, thereby supporting future investigations into population-level trends.

Growing System Capacity for the Future

Dr. Trevisan stressed the broader implications of this report stating, "The addition of *E. coli* demonstrates how the SDRS can evolve with industry needs. It also positions the system for future incorporation of other bacterial pathogens. Just as importantly, this module serves as proof of concept that cross-laboratory collaboration coupled with targeted data curation can yield practical, accessible tools for the field."

Future enhancements are being discussed for consideration. Stakeholders have expressed interest in integrating bacterial culture results and antimicrobial susceptibility profiles into the reporting system. Such additions would create a more holistic view of *E. coli*, potentially connecting molecular detection trends with real-world treatment outcomes. For producers, this would translate into even faster access to actionable intelligence that drives profitability and herd well-being.

The expansion of the SHIC Domestic Swine Disease Monitoring Reports to include *E. coli* genotyping and virotyping data provides valuable insights into the trends and geographic distribution of this pathogen. This information can be used to identify regional trends in virulence genes, inform disease control strategies, and reduce the production impact of *E. coli* on US swine.

SHIC-Funded Domestic Swine Disease Surveillance Project Annual Report Leads to 2025-2026 Renewal

December 4, 2025 – The Swine Health Information Center has renewed funding for the Domestic Swine Disease Monitoring Report through September 2026. Leading the project are Drs. Giovani Trevisan and Daniel Linhares at Iowa State University. Since 2017, SHIC has funded the reports under the Swine Disease Reporting System initiative, focusing on the analysis and reporting of collated veterinary diagnostic laboratory data to identify emerging endemic disease trends. Reports provide producers with an early warning system to prompt preventative actions such as increasing herd surveillance and heightening biosecurity or biocontainment measures. SDRS is the largest publicly available source of swine health information from six US veterinary diagnostic labs and represents >97% of all swine samples submitted for testing.

Reported data includes activity of nine pathogens across all age groups, production phases and sample types.

The annual report highlighting activities and accomplishments of the Project from October 2024 – September 2025 can be found as SHIC project #24-098 here.

SDRS continues to provide real-time, science-based information on endemic and emerging pathogens, supporting early detection and disease management efforts to benefit the US swine herd. Continuously updated metadata includes site state, date of receipt, farm type, pig age, and PCR test results for several endemic swine pathogens, namely PRRSV-1, PRRSV-2, PEDV, PDCoV, TGEV, *M. hyopneumoniae*, PCV2, PCV3, *Escherichia coli*, and IAV. Additional PRRSV ORF5 sequencing information, organized by lineage, variant, and RFLP, with a feature to search and compare a provided sequence, is also available.

Data includes pathogen activity across all age groups, from boar studs to breeding herds to grow-finish pigs, and a wide variety of specimens, including biological, feed, and truck/environmental samples. The six participating laboratories are ISU-VDL, UMN-VDL, SDSU-ADRDL, KS-VDL, OH ADDL, and Purdue ADDL. SDRS pathogen monitoring supports programs such as the PEDV Elimination Task Force and providing information for the US SHIP program.

In the last year, a major update to SDRS included implementing a new PRRSV ORF5 variant and PRRSV-1 lineage classification system in the dashboards and the PRRSV BLAST tool. Adding a PRRSV variant and lineage classification in the online dashboards aids in epidemiological investigations and enables monitoring of emerging new variants, such as the 1C.5.32 that started to have clonal expansion in 2024. Educational material to help interpret the new PRRSV ORF5 sequence data was published on the SDRS YouTube channel. In addition, revamped SDRS state-level monitoring and PRRSV ORF5 sequence dashboards were updated on the SDRS website. State-level monitoring was updated through the development of an internal analytical tool to analyze state-level changes, providing producers and veterinarians with increased granularity of PRRS distribution. Leveraging SHIC funding, this work was developed in partnership with a USDA funded project.

A new PEDV facility category was also introduced last year to monitor PEDV PCR activity across truck washes, packing plants, and vehicles. This addition provides information about the positivity of PCR submissions coming from these facilities. This data helps producers and veterinarians understand PEDV detection dynamics outside of the farm during transport and harvest, raising alerts for enhanced biosecurity when PEDV activity is high in the facility category.

A new SDRS survey was created and is available on the SDRS website to allow stakeholders to provide input about potential ideas for continued SDRS improvements and expansions. This new tool enables anonymous suggestions to be offered to the SDRS team, creating a new channel for feedback from the industry to suggest SDRS changes, in addition to the SDRS Advisory Council.

From October 2024 to September 2025, 12 monthly PDF and audio reports were disseminated within the SHIC newsletter, summarizing diagnostic results from the six participating

laboratories. These reports were also distributed via email to 686 subscribers from 236 organizations, a 44% increase from the previous year, and reached 21 countries. Video summaries on LinkedIn, YouTube, and Instagram accumulated over 67,000 views.

SDRS continues to provide high-value disease surveillance reports through integrating, monitoring and sharing information regarding emerging and re-emerging swine health threats. Renewal of the program will allow SDRS to continue to enhance domestic swine disease monitoring, inform pathogen elimination programs, support informed decision-making, and help protect the health and productivity of the US swine herd. SHIC support is also contributing to a path for SDRS to actively train the next generation of animal health professionals on surveillance approaches. During 2025, an MBA, MS, and PhD student acquired their degrees working with the SDRS while another PhD student used SDRS content in one of their PhD chapters.

Monthly Domestic Swine Disease Monitoring Report Summaries

The SHIC Domestic Swine Disease Monitoring Reports have provided the only publicly available source of swine health information from US VDLs on pathogen activity in all production phases and sample types submitted for 9 endemic porcine pathogens. Continued to be positioned as one of the largest global databases for veterinary diagnostic information, the Reports have been published since March 2018 and include robust diagnostic data with statistical analyses on PRRSV, PEDV, PDCoV, TGEV, MHP, IAV, PCV2, PCV3 and *Escherichia coli*. Reports provide science-based spatiotemporal information on endemic pathogen activity accounting for >96% of all swine samples submitted to US VDLs, offering broad representativeness and assisting US pork producers and swine veterinarians in making informed decisions on disease prevention, detection and management.

Summaries of the Domestic Swine Disease Monitoring Reports published in 2025:

January 6, 2025. This month's Domestic Swine Disease Monitoring Report brings information about a turning point in the case positivity of PRRSV with a moderate decrease in detection for the wean-to-market category (42% in December compared with 46% in November). The positivity was mainly driven by the PRRSV lineage 1C.5, which represented over 50% of all wild-type detections in 2024. PEDV, PDCoV, *Mycoplasma hyopneumoniae*, and influenza A positivity ended the year following the overall expected detection curve but with above-forecasted detection levels for some state-specific baselines. In the confirmed tissue diagnoses, there were alarms for increased PRRSV, *Streptococcus suis*, *Pasteurella multocida* as the three most frequent diagnoses in November and December. The podcast presented by Dr. Guilherme Cezar, SDRS Coordinator, provides a review of 2024 pathogen activity and SDRS project implementations.

February 3, 2025. This month's Domestic Swine Disease Monitoring Report brings information about the increased case positivity of PRRSV in all age categories. Lineages 1C.5, 1C.2, and 1A were predominantly detected in January 2025. The report contains a Bonus page about the PRRSV L1C.2 scenario, showing the record high detection trends of this lineage in 2024. Based on historical data and as expected for this time of the year, the report brings information about an increase in PEDV and PDCoV detection, mainly in wean-to-finish sites. *Mycoplasma hyopneumoniae* and Influenza A case positivity decreased in January, mainly in the wean-to-

market category. PCV2 case positivity remains high in the wean-to-market category with low PCR Ct values in tissue cases. In the podcast, Dr. Paul Yeske, Swine Vet Center, discussed the clinical implications of PRRSV L1C.2, the next steps for the PEDV elimination plan, and *M. hyopneumoniae* elimination strategies.

March 3, 2025. This month's Domestic Swine Disease Monitoring Report incorporates a new category for PEDV and PDCoV PCR detection: facilities. This new category includes PCR tests from truck washes, vehicles, and packing plants. With this new facility category, SDRS can monitor enteric coronavirus activity from outside the farms. The report includes a bonus page explaining the latest charts for the facility category. PEDV and PDCoV case positivity increased in the new facility category. Also, PEDV and PDCoV overall positivity was above expected in Indiana. The report brings information about the decreased case positivity of PRRSV in wean-to-finish sites. However, PRRSV lineage 1C.5 is spreading rapidly in 2025, exhibiting a historical record compared with the beginning of previous years. Influenza A case positivity increased in all age categories, with the highest positivity coming from wean-to-finish sites (33%). In the podcast, Dr. Tyler Bauman, herd veterinarian with The Maschhoffs, discussed health management strategies in finishing sites for control and elimination of *Mycoplasma hyopneumoniae*, IAV, PEDV, and PRRSV, including the different clinical implications of PRRSV L1C.2 and L1C.5.

April 2, 2025. This month's Domestic Swine Disease Monitoring Report brings information about the seasonal decrease in PRRSV case positivity, mainly in wean-to-finish sites. However, Iowa and North Carolina had higher PRRSV case positivity compared to historical data. Also, Iowa has a high diversity of strains circulating, with 26 PRRSV variants detected in 2025. PRRSV lineage 1C.5 detections continue to increase, reaching more than 600 detections in 2025. The report includes a bonus page about TGEV, including details on four years without a single positive case. More than 176,000 cases were submitted across six VDLs, with more than 500,000 RT-PCRs performed and not a single PCR-positive TGEV case. PEDV and PDCoV facilities' case positivity decreased in March, but overall positivity was above the expected in Indiana. *Mycoplasma hyopneumoniae* case positivity in sow farms decreased, maintaining the promising trend of reduced activity of this pathogen in sow farms. PCV2 case positivity by PCR remains high in the wean-to-market category. However, the PCR Ct values are not as low as in previous periods of PCV2 activity. In the podcast, Dr. Lauren Glowzenski, Pipestone Veterinary Services, discussed the impact of PRRSV diversity, the hypotheses for TGEV disappearance, and strategies for handling pathogen co-infections in farms.

May 5, 2025. This month's Domestic Swine Disease Monitoring Report brings information about the spike in PRRSV case positivity in wean-to-finish sites. Comparing the April PRRSV positivity for finishing sites with previous years', it was the highest April positivity since 2018. In addition, the PRRSV variant 1C.5.32 had the highest number of detections for any variant in 2025. Together with the original L1C.5 variant, they represented 42% of all the ORF5 sequences recovered from the SDRS participant VDLs. The report includes a bonus page about the new PRRSV nomenclature and its implementation in the SDRS dashboards and BLAST tool. PEDV had increased regional case positivity in sow farms, mainly in Minnesota. As expected, the seasonal spike in influenza A case positivity occurred in April, repeating the trend of increased positivity in the spring season. In the first quarter of 2025, *Mycoplasma hyopneumoniae* had the

lowest number of historical confirmed tissue diagnoses. In the podcast, Dr. Kim VanderWaal, University of Minnesota, discussed the new PRRSV nomenclature, PRRSV clonal expansion, and the impact of multiple PRRSV variants detected on farms.

June 2, 2025. This month's Domestic Swine Disease Monitoring Report covers the increased detection of PRRSV lineages 1C.5 and 1C.2. The PRRSV case positivity in wean-to-finish historically decreases in May; however, the positivity remains above 40% this year. In sow farms, the PRRSV case positivity also continues to increase at an alarming rate. PRRSV L1C.5 doubled the number of 2025 detections in a single month in Iowa, Minnesota, South Dakota, and Indiana. Iowa had 569 detections from January to April 2025 and at the end of May, the cumulative number of detections reached 1,100. Detection of lineage 1C.2 RFLP 1-2-4 also increased in April, becoming the third most detected variant in the US in 2025. PEDV had increased regional case positivity in Iowa, Kansas, Indiana, and North Carolina. PDCoV, PCV2, and IAV case positivity went down in all age categories. *Mycoplasma hyopneumoniae* case positivity remains above the expected in wean-to-finish. The trend of low *Mycoplasma hyopneumoniae* positivity in sow farms continues with several production systems targeting elimination. In the podcast, Janelle Hamblin, Manitoba Pork, discussed the PEDV elimination plan in Canada, explaining the importance of a PEDV vaccine and non-negotiable points for the US to target PEDV elimination.

July 2, 2025. This month's Domestic Swine Disease Monitoring Report covers the first detection of PRRSV lineage 1C.2 in North Carolina. The PRRSV case positivity in wean-to-finish remains at 40% in June, which is unusually high for the summer. PRRSV case positivity remains above the expected state-specific baselines in Iowa, Minnesota, South Dakota, and Indiana. Although there is decreased PEDV case positivity across all age categories, the percent positive cases from vehicles and truck washes remains high (17%). PDCoV case positivity is above the state-specific baselines in Missouri, Indiana, Ohio, and North Carolina. *Mycoplasma hyopneumoniae* case positivity increased in wean-to-finish, but most of the positive cases were deep tracheal swabs and lungs collected to prepare homogenate for sow farm exposure. PCV2 and PCV3 case positivity increased moderately with PCV2 being detected predominantly in finishing sites and PCV3 in sow farms. In the podcast, Nicolai Weber, Danish Agriculture & Food Council, discussed Denmark's strategy for reducing PRRSV at the national level, PRRSV diagnostic strategies applied in the Danish reduction plan, and how similar PRRSV reduction approaches could be adapted in the US.

August 5, 2025. This month's Domestic Swine Disease Monitoring Report covers the reduction in PRRSV case positivity across all age categories, with overall positivity dropping below 20%. However, PRRSV lineage L1C.5 had several detections mostly concentrated in Iowa (175). In addition, after the first detection in North Carolina, the PRRSV lineage L1C.2 continues to be detected there and elsewhere in the US. *Mycoplasma hyopneumoniae* reached the lowest monthly case positivity in sow farms since 2012. In the ISU-VDL, confirmed tissue diagnosis of MHP had the lowest number of cases in the second quarter of 2025. The overall percentage of PCV3 positive submissions increased sharply in July, surpassing PCV2 overall case positivity by 18%. Most of the July PCV3 positive samples were processing fluids (310/475) followed by oral fluids (85/475). In the podcast, Maria Pieters, University of Minnesota Associate Professor,

discussed the *Mycoplasma hyopneumoniae* elimination trends in the US, new diagnostic tools, success rates of elimination protocols, and particularities to address for each farm.

September 2, 2025. This month's Domestic Swine Disease Monitoring Report adds information on a new pathogen: *Escherichia coli* genotype PCR. A bonus page and podcast explain the *E. coli* data. PRRSV overall case positivity decreased, remaining below 20% as expected for the summer period. However, PRRSV case positivity is still above the expected levels in Iowa and Minnesota. PEDV case positivity also remains low, but in the wean-to-market category, there was a moderate increase in positive cases, raising concern for biosecurity in finishing sites. Influenza A case positivity achieved the lowest percentage (18%) since 2010, highlighting that IAV detection is below the expected levels compared with historical data. Finally, in the confirmed tissue diagnosis from Iowa State University, there was a moderate increase in the number of Sapovirus cases detected. In the podcast, Dr. Marcelo Almeida, assistant clinical professor and diagnostician at ISU, discusses the recent *E. coli* PCR genotype trends, the main E. coli virotypes and pathotypes, and tips for *E. coli* control on farms.

October 7, 2025. This month's Domestic Swine Disease Monitoring Report shows that PRRSV case positivity in wean-to-market pigs has climbed to 41.46%, representing an increase of 6.28% compared to the same period last year. This emphasizes the need for stronger monitoring, biocontainment, and biosecurity practices in production sites. A bonus page highlights that PRRSV lineage 1C.5 continues to dominate, with 3,347 detections in 2025 already surpassing the total from 2024. Iowa alone accounts for 1,182 PRRSV 1C.5 cases. Illinois reported its first detection of PRRSV 1C.5.33. Pennsylvania had its first PRRSV 1C.2 detection in 2025; previous detections occurred in 2023 and 2024. Co-detection of IAV and PRRSV positive cases rose from 6% in July to over 10% in September, with IAV case positivity experiencing a substantial increase, reaching 35.66% in the wean-to-market category. In the podcast, Dr. Daniel Boykin, senior veterinarian at Smithfield Foods, discusses rapid response and biocontainment for emerging PRRSV strains, tips on preparedness for biosecurity practices, and next steps in regional control of PEDV and *M. hyopneumoniae*.

November 4, 2025. This month's Domestic Swine Disease Monitoring Report highlights several key points: PRRSV activity continues to rise, with 43.67% positivity in wean-to-market sites, while sow farm positivity remains relatively low at 17.03%. The lineage L1C.5 is surging, with 3,653 detections in 2025—already surpassing last year's total—and has become the predominant lineage over other lineages, such as L1A and L1H. IAV positivity reached 35.44% in wean-to-market, accompanied by a surprising decrease in sow farm positivity to 15.16%. Following the expected pattern for this time of the year, *M. hyopneumoniae* reached its highest overall positivity. A bonus page features highlights from the SDRS Advisory Group on current pathogen activity, presented during the October 2025 Winter Preparedness Call. In the podcast, Dr. Brooke Kitting, Senior Veterinarian at Seaboard Foods, discusses strategies for tackling PRRSV outbreaks and pig flow biosecurity, managing PEDV and *M. hyopneumoniae* outbreaks, and preparing for winter through vaccination and immunity-boosting protocols.

December 4, 2025. This month's Domestic Swine Disease Monitoring Report shows PRRSV positivity in the wean-to-market phase rose to 48.5%, the highest level since 2018. PEDV positivity rates also increased, with adult/sow farms at 6.5% and wean-to-market farms at 17.4%,

surpassing predicted thresholds. In contrast, IAV positivity in adult/sow farms during fall 2025 declined to 15.7%, marking its lowest level since 2015. A bonus page in the report highlights the first multi-laboratory integration of confirmed tissue diagnosis codes, bringing OH ADDL data together with ISU VDL to expand swine disease monitoring. This unified dataset expands the representativeness of the disease diagnosis database, enabling early detection of emerging challenges. In the podcast, Dr. Guilherme Cezar, former SDRS project coordinator, discusses SDRS's role in the swine industry, offering insights into disease diagnosis, co-detections, and applied use of aggregated diagnostic data.

Monitor Global Swine Diseases for Emerging Threats

World Organisation for Animal Health Reports Recurrence of Foot-and-Mouth Disease in Germany

January 10, 2025 – This is the first detection of FMD in Germany since January 31, 1988. A report posted by the World Organisation for Animal Health's World Animal Health Information System today (1/10/2025) reveals a case of foot-and-mouth disease has been confirmed in Germany, the first in nearly 40 years. See the WOAH posting here.

According to a Reuters news report, FMD was found in a herd of water buffalo on the outskirts of Berlin and affected animals have been euthanized. "An exclusion zone of 3 kilometres and a monitoring zone of 10 kilometres have been set up, and no more products or animals may be taken out of these zones, said a federal agricultural ministry spokesperson at a regular government news conference. Local authorities are investigating how the animals became infected, but there are no plans for measures at the federal or international level, the spokesperson added," wrote Reuters.

USDA Animal and Plant Health Inspection Service information on FMD can be found here. The USDA APHIS site reads, "Foot-and-mouth disease (FMD) is a severe, fast-spreading viral disease that primarily affects cloven-hoofed animals, including cows, pigs, sheep, goats, and deer.

"FMD is one of the most challenging animal diseases to control. Although most infected animals survive, they're left weak and unable to produce the level of meat and milk prior to infection. FMD was first discovered in the United States in 1870 and eradicated in 1929.

"FMD is not a human health or food safety threat. The disease is not related to hand, foot, and mouth disease, a common childhood illness caused by a different virus."

SHIC will closely monitor the situation in Germany and provide updates as warranted to our stakeholders.

SHIC Update on Recent Detection of FMDV Serotype O in Germany

January 14, 2025 – SHIC actively monitors global swine diseases as part of its mission to enhance swine health through the identification and mitigation of emerging disease threats. On January 10, 2025, Germany confirmed its first outbreak of foot-and-mouth disease virus (FMDV) since 1988. The outbreak was detected in a herd of water buffalo in the Märkisch-

Oderland district of Brandenburg, near Berlin. As part of the SHIC Global Swine Disease Monitoring Reports, the team at the Center for Animal Health and Food Safety (CAHFS) has prepared this summary of the current FMDV situation in Germany.

Within the affected water buffalo herd, three infected buffalo died, and the remaining herd of 11 animals was euthanized to contain the disease. Authorities have implemented strict control measures, including the establishment of a 3 km exclusion zone and a 10 km monitoring zone, and are conducting investigations to determine the source and route of the infection. Immediate actions included culling all susceptible animals within a 1 km radius, including a farm with 170 pigs and another location with 55 goats, sheep, and three cattle as a precaution. A transport ban for livestock was imposed across Brandenburg and later extended to Berlin, lasting at least 72 hours. Sampling of animals within a 3 km radius is ongoing to assess the outbreak's spread.

The Friedrich Loeffler Institute (FLI) identified the FMD virus as serotype O, a strain commonly found in the Middle East and Asia. Although, the exact route of entry remains unclear. The affected farm operates organically, using only its own hay for feed. The outbreak highlights the ongoing risk of FMD introduction into the EU through illegal trade and travel-related movement of animal products from FMD-endemic regions. Germany, previously recognized as FMD-free along with the EU, has lost its status, triggering trade restrictions. Thus, South Korea banned the import of German pork and quarantined 360 tons imported since December 27 for testing. At the Green Week agricultural fair in Berlin, cloven-hoofed animals were excluded to mitigate risks. In the Netherlands, 125 farms that recently imported calves from Brandenburg were ordered to suspend operations, and a nationwide standstill on calf transport was implemented until January 19. Veal calf imports from Brandenburg were also banned. However, export to countries within the European Union's single market is still possible for products that originate outside the restricted zones, under the principle of regionalization.

Water buffalo, introduced to Germany in the 1990s, are farmed for milk, meat, and grassland maintenance. The animals were part of a herd in Brandenburg, a region now under extensive surveillance. All cloven-hoofed animals in the vicinity are being tested to evaluate the spread of the disease and to inform further actions, including potential vaccination.

Germany's FMD antigen bank, established for emergencies like this, holds serotype-specific vaccines and can produce them within days. However, vaccines must be tailored precisely to the specific serotype, as vaccines against other strains are ineffective. FMD, which affects cloven-hoofed animals such as cattle, pigs, sheep, and goats, is highly contagious and causes severe symptoms, including fever, painful blisters, reduced milk production, and significant economic losses for farmers. Though FMD poses no direct health risk to humans, they can act as carriers of the virus via contaminated clothing, shoes, or equipment.

Past outbreaks in Europe, such as those in the UK (2007) and Bulgaria (2011), resulted in extensive culling of livestock to control the disease. The current outbreak underscores the importance of biosecurity measures, rapid response, and vigilance to protect agriculture and livestock from this economically devastating disease.

Summary of the incursion of new FMDV strains into new territories (2022 to date):

2022

- **Egypt:** South American strains A/EURO-SA, and O/EURO-SA, were isolated from a batch of Egyptian samples tested by the World Reference Laboratory (WRLFMD).
- **Libya:** FMD virus O/EA-3, a strain from East Africa was detected.
- **Iraq:** FMD virus SAT2/XIV, closely related to viruses from Ethiopia was detected. It was observed to cause more severe clinical disease.
- **Jordan:** FMD virus SAT2/XIV, closely related to viruses from Ethiopia was reported in the country.
- **Türkiye:** FMD virus SAT2/XIV, was reported for the first time.

2023

- **Qatar:** FMDV SAT1/I topotype, a virus with close sequence identity to a virus from Kenya was reported for the first time.
- **Algeria:** Virus of the SAT2 topotype (SAT2/V) detected for the first time. Viruses from this lineage were last found in Ghana (1991), Togo (1990) and Ivory Coast (1990).

2024

- **Libya:** A new incursion of FMDV O/EA-3 which is endemic to East Africa.
- **Türkiye:** Re-emergence of a virus strain originally from Iran, FMDV A/ASIA/Iran-05FAR-11.

2025

- **Germany:** Recurrence of FMD after 37 years. The National Reference Laboratory at the FLI confirmed the virus Serotype as type O, although the virus strain, origin, and route of entry into Germany are yet to be determined.

References

Germany confirms first case of foot-and-mouth disease in nearly 40 years
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Foot-and-mouth disease detected in Brandenburg
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German agri minister meets sector stakeholders on foot-and-mouth
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Foot and mouth outbreak halts German pork exports to GB
https://nationalpigassociation.co.uk/foot-and-mouth-outbreak-halts-german-pork-exports-to-gb/

SHIC Monitoring FMDV Incursion in Hungary: First Outbreak in 50 Years

April 2, 2025 – SHIC actively monitors global swine diseases as part of its mission to enhance swine health through the identification of emerging disease threats. On March 7, 2025, Hungary reported its first foot-and-mouth disease outbreak in over 52 years at a dairy cattle farm in Kisbajcs, a town located near the Slovakian border. The outbreak affected a herd of 1,400 cattle, with classic FMD symptoms observed, including fever, excessive salivation, and blisters on the mouth, tongue, and hooves. On March 26, 2025, a second FMDV outbreak was reported in the

same region of Hungary affecting a 3,000 head dairy herd. As part of the SHIC Global Swine Disease Monitoring Report, the team at the Center for Animal Health and Food Safety (CAHFS) has prepared this update of the FMDV situation in Hungary.

Key Dates in Hungary's FMD Outbreak
March 3, 2025 – Clinical signs of FMD observed.
March 6, 2025 – Laboratory confirmation of FMD.
March 7, 2025 – Hungary officially reported the outbreak to the WOAH.
March 26, 2025 – Hungary confirms second FMDV outbreak.

Outbreak locations
The initial outbreak occurred at a dairy farm in Kisbajcs, a town in northwestern Hungary located within 2 km of the Slovak border. The second outbreak occurred in Level, Gyor-Moson-Sopron county (less than 50 km (30 miles) from the first outbreak), the same region as the first outbreak near the Slovakian border.

Cause and Transmission: How and Why the Outbreak Occurred
The exact source of the virus remains unknown. Authorities are conducting epidemiological investigations to determine the source of the outbreak and assess the potential risk of further transmission. The Hungarian National Reference Laboratory has identified the FMD virus as serotype O. Genetic sequencing revealed that the strain shares 98–99% similarity with a virus isolated in Pakistan in 2017–2018, indicating a potential epidemiological link. Importantly, this strain is genetically distinct from the one detected in Germany in January 2025, confirming that the Hungarian and German outbreaks are not connected. Potential transmission routes include human clothing, shoes, exposure to infected animals, animal trade, and movement of animal products. Authorities are investigating the possibility of transmission to wildlife (e.g., wild boar and deer).

Measures Taken
The entire infected first herd (1,400 cattle) was culled. Hungary established a 3km protection zone and a 10km surveillance zone, extending into Slovakia. For the second outbreak, culling of infected cattle is anticipated to be completed soon, mandatory culling of pigs in the affected areas by March 31 due to their potential role in virus transmission, and grazing restrictions enforced along a 10 km strip near the border to prevent further spread.

Increased Surveillance
- Susceptible herds within a 10km radius are being tested.
- Blood samples are being collected from hunted wild animals in the region.
- Zoos closed.
- Hunting is prohibited within restriction zones to minimize the risk of virus spread.
- Decontamination protocols say vehicles can only leave infected farms and burial sites after strict disinfection.

Movement Restrictions
- National ban on the movement of susceptible cloven-hoofed species initiated.
- Pigs, sheep, and goats can be transported for immediate slaughter outside affected counties.

- Cattle remain under full movement restrictions.

International Trade Impact

- 15 non-EU countries have temporarily banned imports of Hungarian meat products.
- The EU has issued certification for continued trade within its member states.

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Overview of International Responses to Hungary's FMD Outbreak

Romania

- Enhanced surveillance of cattle, pigs, sheep, and goats.
- Instituted mandatory reporting of illness or mortality in livestock.
- Printed advisories posted in public places (e.g., city halls, veterinary clinics, churches).
- Implemented stricter monitoring of animal transport from affected areas.

United Kingdom

- Banned imports of cattle, pigs, meat, dairy, and animal by-products from Hungary and Slovakia.
- Restricted travelers from bringing meat, dairy, and animal by-products into the UK.
- Conducting ongoing risk assessment with potential for further restrictions.

Kosovo

- Put full import ban on live animals and animal products from Hungary in place.
- Declared FMD-free status and enhanced disease monitoring.

Poland

- Closed borders to imports of livestock, meat, dairy, and animal by-products from Hungary and parts of Slovakia.
- Began sanitary border inspections at crossings with Slovakia and the Czech Republic.
- Required mandatory disinfection of animal transport vehicles.
- Deployed special vehicle disinfection gates at key border crossings.

Czech Republic

- Banned transport of susceptible animals from Hungary and Slovakia (except for direct slaughter).
- Conducting border inspections by veterinary authorities, police, and customs officials.
- Requiring strict disinfection protocols for animal transport vehicles.
- Restricted farm access for individuals recently in Hungary.

Ukraine

- Banned imports of live animals, genetic material, and animal products from Hungary.
- Monitoring the epizootic situation continuously.

Canada

- Implemented import restrictions on live animals, raw meat, milk, and animal by-products from Hungary and Slovakia.
- Issued border alerts and enhanced screening by Canada Border Services Agency.

- Tracking shipments of pork and dairy products imported after February 2, 2025.

Australia

- Suspended imports of meat and dairy products from Hungary and Slovakia.

Ongoing Concerns and Next Steps

The economic impact of trade restrictions is expected to last for several months. Authorities are monitoring wildlife and other livestock premises to detect potential further spread. Hungary will only be declared FMD-free after an extended period of testing and a confirmed absence of new cases.

With the recent addition of FMDV detection in Slovakia, the detection of FMD in three EU countries within a short timeframe raises concerns about biosecurity breaches, trade risks, and virus translocation within the region. This highly contagious disease requires continued vigilance and strict control measures to prevent further spread in Hungary, Slovakia, and other EU countries.

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Germany regains status as free of foot-and-mouth disease, ministry says
Hungary detects first case of foot-and-mouth disease in 50 years
Veterinary watchdog orders measures to prevent spread of FMD virus from Hungary to Romania
UK bans imports of some animal products from Hungary, Slovakia after foot-and-mouth case
Kosovo bans import of animals and their products from Hungary
Health checks at the border with Slovakia after detection of foot-and-mouth disease in Hungary
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Australia bans imports from two EU nations after foot-and-mouth detected

Slovakia on High Alert: Third EU Country with FMD Outbreak Following Cases in Hungary and Germany

April 2, 2025 – As part of its mission to identify emerging disease threats to the US pork industry, SHIC is monitoring the recent FMDV incursions in the EU, with Slovakia being the most recent country to report detection. Slovakia confirmed its first FMD outbreak in over 52 years at four cattle farms in the southern regions of Dunajská Streda and Komárno, near the Hungarian border. On March 30, 2025, a fifth cattle farm in the western Bratislava region was confirmed with FMD. Over 6,000 cattle are affected, with animals showing classic FMD symptoms such as fever, excessive salivation, and mouth and hoof blisters. Within the framework of the SHIC Global Swine Disease Monitoring Report, the team at the Center for Animal Health and Food Safety (CAHFS) has prepared this update of the FMDV situation in Slovakia.

The Slovakian outbreak follows recent cases in Hungary and Germany, making it the third confirmed FMD outbreak in Europe in 2025. Emergency measures, including movement bans, culling, and zoo closures, have been implemented while investigations continue to determine the source and contain further spread.

Timeline of Events: Key Dates in Slovakia's FMD Outbreak

- **March 21, 2025:** The first three FMD outbreaks were confirmed at three cattle farms in Medveďov, Ňárad, and Baka (Dunajská Streda District), involving a total of over 2,760 susceptible animals (Baka: 1,301; Ňárad: 790; Medveďov: 670). A state of emergency was declared in the district.
- **March 22–23, 2025:** Vaccination completed at affected farms in Medveďov and Ňárad to reduce virus shedding before culling. Culling operations begin at the Baka farm, progressing at 300 animals per day.
- **March 24, 2025:** Ongoing culling operations and transport of slaughtered animals to disposal facilities.
- **March 25, 2025:** The fourth FMD outbreak was confirmed at a farm housing 270 cattle near Malá Lúč (Lúča na Ostrove), approximately 10km from Baka.
- **March 30, 2025:** The fifth FMD outbreak was confirmed at a large cattle farm housing 3,750 cattle in the western village of Plavecký Štvrtok, about 30 km northwest of Bratislava and not far from the Austrian and Czech borders. Authorities confirmed that this farm has a connection with one of the outbreaks in Hungary (Lével). Vaccination has started.

Outbreak Locations

The outbreaks confirmed in the southern part of the country are near the border with Hungary. These areas, particularly the Dunaszerdahely region, are major hubs for Slovakian livestock production, housing approximately 13,000 cattle and 128,000 pigs, and are now under intensive control measures due to their heightened vulnerability to disease spread.

1. **Medveďov (Dunajská Streda District, Trnava Region)**
    - One of the first outbreak sites.
    - Home to a large herd of milking cows.
    - Managed by Naše Farmy, part of the J&T investment group.
2. **Ňárad (Dunajská Streda District, Trnava Region)**
    - Also part of the Naše Farmy network.
    - Symptoms were first noticed in mid-March.
3. **Baka (Dunajská Streda District, Trnava Region)**
    - Operated by EXATA Group, owned by major Slovak business figures.
    - The farm housed over 1,300 dairy cows and calves.
    - A major milk producer, supplying 12 million liters annually prior to the outbreak.
4. **Lúča na Ostrove (Dunajská Streda District, Trnava Region)**
    - Fourth confirmed outbreak, announced on March 25, 2025.
    - Infected herd includes approximately 270 cattle.
    - Located near previously affected areas, contributing to growing concerns about regional spread.

5. **Plavecký Štvrtok (Malacky district, Bratislava Region)**
    - Fifth confirmed outbreak, announced on March 30, 2025.
    - Affected site housing around 3,000 cows, 150 heifers, and 600 calves.
    - Located approximately 30 km from Bratislava near the Czech and Austrian borders.

Cause and Transmission: How and Why the Outbreak Occurred
The exact source of the outbreak remains under investigation. However, authorities suspect the virus likely entered from neighboring Hungary, where an outbreak was reported in early March 2025, near the Slovak border. Affected farms are located in regions with dense livestock populations, making the area particularly vulnerable to fast and extensive transmission. The proximity of outbreak sites to Hungary and the interconnected nature of livestock trade and transport further contributed to the virus's spread.

Measures Taken
In response, Slovakia has implemented strict emergency measures to contain the outbreak and prevent further spread:

- State of Emergency declared in the Dunajská Streda district.
- Nationwide ban on the movement of cloven-hoofed animals (cattle, pigs, sheep, goats, and farmed game), except for necessary transport within the same holding.
- International transport restrictions for susceptible animals through Komárno and Dunajská Streda districts.
- Culling of over 3,000 cattle, with operations ongoing and averaging 300 animals per day.
- 10,000 vaccine doses procured by the Ministry of Defense to support the emergency response and enhance outbreak control capacity.
- Vaccination at selected outbreak sites (e.g., Medveďov, Ňárad) to reduce virus shedding prior to humane culling.
- Disposal protocols in place:
    - Carcasses of visibly infected animals are incinerated at rendering plants.
    - Uninfected carcasses are buried at designated sites.
    - All transport containers are disinfected and sealed, with inspections at departure and arrival points.
- Over 1,500 police officers deployed to enforce movement restrictions and control zones. Fire and rescue services engaged in animal carcass transport, disinfection, and culling support.
- Installation of disinfectant fords and vehicle checkpoints on roads near infected premises.
- Closure of all zoos, circuses, and animal display facilities across Slovakia.
- Public forest access is banned in affected districts to reduce the risk of wildlife-mediated spread.
- Authorization for hunters to cull wild susceptible animals showing signs of disease, even outside regular hunting seasons.
- Coordination with the EU and WOAH, and an official request for financial compensation submitted to the European Commission.

EU experts acknowledged Slovakia's response as best practice, strengthening the country's eligibility for support.

Overview of International Responses to Slovakia's FMD Outbreak

Poland

- Comprehensive import ban on live cloven-hoofed animals, meat, dairy, and by-products from Slovakia and Hungary.
- Enhanced inspections and disinfection at border crossings with Slovakia.
- Installation of disinfection gates at key border points (e.g., Barwinek).
- Trace-back investigation of over 400 animal shipments from Slovakia in the past month.

Czech Republic

- Initial ban on the transport of susceptible animals from Hungary and Slovakia (except for direct transport to slaughterhouses) imposed on March 7, lifted on March 18, then reinstated on March 21 following FMD confirmation in Slovakia.
- Import ban on livestock and animal products from affected areas of Slovakia (reinstated March 21).
- Border inspections at four major crossings, conducted by veterinary inspectors, police, and customs officers.
- Mandatory disinfection of transport vehicles and required documentation for biosecurity compliance (e.g., proof of vehicle disinfection, animal health certificates).
- Access restrictions to farms for individuals who had recently traveled to outbreak areas (e.g., Hungary, Slovakia).
- Deployment of 16 Czech firefighters and a mobile livestock culling unit to Slovakia to assist with containment, disinfection, and humane slaughter operations.
- Appeals to Czech farmers and agricultural unions to enforce strict biosecurity, including hygiene, disinfection, and bans on unauthorized entry into livestock facilities.

United Kingdom

- Banned imports of cattle, pigs, meat, dairy, and animal by-products from Slovakia and Hungary.
- Since 8 March, travelers to Great Britain are prohibited from bringing meat, meat products, milk, dairy products, certain composite products, animal by-products of pigs and ruminants, as well as hay and straw from Hungary and Slovakia.

Canada

- Immediate import restrictions on live animals, raw meat, milk, and animal products from Slovakia and Hungary.
- Border alert issued and import certificates reviewed for compliance.
  Shipments arriving after February 2, 2025, are being traced and assessed.

Ukraine

- Ban on imports of live animals, genetic materials, and animal products from Slovakia and Hungary.
- Ongoing surveillance of the domestic epizootic situation to maintain disease-free status.

Australia

- Suspended imports of meat and dairy products from both Slovakia and Hungary due to FMD detection.

Ongoing Concerns and Next Steps

Slovakia's FMD outbreak has raised serious concerns for both animal health and economic stability. With over 3,000 cattle affected and outbreaks confirmed near Hungary's border, there is

a high risk of regional spread, especially in areas with dense livestock populations. Authorities are closely monitoring wildlife and nearby farms to prevent further transmission. Despite containment efforts, the economic impact is growing, with estimated losses exceeding €10 million. Farmers are concerned about long-term consequences, including trade disruptions and livestock restocking challenges. Slovakia is coordinating with the European Commission to secure financial compensation and technical support. The government is also working with the WOAH to maintain transparency and ensure proper control measures.

Next steps include:

- Completing culling and disinfection operations.
- Expanding surveillance and testing in at-risk zones.
- Continuing cross-border coordination with neighboring countries.
- Finalizing damage assessments to access EU compensation mechanisms.

The situation remains dynamic, with authorities stressing the need for continued vigilance and swift regional cooperation to prevent further outbreaks. The distribution of FMD outbreaks is presented on Figure 1.

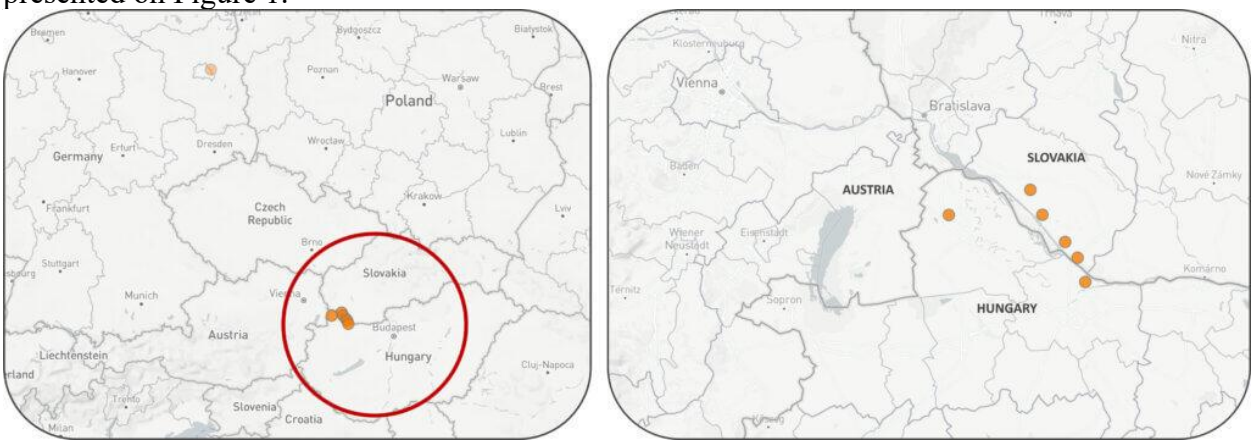

Figure 1. Distribution of FMD outbreaks in Germany, Hungary and Slovakia from January 9, 2025 to March 26, 2025 (Source: FAO EMPRES-i).

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Czech firefighters join Slovakia's fight against foot-and-mouth outbreak
Animals from Slovakia and Hungary Can Be Transported Again to Czech Republic
Czechia Bans Animal Transport from Hungary, Imposes Border Control with Slovakia

Czech Republic bans livestock imports from Slovakia after new foot-and-mouth outbreak
Czech Republic reinstates border controls with Slovakia following foot-and-mouth disease outbreak
Fifth outbreak in Slovakia

New World Screwworm Reported within 70 Miles of Texas Border: SHIC Provides Surveillance Information

October 2, 2025 – On September 21, 2025, USDA reported the presence of New World Screwworm in Sabinas Hidalgo, located in the state of Nuevo León, Mexico, less than 70 miles from the US-Mexico border. USDA said this is the northernmost detection of NWS during the current outbreak and, consequently, the most threatening to the US livestock industry. The previous northernmost case was reported on July 9, 2025, in Veracruz, approximately 370 miles further south of Sabinas Hidalgo. On September 21, 2025, NWS was detected in an eight-month-old heifer that had been transported to Sabinas Hidalgo from a region in southern Mexico with known active NWS cases. Identifying and responding to NWS becomes essential as the pest nears the US border.

NWS larvae, commonly known as maggots, can infest livestock and other warm-blooded animals, including humans. They most often enter through an open wound, some as small as the size of a tick bite, and feed on the animal's living flesh. They can also gain access to the host through body openings including the nose and mouth. The name screwworm refers to the maggots' feeding behavior as they burrow into the wound, feeding as they go, like a screw going into wood. NWS maggots cause damage by tearing at the host animals' tissue with sharp mouth hooks. The wound can become larger and deepen as more maggots hatch and feed on living tissue. As a result, NWS can cause serious, often deadly, damage to the animal, as well as a great deal of pain, becoming an animal welfare issue. Adult screwworm flies are about the size of a common housefly or slightly larger. They have orange eyes, a metallic blue or green body, and three dark stripes along their backs.

Surveillance Information
USDA provides guidance for detection and surveillance of NWS. Watch for:

1. Maggots in wounds or other body openings, such as the nose, ears, genitalia, or umbilicus of newborn animals
2. Wounds that have bloody discharge and foul odor
3. Wounds that become deeper and larger as the maggots grow and feed on living tissue
4. Animals showing signs of pain including depression, irritability, not eating, and isolating themselves from other animals or people

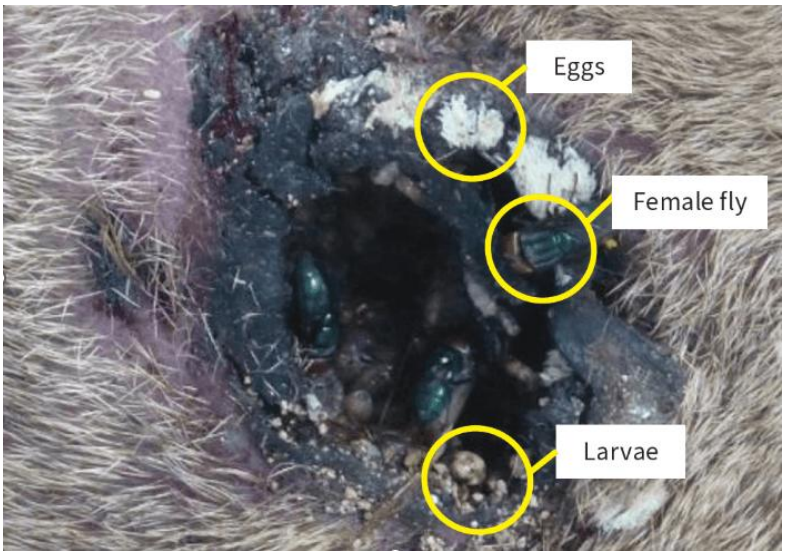


Figure 1. USDA Image: New World Screwworm infestation in wound on mammal.

If suspected clinical signs are noted, contact your herd veterinarian immediately as NWS is a reportable disease to the State Animal Health Official and the USDA federal veterinary authorities. The process for reporting is provided by USDA in their publication, Foreign Animal Disease Investigation Guide: New World Screwworm. Additional information is included in the USDA publication, Standard Operating Procedure for Possible Detections of New World Screwworm in Animals.

Historic Perspective and Control Strategies

While NWS is currently not in the US, other than a single human case in August 2025 due to travel to affected areas, NWS has been an issue for US livestock producers since at least 1842 according to a USDA publication, New World Screwworm Ready Reference Guide – Historical Economic Impact. The need to prevent NWS infestation in the US and its cost to the livestock sector and overall US economy is clear.

During a SHIC/AASV webinar on NWS conducted on June 13, 2025, Dr. Cody Egnor, veterinary medical officer at USDA, addressed expected control strategies. USDA has actively focused on the use of Sterile Insect Technique to reduce and eliminate the flies in affected locations. This method involves the release of sterile flies into the wild population to reduce the reproductive capacity of NWS flies and eventually eliminate them from the environment. Prevention activities include robust regulatory controls, active field surveillance for myiasis, sterile fly release, and stakeholder engagement. USDA's preparedness and response activities are contained in the Disease Response Strategy – New World Screwworm Myiasis.

Currently, there are no labeled products approved for treatment of NWS myiasis in swine. However, USDA and FDA are working together to evaluate emergency and conditional use of specific products in livestock species. Additional information from the FDA regarding NWS and treatment guidance for veterinarians can be found in the document, Animal Drugs for New World Screwworm.

WOAH Confirms First ASF Case in Taiwan

November 5, 2025 – According to a World Organisation for Animal Health report, African swine fever has been confirmed in Taiwan on a pig farm located on the western coast of the island nation (Figure 1). This is the first ASF occurrence in Taiwan. Samples were sent to the National Reference Laboratory for diagnosis on October 21, 2025, due to increased mortality rates. On October 25, 2025, the outbreak was confirmed as ASF. All control measures have been implemented since October 21, 2025. There were 301 susceptible pigs on the affected farm with 109 ASF cases noted and 106 deaths. The remaining 195 pigs on the farm were euthanized. WOAH reports that all appropriate response actions are being taken in Taiwan to limit the spread.

Figure 1. Site of African swine fever diagnosis in Taiwan, October 2025. Source: World Organisation for Animal Health.

Taiwan is approximately 100 miles (160 km) off the southeastern coast of mainland China, separated by the Taiwan Strait. However, the closest point is much narrower, with some smaller Taiwanese-controlled islands, like Kinmen, being just a few miles from the Chinese mainland. Taiwan's northernmost island is only 79 miles (128 km) from the northernmost island of the Philippines, Mavulis Island in Batanes.

Taiwan had recently become the only country in Asia formally recognized by WOAH as free from both ASF and classical swine fever. This dual recognition was solidified in May 2025 during the WOAH General Assembly, following Taiwan's self-declaration of freedom from ASF on July 2, 2024. The ASF-free status is nullified by the recent diagnosis.

The CSF-free status was the culmination of an extensive, decade-long process that began with the last documented case in 2015. Taiwan submitted its formal CSF-free application to WOAH in August 2024, which was approved by the Scientific Commission in February 2025. This accomplishment builds on Taiwan's earlier success in eliminating foot-and-mouth disease virus, from which it was declared free by WOAH in 2020.

African Swine Fever Confirmed in Spain After Three Decades

December 4, 2025 – The World Organisation for Animal Health reported on November 28, 2025, that African swine fever has been detected in wild boars found dead in Barcelona Province, Spain. The confirmation, dated November 27, 2025, marks the country's first ASF occurrence since September 30, 1994—ending more than three decades of being free of the disease.

According to a Reuters report published November 30, 2025, the number of suspected cases has grown since the initial finding. Two wild boars tested positive initially, while an additional 12 wild boar are undergoing diagnostic testing. If confirmed, the total would rise to 14 cases. Spanish authorities have launched immediate response measures, including surveillance and containment efforts. Several international trading partners have already restricted imports of Spanish pork, a sector valued at €8.8 billion ($10.2 billion) annually, as noted by Spain's Agriculture Minister Luis Planas.

The re-emergence of ASF in Spain underscores the ongoing challenges posed by the virus across Europe and highlights the critical importance of continued biosecurity vigilance in protecting both animal health and global trade.

Monthly Global Swine Disease Monitoring Reports

The SHIC Global Swine Disease Monitoring Reports have provided near real-time information on swine diseases regularly since November 2017. This reporting system has been successful in identifying, scoring and reporting hazards using a stepwise procedure for screening diseases that represent a potential risk for the US swine industry. A combination of unofficial and official data is actively and passively collected and organized. Following successive screening steps in which data and information are modified, edited, corrected, and expanded in collaboration with stakeholders, a report describing the outputs is communicated to the US pork industry through SHIC's monthly e-newsletter and posting online on the SHIC website. The project has been successful in finding and communicating multiple potential threats to the US pork industry.

Summaries of the Global Swine Disease Monitoring Reports published in 2025:

January 8, 2025. In the January Global Swine Disease Monitoring Report, read about African swine fever remaining prevalent in Poland, with 44 outbreaks reported in domestic pig herds in 2024. This is 14 more than in 2023 and 30 more than in 2022. ASF has been confirmed in Sri Lanka with 135 outbreaks reported since the initial case on October 25. The Rosalia strain of PRRSV in Spain remains a concern with studies reporting promising results in reducing mortality, improving productivity, and lowering production costs. At the United Kingdom's Dover Port, over six tonnes of illegal meat including pork, was confiscated during a 14-hour operation. The meat was shipped from ASF-affected regions in Romania.

February 3, 2025. This month, the Global Swine Disease Monitoring Report shares information on efforts to prevent African swine fever in France. The French National Swine Health Association will train 600 auditors and conduct 3,000 biosecurity audits, prioritizing small-scale pig and wild boar farms. Taiwan was recognized as an FMD-free country in 2020 and has self-reported as free of ASF so fresh pork exports to Singapore have resumed for the first time in 15 years. In Sri Lanka, authorities are weighing complete depopulation to control the ASF outbreak

there. The total pig population in the country is estimated at 170,000 head. The Department of Agriculture in the Philippines has distributed over 32,000 doses of ASF vaccines. Those vaccines are being administered in 11 municipalities across five provinces. Brazil has secured an agreement with Singapore to ensure continued pork exports even in the event of an ASF outbreak.

March 4, 2025. The March Global Swine Disease Monitoring Report includes news from the Philippines where the Department of Agriculture announced plans to seek commercial approval for Vietnamese AVAC ASF vaccines, with the government-run vaccine initiative ongoing. Foot-and-mouth disease restrictions have eased in Germany as no new cases have been reported. If no further outbreaks occur, Germany could regain its FMD-free status after three months, allowing the removal of trade restrictions on meat and dairy products. New Japanese encephalitis virus outbreaks have been confirmed in Australian piggeries, the first since July 2022 in South Queensland. And in the United Kingdom, German imports of meat and dairy products entered the country despite a ban due to the foot-and-mouth disease outbreak in Germany.

April 2, 2025. Foot-and-mouth disease activity features prominently in this month's Global Swine Disease Monitoring Report. In Hungary, the first FMD outbreaks in over 50 years have been confirmed at two large dairy farms near the Slovakian border. In Slovakia, five FMD outbreaks have been confirmed near the borders with Hungary and Austria with 6,750 animals culled in response. Germany has successfully recovered from an FMD outbreak reported on January 10, involving a single herd of water buffalo in Brandenburg, the country's first in nearly 40 years, and has nearly regained FMD free status for the entire country. South Korea has reported the first outbreaks of FMD since May 2023. Authorities there have sped up the nationwide FMD vaccination schedule to this April instead of July as planned.

May 5, 2025. The May Global Swine Disease Monitoring Report contains updates on incursions of foot-and-mouth disease in Europe where new outbreaks in Hungary and Slovakia have prompted heightened surveillance in neighboring countries. South Korean authorities confirm the 16th outbreak of FMD since mid-March amid an ongoing wave of recent outbreaks following the last FMDV detection in May 2023. A new serotype of FMD was reported in the Near East, with the FAO issuing an alert as FMD Serotype SAT1 was confirmed in Iraq, Bahrain, and Kuwait this year. Outbreaks of African swine fever are surging in Moldova and Romania compared to 2024. In the UK, surveillance at points of entry resulted in nearly 60 tonnes of illegal meat being seized at Dover in the first quarter of 2025, raising alarm over the high risk of disease introduction, such as ASF and FMD.

June 2, 2025. The June Global Swine Disease Monitoring Report contains an update on Germany regaining FMD-free status. Slovakia and Hungary have reported no additional FMD outbreaks since early to mid-April. Slovakia and Latvia have each detected their first ASF outbreak for 2025. In Turkiye, the first FMD SAT1 outbreak since 1965 was reported. In Latin America, the World Organization for Animal Health has officially recognized Brazil and Bolivia as free of FMD without vaccination. New World Screwworm (NWS) has moved across Central America reaching cattle in Veracruz, Mexico, prompting USDA Secretary Brooke Rollins to suspend imports of live cattle, horses, and bison from Mexico.

July 2, 2025. In the July Global Swine Disease Monitoring Report, African swine fever virus with a genetic link to southern Italy was detected in North Rhine-Westphalia, Germany, suggesting a new introduction rather than local spread. Vietnam delivered the first ASF vaccine shipment to Indonesia following approval in April by the Indonesian Ministry of Agriculture. In southern Africa, foot-and-mouth disease serotype SAT2 has been confirmed in Eswatini, Mozambique, and South Africa. A Sydney woman was convicted of illegally importing 62 tonnes of high-risk animal products, including pork, from Thailand, in violation of Australia's strict biosecurity laws.

August 5, 2025. In the August Global Swine Disease Monitoring Report, read about foot-and-mouth disease in South Africa, where 27 new outbreaks were reported across five provinces as the triple serotype (SAT 1, 2 and 3) threat escalates. In Estonia, the first report of African swine fever since 2023 occurred, with multiple outbreaks in commercial farms confirmed and over 17,000 pigs culled. In Germany, ASF spread to a second district in North Rhine-Westphalia, raising concerns as the outbreak zone lies only 93 miles from Belgium and the Netherlands. Also, read about the two main clades of Nipah virus in South and Southeast Asia – Bangladesh clade (NiV-B) and Malaysia clade (NiV-M) – in a special section.

September 2, 2025. In the Global Swine Disease Monitoring Report, African swine fever was detected in Estonia, where the virus was confirmed on the country's largest pig farm in a farrowing unit housing around 27,000 pigs, accounting for nearly 45% of Estonia's pig production. In Egypt, a new foot-and-mouth disease serotype, SAT-1, was detected, adding to the country's existing endemic serotypes SAT-2, O, and A. The illicit movement of animal products was pronounced in August where detection at points of entry into Indonesia, US, and Malaysia are described. Authorities in Indonesia detained 800 kg of wild boar meat shipped without proper documentation. In Los Angeles, 6,682 lbs of mislabeled animal products from China were seized from a repeat offender. Additionally, the report highlights the seizure of 114 tonnes of pig carcasses and 640 tonnes of smuggled pork products in Malaysia in early 2025.

October 8, 2025. In the October Global Disease Monitoring Report, information on African swine fever activity in the Island of Hispaniola, the Baltics, and Vietnam is detailed. Authorities in the Dominican Republic reported over 390 ASF outbreaks in 2025 to date. In Europe, Estonia and Latvia have reported the largest ASF outbreaks to date, with a total of more than 50,000 pigs affected. In Vietnam, over 970 ASF outbreaks had been reported across 28 provinces by July 2025, affecting more than 100,000 pigs, mostly on smallholder farms with low biosecurity. Vietnam outbreaks include ASF virus of both genotype II and recombinant genotype I+II strains. A special report shares information on an outbreak of Brucella suis biovar 2 in Denmark, the first in 25 years. The pathogen was found in a free-range pig herd in Herning on August 22, 2025, following confirmation by the French Agency for Food Safety and the Environment (ANSES) reference laboratory. The affected herd includes approximately 3,850 pigs, with reproductive losses but no mortalities reported.

November 4, 2025. In this month's Global Swine Disease Monitoring Report, details concerning the confirmation of the first case of African swine fever (ASF) in Taiwan are included, along with information on the geographical expansion of foot-and-mouth disease (FMD) in Asia, with the SAT1 serotype confirmed for the first time in Azerbaijan. Surveillance efforts at points of

entry included local authorities seizing over 300 kg of untraceable meat and 75 packets of banned Chinese pork noodle products in London's Chinatown. These findings underscore the ongoing global efforts to monitor and control the spread of swine diseases through both in-country reporting and border security.

December 4, 2025. In the December Global Swine Disease Monitoring Report, read about African swine fever being confirmed in dead wild boars in Catalonia, Spain, in November. This marks the first ASF detection in Spain in more than 30 years. The World Organisation for Animal Health officially restored Slovakia's status as foot-and-mouth-disease-free without vaccination as of October 31, 2025. The Canadian Food Inspection Agency has temporarily suspended US imports of horses, swine, and ruminants from infected states following the confirmation of vesicular stomatitis virus (VSV) in Arizona.

Mitigate Risks to Swine Health

SHIC Shares New WOAH Guidelines for ASF Vaccine Use and Field Evaluation

September 26, 2025 – In May 2025, the World Organisation for Animal Health (WOAH) adopted their first international standard for African swine fever (ASF) vaccines. With this recognition, the global swine health community has formally acknowledged the role that ASF vaccines may play in controlling and mitigating the disease. This is a major step forward, as WOAH standards are the basis for regulations recognized by the World Trade Organization (WTO) for international trade in animals and animal products. These standards directly shape countries' import and export regulations. The Swine Health Information Center is pleased to share this update provided by Drs. Andres Perez and Rachel Schambow from the University of Minnesota College of Veterinary Medicine, Center for Animal Health and Food Safety.

Following the adoption of the standard, several countries asked WOAH to provide guidance for evaluating ASF vaccines in the field. In July 2025, WOAH convened a panel of experts from different regions and specialties to develop a set of guidelines. Dr. Perez served as a member of this WOAH *ad hoc* Group on ASF Vaccines: Field Evaluation and Post-Vaccination Monitoring. The first version of the guidelines developed by the panel has recently been released. Key points from these documents and relevant scientific publications include:

1. Current ASF vaccines use live attenuated (modified live) strains of the virus and are not inactivated or killed. This means some virus shedding is expected from vaccinated animals, and adverse side effects are possible. Countries will need to evaluate these potential adverse effects against the potential benefits of using vaccines.
2. Due to virus shedding, the nonspecific clinical signs of ASF, and the absence of a serological test to differentiate vaccinated from infected animals, it may be challenging to define what constitutes an ASF case during vaccine evaluations or implementation.
3. Evaluating adverse side effects may be difficult and will require careful study design. Side effects can be expected from modified live vaccines, such as the ASF vaccine. Specific triggers, such as specified levels of adverse signs or specific types of signs, should be defined in advance to support evaluation.

4. Governments and producers must define in advance whether the vaccine is being evaluated to reduce the impact of ASF or to eliminate it entirely. The design and requirements of field evaluations will differ depending on the intended goal.
5. Ongoing surveillance and monitoring of vaccinated animals are essential to assess adverse effects, monitor for reversion to virulence or recombination, and evaluate vaccine effectiveness over time.
6. Evaluations and trials should be transparent, with clear protocols, data sharing, and support through public-private partnerships.

The science around ASF vaccines continues to evolve rapidly. When these guidelines were drafted, only Vietnam and the Philippines had implemented field use of ASF vaccines, and only in pigs older than 10 weeks destined for slaughter. Since both countries are net pork importers, there is little information yet on how international markets might respond to vaccine use. In this ever-changing space, this new standard and evaluation guidelines provide a framework for countries considering the use of ASF vaccines. Producers and veterinarians should stay engaged to understand how ongoing changes in ASF vaccine protocols and evaluation may impact them.

SHIC Funds Study on Real-Time Surveillance System to Regionally Detect Swine Diseases

November 5, 2025 – A new real-time, county- and farm-type stratified spatial disease surveillance system for swine pathogens has been developed to detect diseases at a regional level. The study, funded by the Swine Health Information Center, sought to evaluate a surveillance system that integrates diagnostic and animal movement data to track pathogen activity and spread at the site and regional levels. Led by Dr. Gustavo Silva at Iowa State University and his PhD Candidate Swaminathan Jayaraman, a comprehensive, data driven approach to emerging disease management was developed integrating data from 3,084 sites across 18 US states representing 10 major production systems. The newly developed system detects emerging diseases and provides weekly infection risk forecasts to support targeted disease control efforts. Producers and veterinarians who are interested in joining this surveillance system as participants should contact Dr. Silva at gustavos@iastate.edu.

Find the industry summary for Swine Health Information Center project #24-029 here.
By integrating diagnostic data, animal movement information, and site location data across >3,000 sites, the analysis revealed critical insights into disease transmission dynamics. Results determined that farm type is the primary determinant of porcine reproductive and respiratory syndrome virus transmission risk, accounting for 81% of the total variance. Two complementary Bayesian spatial surveillance models were used to characterize PRRSV transmission dynamics at the county and sites levels. Models incorporated farm-type stratification to account for different breeding herds, growing herds and other herds in addition to spatial proximity within a 25 km radius.

Baseline infection probabilities for PRRSV were 73% for growing herds, 70% for breeding herds, and 58% for other herds. Movement networks were found to be the second most significant factor at 16%, with geographic proximity explaining only 3%. This finding challenges the conventional emphasis on geographic clustering and highlights the importance of production phase in disease spread.

Overall, the system's forecasting capabilities achieved accuracy of over 83% for county level models and over 84% for site level models for a one-week horizon. Although predictive accuracy decreased for longer forecasting periods, the system's ability to provide timely, actionable data remains a powerful tool for veterinarians and producers.

The study also documented numerous spillover events, identifying how infections likely spread between different sites and farm types, often within the same production system and within a relatively short distance. The spillover analysis (January 2019 – June 2025) documented 319 breeding herd outbreaks, of which 109 were linked to a potential spillover from other sites. Spillover events were characterized by state, farm type, distance between sites, and pathogen lineage. The system also detected site-specific events, enabling direct feedback to producers and supporting targeted outbreak investigations.

A conditional logistic regression model further assessed risk factors, demonstrating that increased densities of total and PRRSV-positive farms in the vicinity of breeding herds significantly raise the odds of an outbreak. This model assessed risk factors for PRRSV or PEDV classification in newly positive sites, incorporating farm density within a five-to-20-mile radii around breeding herds.

This surveillance system offers data-driven, actionable insights to reduce disease spread, guide targeted interventions, and improve swine herd health at both site and regional scales. By integrating diagnostic, movement, and spatial data into a single, continuously updated platform, it enables early detection of emerging health threats, identification of high-risk sites, and real-time situational awareness for veterinarians and producers. The overall findings emphasize the dominant influence of production phase and movement connectivity on PRRSV transmission, challenging the traditional focus on geographic clustering.

Further, findings advocate for targeted surveillance and intervention strategies tailored to farm-type risk profiles and movement networks to improve precision disease control in commercial swine populations. Ultimately, this work provides the US swine industry with a proactive tool to strengthen biosecurity, enhance disease preparedness, and protect animal health and productivity.

SHIC Continues Research with DHS on $650K Grant from USDA NIFA to Investigate ASFV Stability in Soybean Products

In 2025, SHIC has continued to make progress on a 5-year $650,000 grant from the USDA National Institute of Food and Agriculture – Agriculture and Food Research Initiative Competitive Grants Program for research designed to reduce the risk of imported feed ingredients, specifically soybeans, from spreading African swine fever virus in the domestic swine herd. This project will define the stability of ASFV in soybean products commonly used in complete feed diets as well as improve diagnostic capabilities and surveillance tools for the detection of ASFV in contaminated soybean products and complete feed.

The project is entitled "Stability and detection of African swine fever virus in soybean products fed to pigs" and is part of the Tactical Sciences for Agricultural Biosecurity Program Area. The two research objectives of the project are to 1) assess stability of ASFV in soybean products commonly imported into the US and 2) increase the utility of diagnostic tools to detect ASFV in

contaminated soybean products. Project goals include identifying soybean products at highest risk for ASFV introduction and increasing diagnostic screening capabilities for ASFV contamination of feed. SHIC has awarded the US Department of Homeland Security Science & Technology Directorate a subcontract to complete the research objectives and is actively collaborating with DHS on the procedures, project progress, and data analysis.

SHIC/DHS S&T Partnership Marks Three Years of Progress in ASFV Feed Research

December 4, 2025 – The Swine Health Information Center (SHIC) and the U.S. Department of Homeland Security Science and Technology Directorate (DHS S&T) are marking three years of successful collaboration to better understand and reduce the risk of African swine fever virus (ASFV) transmission through feed ingredients. Supported by a $650,000 grant from the U.S. Department of Agriculture National Institute of Food and Agriculture (USDA NIFA), this five-year project continues to make significant strides in protecting the U.S. swine herd from one of the most serious global animal health threats.

The USDA NIFA-funded research, conducted in partnership with DHS S&T at the Plum Island Animal Disease Center (PIADC), investigates ASFV stability in soybean-based feed ingredients and enhances diagnostic tools to detect virus contamination. The partnership represents a strong model of cooperation between stakeholder organizations and federal agencies, uniting expertise, infrastructure, and shared goals to safeguard U.S. agricultural biosecurity.

Feed biosecurity is an important aspect of overall agricultural biosecurity, as previous research has proven that contaminated feed and ingredients can serve as a source for introduction and spread of transboundary animal diseases. Soybean products, widely used in complete pig feeds, are globally traded and can pose a potential disease introduction risk if imported from ASFV endemic countries or regions.

Led by SHIC Executive Director Dr. Megan Niederwerder in partnership with DHS Principal Investigator Lindsay Gabbert at PIADC, research milestones have been achieved, including:

- Development and validation of laboratory methods to recover and detect ASFV from soybean feed ingredient samples.
- Completion of regulatory and biosafety protocols, necessary for *in vitro* and *in vivo* studies at PIADC.
- Comprehensive assessment of feed inoculation, virus decay rates, and environmental stability under multiple temperature conditions.
- Cross-training of scientists, veterinarians, and research staff in advanced techniques for ASFV detection in feed.

“The collaboration with DHS at Plum Island, made possible through USDA NIFA support, is an outstanding example of federal–industry partnership in action,” said Dr. Niederwerder. “Together, we are generating science-driven solutions that help protect US swine producers and strengthen agricultural defense across the feed supply chain.”

Data generated through this ongoing partnership helps define the relative risk of different soybean products used in swine feed, supports diagnostic advancements, and informs mitigation strategies for industry and regulatory use. Results are being shared with pork producers, veterinarians, and feed industry stakeholders through SHIC annual reports, peer-reviewed publications, and scientific meetings.

This project is supported by the Agriculture and Food Research Initiative Competitive Grant no. 2022-67015-38576 from the USDA's National Institute of Food and Agriculture A1181 Agricultural Biosecurity program. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the view of the U.S. Department of Agriculture or U.S. Department of Homeland Security.

Respond to Emerging Disease

SHIC-Funded Study Develops Diagnostic Tools for *Glaesserella australis*

February 26, 2025 – *Glaesserella australis,* a newly recognized Gram-negative bacterium species, was isolated from the lung lesions of pigs in Australia in 2018 and in two swine herds in Ontario, Canada in 2023. In response, the Swine Health Information Center funded a study led by Dr. Nubia Macedo, Iowa State University, to investigate the detection and characterization of this potential emerging swine pathogen in US clinical samples. Diagnostic tools developed through this project were used to screen historic isolates and current clinical samples. All US swine samples tested to date have been negative for this emerging bacterium. The tools developed herein will contribute to accurate detection of *G. australis* and help inform understanding of this potential pathogen.

G. australis causes clinical signs and pathologic lesions that appear very similar to that caused by *Actinobacillus pleuropneumoniae*. Because no methods were available to detect *G. australis* in swine samples at US VDLs, ISU investigators hypothesized that infections may have been misdiagnosed as *A. pleuropneumoniae*. The overall goals of this study were to develop and optimize diagnostic tools to detect the presence and prevalence of *G. australis* in the US. Aligned with SHIC's mission to protect the health of the US swine herd, surveillance and discovery of emerging diseases such as *G. australis* is critical.

In the affected Australian farms, most pigs had no signs of respiratory disease but there was increased pleurisy and pulmonary abscesses at the abattoir. On one farm, three affected pigs, aged 12, 16, and 20 weeks old, presented with cough and reduced growth rates followed by sudden death with cyanosis of extremities. Pulmonary lesions in these pigs affected up to 50% of lungs, characterized by multifocal necrotizing and fibrinosuppurative bronchopneumonia. In these cases, *G. australis* was isolated in pure culture. Other farms positive for *G. australis* had co-infections with other pathogens, including PCV2, *A. pleuropneumoniae*, *Pasteurella multocida*, *Glaesserella parasuis*, *Streptococcus suis* and *Mycoplasma hyopneumoniae*.

To date, there are no reports of detecting *G. australis* in US swine samples. However, *G. australis* was detected for the first time in two swine herds in Ontario, Canada, in 2023 when the bacterium was isolated from the pericardium and lung of one pig in each herd. Co-infections in

the Canadian swine were present and included *Streptococcus suis*, *Pasteurella multocida*, *Actinobacillus porcitonsillarum*, IAV, and PRRSV.

In the US, the identification of a potential *G. australis* case could have been missed by VDLs for two reasons, including similarities to other pathogens, such as *Glaesserella parasuis* and *Actinobacillus pleuropneumoniae*, and a lack *of* diagnostic tools to accurately identify *G. australis*. Researchers sought to develop accurate diagnostic methods and increase awareness among producers, veterinarians, and diagnosticians on this potential pathogen threat.

Specifically, the objectives of the study were to 1) phenotypically characterize historical ISU VDL *Actinobacillus* sp. isolates using traditional biochemical methods and whole genome sequencing (WGS) and 2) develop and optimize diagnostic tools for *G. australis* detection within US swine herds including ISH and real-time PCR.

First, sequencing of historical isolates with similar characteristics was attempted at the ISU Veterinary Diagnostic Lab, but no US sample sequence was found to be a match for *G. australis*. Twenty-one isolates from the ISU VDL inventory were selected for further identification with WGS revealing that 19 isolates were closely related to *Actinobacillus minor* or *A. porcitonsillarum*. Final identification of the remaining two isolates in underway. For testing of future submissions, the *G. australis* reference strain was added to ISU VDL's sequencing platform and to its MALDI-TOF database for real-time screening of clinical samples.

Second, a PCR test was developed, validated and is now available for further screening and diagnostic purposes. Using the TaqMan-MGB-based primer/probe sequences, the RT-PCR proved to be highly specific and sensitive. An ISH assay was developed and is currently undergoing validation to detect this organism in tissues associated with lesions. Once the ISH assay is available, it will allow the screening of *G. australis* directly in affected tissues, as well as detect concurrent pathogens such as *G. parasuis, A. pleuropneumoniae*, and *P. multocida*.

Since January 2024, ISU VDL staff have screened for *G. australis* through MALDI-TOF and all samples have been confirmed as negative for this new swine pathogen. Nevertheless, the tools described here will contribute to the *G. australis* screening process in the US and help improve understanding of its prevalence and pathogenesis. In addition to the ongoing MALDI-TOF screening, the RT-PCR is available for surveillance and a sequencing pipeline is in place to quickly and accurately confirm any suspect isolates identified.

The emergence of *G. australis* highlights the importance of ongoing disease surveillance and the development of accurate diagnostic tools. Producers should be aware of this potential new pathogen and consult with their veterinarians if they observe respiratory clinical signs in their pigs. The availability of these new diagnostic tests will improve the ability to detect and manage *G. australis* if present in the US swine population, protecting herd health and productivity.

SHIC-Funded Study First to Confirm Porcine Astrovirus 4 as a Primary Cause of Tracheitis and Bronchitis in Piglets

June 27, 2025 – With the goal of determining if porcine astrovirus 4 alone can cause respiratory disease, a collaborative team of investigators from North Carolina State University, USDA

Agricultural Research Service, Iowa State University, and University of California Santa Cruz investigated if piglets infected with PoAstV4 exhibited reproducible lesions in the respiratory tract. Funded by the Swine Health Information Center, the study design included infecting PoAstV4 naïve piglets with the virus and characterizing the resulting infection and pathological lesions. Infected piglets shed the virus in nasal secretions, exhibited tracheitis and bronchitis with virus detected in tissues, and developed a productive immune response to infection. Results from this study are the first to confirm that PoAstV4 can be a primary cause of epitheliotropic viral infection in the respiratory tract of piglets.

Find the industry summary for study #23-077 here.

PoAstV4 has frequently been detected in nasal swabs from young pigs exhibiting respiratory disease. Retrospective studies, including an evaluation of 117 IAV negative cases of tracheitis and bronchitis, demonstrated a strong association between PoAstV4 detection in respiratory epitheliotropic viral infection lesions. However, observational associations do not establish causation. Understanding the pathogenesis of PoAstV4 as an emerging virus is crucial for accurate diagnosis, differential considerations, and effective management strategies for respiratory disease in swine.

The study described the use of caesarean-derived colostrum-deprived (CDCD) piglets challenged intratracheally (17 – challenged and 11 negative controls) with PoAstV4 PCR positive tissue homogenate that had been screened by next generation sequencing for the presence of other primary swine pathogens. Nasal swabs were collected to monitor viral shedding, and piglets were necropsied at five- and eight-days post-challenge (DPC) to evaluate gross and microscopic lesions. Viral localization within tissues was confirmed using PoAstV4 in situ hybridization. The immune response was characterized by detecting anti-PoAstV4 IgM and IgG antibodies in serum and quantifying infiltrating lymphocytes (T and B cells) within lesioned airways using immunohistochemistry and digital image analysis software.

PoAstV4 was detected in nasal secretions of challenged piglets as early as two DPC. All challenged piglets were negative for nasal shedding by 14 DPC, with peak shedding occurring earlier in the post-challenge period. Fecal shedding was also observed, suggesting either swallowed respiratory exudates or potential low-level gastrointestinal involvement. Microscopic lesions consistent with epitheliotropic viral infection, specifically tracheitis and bronchitis, were consistently observed in challenged pigs at five and eight DPC. PoAstV4 was successfully localized to the respiratory epithelial cells within these lesioned tissues via ISH, directly linking the virus to the observed pathology.

A robust immune response was mounted against PoAstV4. Both anti-PoAstV4 IgM and IgG antibodies were detected in serum, with IgG levels becoming detectable at 14 DPC and increasing through the study's end at 21 DPC. Furthermore, significant infiltration of lymphocytes was observed within the lesioned respiratory mucosa of challenged pigs, indicating a cell-mediated immune response. The demonstration of both antibody and cell-mediated immune responses to PoAstV4 is foundational for understanding immunity and potential vaccine development strategies.

This study provides compelling evidence that PoAstV4 is a primary respiratory pathogen capable of causing tracheitis and bronchitis in young, naïve pigs. The reproduction of microscopic lesions, viral shedding patterns, and characterization of the immune response solidify PoAstV4's role as a direct contributor to respiratory disease in swine.

While the reproduced lesions in this controlled setting were not as severe or extensive as some field cases, this is likely influenced by the precise challenge dose (which is difficult to quantify for non-isolatable viruses) and the optimal health conditions of CDCD piglets.

The findings suggest that PoAstV4 should be considered a differential diagnosis for respiratory signs, particularly coughing, in suckling and early nursery pigs, especially in cases where common viral pathogens like IAV are not detected. Future research efforts are critical to isolate PoAstV4 from clinical cases, which will enable more precise challenge studies, evaluation of the virus's impact on production parameters, and assessment of its role in co-infections with other swine respiratory pathogens.

SHIC Announces New Training Resources for Standardized Outbreak Investigations

December 4, 2025 – The Swine Health Information Center-funded Standardized Outbreak Investigation Program (SOIP) web application, developed by Iowa State University and introduced in December 2023, now has new training videos and a written guide available for end-users. Developed to assist veterinarians and producers as they capture data from disease outbreak investigations in a secure industry database, SOIP provides a platform for consistent data collection, pinpointing risks for pathogen entry, and driving sustainable biosecurity improvements.

The new written training guide and training video resources are now available to support continued use, ease navigation, and broaden adoption of the web-based program. Videos can be viewed on the SHIC YouTube channel. The video resources contain two separate modules that include multiple short how-to episodes that guide users on how to access and fully utilize the various components of the SOIP, including farm or system start-up, data entry, creating farm maps, reviewing the investigation process, generating reports, and interpreting hazards.

SHIC Training Videos include:

Module 1

- **Episode 1**: The Organization of the SOIP
- **Episode 2**: How to Add a Company Representative in the SOIP
- **Episode 3**: Who Can Delete Sites, Users, and Companies in the SOIP
- **Episode 4**: How to Set Up Sites and Build Site Maps in the SOIP
- **Episode 5**: How to Delete or Edit Existing Sites in the SOIP
- **Episode 6**: Overview of the Pre-Investigation Survey Section of the SOIP
- **Episode 7**: Overview of the Questionnaire Section of the SOIP
- **Episode 8**: How to Edit an Existing Investigation in the SOIP
- **Episode 9**: How to Update Master Mapping Information in the SOIP
- **Episode 10**: How to Unlock a Locked Investigation in the SOIP

- **Episode 11**: How to Interpret a Detailed Report in the SOIP
- **Episode 12**: How to Interpret an Executive Summary in the SOIP

Module 2

- **Episode 1**: The Purpose of the SOIP
- **Episode 2**: Terminology Used in the SOIP
- **Episode 3**: The Process for Conducting an Outbreak Investigation – The Investigation Phase
- **Episode 4**: The Process for Conducting an Outbreak Investigation – The Investigation Form
- **Episode 5**: The Process for Conducting an Outbreak Investigation – The Post-Investigation Phase

Developers of SOIP and SHIC encourage the use of the app due to the following benefits:

- All outbreak investigation data and related information (diagnostic reports, animal movement information, etc.) are stored in a centralized database system for easy access and management.
- The platform allows multiple investigators/production/farm staff to access, share, and contribute to the investigation enhancing collaboration across teams.
- The system automatically generates site maps and incorporates daily local weather data during the investigation period.
- Users can generate custom forms allowing for targeted data collection to focus on pathogen entry events during the investigation period.
- The application helps users identify risks through built-in logic to flag responses that may indicate potential biosecurity hazards.
- Completed investigation forms can be automatically compiled into comprehensive reports.
- Facilitates collective learning from the experiences of veterinarians and producers by highlighting the most frequent biosecurity gaps identified across the US swine industry.

For use of the web-based application, veterinarians should contact the Iowa State University-based administrator for access, a one-time process, at soip@iastate.edu.

The SOIP application can be used by veterinarians and producers to identify and prioritize biosecurity hazards, manage and prevent pathogen introduction, and prepare for seasonal challenges so that production systems can enhance biosecurity control measures accordingly. The development of resources that support continued utilization of the SOIP helps SHIC fulfill its mission to protect and enhance the health of the US swine herd by supporting efforts to prevent, respond to and mitigate emerging, re-emerging, and transboundary swine diseases.

Surveillance and Discovery of Emerging Disease

SHIC-Funded Study Evaluates Tongue Tip Fluids for Pathogen Monitoring in Nursery and Grow-Finish Pigs

February 7, 2025 – The Swine Health Information Center funded a study to evaluate tongue tip fluids, a sample type more frequently used in breeding herds, as a potential tool for pathogen surveillance in nursery and grow-finish phases. The study evaluated PRRSV and IAV detection in oral fluids compared to tongue tip fluids using PCR in weekly samples from wean-to-market pigs and assessed the likelihood of successful PRRSV ORF-5 sequencing across the two sample types. Led by Drs. Gustavo Silva and Onyekachukwu Henry Osemeke of Iowa State University, the study found that tongue tip fluids offer a comparable and cost-effective alternative to oral fluids for the detection of PRRSV and IAV by qPCR in growing pig herds when mortalities are present.

Find the study industry summary here.

PRRSV and IAV are two swine pathogens that significantly impact the health and productivity of post-weaning pigs. While oral fluids are widely used for monitoring these viruses, post-mortem tongue tip fluids represent a cost-effective alternative with potential advantages for viral detection in mortalities. Surveillance programs in growing pig herds are generally not as robust as those in breeding herds. Consequently, all sample types considered for use in post-weaning pigs require evaluation for ease of collection, cost-effectiveness, sensitivity, and reliability of surveillance results under conditions of sample pooling.

Three objectives were evaluated in this study, including: 1) to compare the detection of PRRSV and IAV using qPCR in weekly oral fluids and tongue tip fluids from wean-to-market pigs, 2) to assess the likelihood of successful PRRSV ORF-5 sequencing across the two sample types, 3) to assess the effect of pooling tongue tip fluids on PCR detection of PRRSV.

To complete these aims, three groups of pigs from two production systems were tested for PRRSV and IAV from weaning until market. Two groups (A and B) were sourced from PRRSV-positive stable sow farms, while Group C was from a farm weaning positive pigs. Groups B and C received a PRRSV-modified live virus vaccine at weaning. Weekly, oral fluids from six pens and tongue tip fluids were tested for PRRSV and IAV using qPCR.

For the second objective, PRRSV-positive tongue tip fluids and oral fluids were selected for Sanger sequencing to compare the performance of both sample types. To assess the impact of pooling on PRRSV detection, PRRSV-positive tongue tip fluids were serially diluted (undiluted, 1/4, 1/16, and 1/64) and qPCR tested; statistical models were used to assess the cycle threshold value changes with varying dilution levels and determine the minimum dilution level at which PRRSV detection was maintained in 95% of cases. This study also evaluated associations between weekly pathogen detection and mortality using mixed-effects regression models.

Across all three groups, there were 60 study weeks with sample submissions. Oral fluids were obtained in all 60 weeks whereas tongue tip fluids were collected in 43 of those weeks. IAV was detected in 34.9% of oral fluids and 30.2% of tongue tip fluids, while PRRSV was found in

67.4% of oral fluids and 53.5% of tongue tip fluids. Tongue tip fluids showed a significantly lower mean cycle threshold for PRRSV (mean Ct = 28.7) compared to oral fluids (mean Ct = 33.2). There was fair agreement between the PCR outcomes of tongue tip fluids and oral fluids (Cohen's kappa values of 0.26 for PRRSV and 0.24 for IAV).

Out of the 22-week-matched tongue tip fluids and oral fluids pairs sent for PRRSV sequencing, 45.5% of oral fluids and 63.6% of tongue tip fluids were successfully sequenced. The higher success of sequencing in tongue tip fluids was attributed to their relatively lower Ct values. The pooling studies demonstrated that pooling samples could effectively increase detection probabilities, with 79% detection probability at a 1/7 dilution compared to 14.29% if only a single day of tongue tip fluids out of one week is tested for the same scenario of one positive day. Lastly, the mortality rates were significantly higher when PRRSV was detected alone or with IAV for both sample types.

Overall, tongue tip fluids offer a cost-effective alternative to oral fluids for the PCR detection of PRRSV and IAV in growing pig herds when mortalities are available. Despite PRRSV and IAV PCR detection being numerically more frequent in oral fluids, tongue tip fluids had a higher success rate for PRRSV sequencing due to their significantly lower Ct values. This makes tongue tip fluids a useful surveillance sample type for PRRSV in wean-to-finish barns. To maximize the diagnostic potential of this sampling approach, practitioners are encouraged to aggregate tongue tissues from all daily mortalities. As there could be weeks without mortalities, postmortem tongue tip fluid sampling and antemortem oral fluid sampling can be jointly part of a comprehensive surveillance program. Furthermore, testing tongue tip fluids in weekly pools can be useful in wean-to-finish barns where budget constraints may limit testing frequency.

SHIC-Funded Study Assesses Tongue Tip Fluids for Value in Growing Pig Disease Diagnosis

February 28, 2025 – Evaluating whether post-mortem specimens such as tongue tip fluids (TTF) can serve as a viable tool for disease surveillance during the post-weaning stages of pork production is needed. To help fill this knowledge gap, the Swine Health Information Center funded a study to determine if TTF can aid in detection of key pathogens affecting swine during the grow-finish phase, including PRRSV, porcine circovirus, porcine parvovirus, *Lawsonia intracellularis*, and influenza A virus. Led by Drs. Cesar Corzo and Marcello Melini at the University of Minnesota, the objectives of the study were to 1) assess the sensitivity and specificity of PRRSV detection in TTF compared to other specimens including intracardiac blood, oral/nasal swabs, rectal swabs, and superficial inguinal lymph nodes and 2) characterize the detection of PCV2, PCV3, PPV1, PPV2, *Lawsonia intracellularis*, and IAV across all sample types. Overall, most pathogens were detected in TTF indicating that this specimen can provide valuable post-mortem information during a diagnostic investigation.

Find the study summary on this page.

In the US, most postweaning swine health monitoring sampling relies on oral fluid collection. As labor constraints are a concern, assessing whether easy-to-collect post-mortem samples can provide value for diagnosis in these production phases is needed. Furthermore, finding practical and time-efficient methodologies to monitor health during the post-weaning stages provides

value to swine health and production. With these potential advantages, industry adoption of TTF collection can help improve understanding of disease occurrence and dynamics.

Understanding whether TTF can effectively screen pathogens commonly found in postweaning pigs provides valuable insights for producers, offering potential solutions to rapidly respond and improve herd health management when conventional sampling methods are unavailable or impractical. By comparing the diagnostic performance of alternative specimens to traditional serum sampling for PRRSV and other pathogens through PCR, this research seeks to offer producers practical, cost-effective options for post-weaning disease surveillance.

To complete this study, samples were collected from two growing pig farms in Minnesota. The first farm, a 2,400-head wean-to-finish farm undergoing a PRRSV outbreak, was visited when pigs were five and 11 weeks of age. The second farm was a 3,300-head finishing site undergoing a similar health challenge as farm 1; this site was visited when pigs were 15 weeks of age. During each farm visit, a total of 30 dead pigs were sampled, resulting in a total sample size of 90 pigs. From each pig, TTF, intracardiac blood (IC), oral/nasal swabs (ONS), rectal swabs (RS), and superficial inguinal lymph node (SILN) samples were collected. Samples were tested for specific pathogens against a gold standard sample and then compared with TTF results.

All TTF samples were tested individually by PCR for all pathogens listed above. All specimens were tested individually for PRRSV. Additionally, ONS were individually tested for IAV; RS were individually tested for PPV1, PPV2, and *Lawsonia intracellularis*; and SILN were individually tested for PRRSV, PCV2 and PCV3. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated for PRRSV TTF and IC serum as the gold standard. The proportion of PCR positive results from specimens tested for other pathogens was compared by descriptive statistics. Most pathogens were detected at least once in TTF with Ct values ranging from 11.6 to 39.8.

For PRRSV, the best results across all specimens were in samples collected at 11 weeks and are shown in the table.

Specimen	Measure	Visit at 11 weeks
Tongue tip fluids	Sensitivity (95% CI)	84% (60 - 97%)
	Specificity (95% CI)	9% (0 - 41%)
	PPV (95% CI)	62% (41 - 80%)
	NPV (95% CI)	25% (1 - 81%)
Oral/nasal swabs	Sensitivity (95% CI)	74% (49 - 91%)
	Specificity (95% CI)	73% (39 - 94%)
	PPV (95% CI)	82% (56 - 96%)
	NPV (95% CI)	62% (32 - 86%)
Superficial inguinal lymph nodes	Sensitivity (95% CI)	100% (82 - 100%)
	Specificity (95% CI)	9% (2 - 41%)
	PPV (95% CI)	66% (46 - 82%)
	NPV (95% CI)	100% (3 - 100%)

For other pathogens, PCV2 was detected in 43% of TTF and 11% of SILN samples whereas PCV3 was not detected in any sample. PPV1 was detected in 1% of TTF and 0% of RS whereas PPV2 was detected in 97% of TTF and 61% of the RS samples. *Lawsonia intracellularis* was detected in 6% of TTF and 0% of the RS samples. IAV was detected in 38% of TTF and 38% of the ONS samples.

Study data demonstrated that most pathogens were detected on TTF samples during the three different ages, indicating that this specimen can provide valuable post-mortem information during a diagnostic investigation. Detection of pathogens in TTF could be the result of shedding or environmental contamination which should be considered when practitioners are interpreting results. Further investigation is required to best report the diagnostic performance of the other alternative specimens utilized in this study. While a complete and exhaustive collection of multiple clinical specimens from different body systems remains the standard in diagnostic investigations, TTF provide an easy-to-collect sample type with low labor requirements and valuable diagnostic test results.

SHIC-Funded Study Develops DNA Sensors for Infectious Swine Virus Detection

March 3, 2025 – Swine viral pathogens such as PRRSV and PEDV pose significant economic challenges to the swine industry. The Swine Health Information Center funded a study to investigate novel diagnostic tools for differentiating infectious versus non-infectious swine viruses to use on-site for real-time detection. The study, led by Dr. Yi Lu at University of Texas Austin, aimed to develop a novel method for differentiating intact viruses versus those virus particles rendered noninfectious by disinfection. Novel diagnostic tools such as the one investigated in this study could provide valuable information to pork producers and veterinarians by evaluating cleaning and disinfection efficacy after a viral disease outbreak.

Find the industry summary of project #22-003 here.

While diagnostic methods such as PCR and cell culture are available to detect viral genetic material and assess infectivity, respectively, inherent limitations to these tests include required sample pretreatment and a skilled operator for processes performed on costly equipment. Further, the tests require hours to days to be conducted in a professional laboratory, making these tests unsuitable for on-site detection. The goal of the study described herein was to develop a novel method for direct detection of intact viruses without any sample pretreatment using a handheld portable meter.

The novel method under investigation is based on DNA aptamers that can be selected to bind and differentiate infectious swine viruses from noninfectious and other viruses. By immobilizing the aptamers into a nanopore, only infectious PRRSV or PEDV produce electrochemical signal changes and thus can be detected and quantified using a handheld meter. This innovative direct detection method utilizing DNA aptamers integrated into solid-state nanopores has previously demonstrated success in detecting a wide range of human viruses, including and human adenovirus and SARS-CoV-2.

There were two primary objectives of the study to apply the technology to swine viruses:

- To obtain DNA aptamers that can bind infectious PRRSV and PEDV through *in vitro* selection and counter selection processes, with the aim of enhancing selectivity.
- To design and validate DNA aptamer-nanopore sensors for the direct detection of infectious PRRSV and PEDV, both within controlled cell cultures and real-world field samples.

To conduct this study, PRRSV and PEDV samples were prepared in the laboratory of Dr. Ying Fang at the University of Illinois at Urbana-Champaign. A portion of the PRRSV and PEDV samples were rendered noninfectious by adding binary ethylenimine or UV light and then purified. Researchers conducted 10 SELEX (systematic evolution of ligands by exponential enrichment) experiments under varying conditions to optimize aptamer selection for PRRSV and PEDV. The SELEX process is designed to identify aptamers which are short, single-stranded DNA or RNA molecules that bind selectively to target viruses.

In previous work by this research group, SELEX projects targeted other viruses, such as human adenovirus and SARS-CoV-2. Using lessons learned from previous work, researchers optimized aptamer selection conditions by varying factors such as virus concentration, purity, and reaction times. Initial findings indicated that virus purity was a critical factor affecting the success of selections. Researchers focused on conducting SELEX experiments using ultra-centrifugally purified PRRSV and PEDV. This approach yielded promising results where shifts in melting temperatures that mirrored previous successes with other viral targets were observed.

After performing NGS on these more refined samples, data was analyzed, and several promising DNA sequences were obtained. Biochemical studies identified aptamers with the highest selectivity for either infectious PRRSV or PEDV. Currently, researchers have identified three different aptamer candidates for PRRSV. First, candidate 5 demonstrated binding to active PRRSV II and inactive PRRSV II, with no binding to active PEDV or active PRRSV I. Second, candidate 7 exhibited binding to active PRRSV II but no binding to inactive PRRSV II, active PEDV, or active PRRSV I. Third, candidate 9 showed binding to both active PRRSV II and active PRRSV I, while no binding was observed with inactive PRRSV II or active PEDV.

Despite these promising results, challenges with reproducibility and consistency in binding assays occurred in this initial pilot study. Additional optimization or complementary techniques may be required for field applications. The insights gained from this study underscore the importance of sample purity and the need to further enhance aptamer selectivity to improve detection reliability in applied settings. Further optimization of the DNA aptamer sequences, and assay conditions are required to develop this system into a practical sensor for on-site and real-time detection.

Through this pilot project, valuable lessons about the complexities of aptamer selection and the importance of optimizing experimental conditions have been gained for PRRSV and PEDV, two of the most important viruses affecting US swine. Moving forward, researchers aim to refine aptamer candidates to improve specificity and reliability for detecting viruses in porcine samples. These insights will guide future research efforts, contributing to the development of more effective diagnostic tools for the pork industry.

SHIC Funds Assessment of Stillborn Piglet Tongue Fluids as Risk-Based Sample

April 2, 2025 – The Swine Health Information Center funded a study to evaluate tongue fluids (TF) samples from stillborn pigs as an indicator of PRRS detection in liveborn littermates. Led by Drs. Isadora Machado and Daniel Linhares of Iowa State University, the study investigated TF as a risk-based sample type in commercial breeding herds to predict PRRSV detection in the litter. Litters with stillborn piglets and small litter size had a higher probability of being PRRSV positive. Moreover, TF from stillborn piglets were shown to be a reliable indicator of PRRSV status for their liveborn littermates, indicating that TF can be an effective risk-based approach for PRRSV detection.

Find the study industry summary for project #23-076 on this page.

A risk-based approach to animal selection for sampling enhances PRRSV detection by increasing the probability of selecting an animal harboring the pathogen while requiring a smaller sample size. Aggregated TF from dead animals has emerged as a promising risk-based approach. It has a similar PRRSV RNA positivity rate as serum, processing fluids, and family oral fluids. Its composition is complex, especially in stillborns, consisting of blood, saliva, respiratory mucus, amniotic fluid, meconium, and environmental contaminants, which may reflect the litter's PRRSV status upon laboratory testing.

Objectives of the study described herein had a goal to further knowledge on the use of TF from stillborns in commercial sow herds for PRRSV detection. Objectives included evaluating 1) the incidence of stillborn piglets on the probability of PRRSV RNA detection within the litter, 2) the stillborn TF PCR-results as an indicator of PRRSV in liveborn piglets, and 3) the litter size as a risk factor for PRRSV.

To investigate these objectives, samples were collected from two PRRSV-positive breeding herds (Herd A: 2,500-sow farm with a three-week batch farrowing system; Herd B: 4,500-sow farm with a weekly batch farrowing system). A total of 130 litters were sampled within 12 hours after farrowing: 66 litters without stillborn piglets and 64 litters with stillborn piglets. This totaled 1,723 liveborn and 105 stillborn piglets sampled. Regarding the litters' parity, in Herd A, 14 were parity 1 sows, seven were parity 2, four were parity 3, and one was parity 4. For Herd B, all 104 litters came from parity 1 sows.

TF and intracardiac blood samples were individually collected from stillborn piglets. Tail blood swabs were individually collected from all liveborn littermates. Samples were individually tested for PRRSV RNA detection by RT-qPCR at the Iowa State University Veterinary Diagnostic Laboratory. Litters with ≤ 11 liveborn piglets were defined as small litters, whereas litters with ≥ 12 were defined as large.

Across all sample types, the percentage of PRRSV-positive litters was 22.3% (29/130 litters), of which 15.4% (20/130 litters) were tail blood swab PCR positive, 10% (13/130 litters) were intracardiac blood PCR positive, and 16.9% (22/130 litters) were TF PCR positive. At an individual animal-level across both herds, 3.4% (59/1,723 liveborn piglets) were tail blood swab PCR positive, 16.2% (17/105 stillborn piglets) were intracardiac blood PCR positive, and 26.7%

(28/105 stillborn piglets) were TF PCR positive. The mean positivity of liveborn piglets within the litter was 5% but varied between 0 – 85.7%, while the total born (stillborn and liveborn piglets combined) was 4.6% (0 – 76.4%).

Regarding sample type Ct values, tail blood swabs had a median of 35.5 (interquartile range, IQR: 29.2-37.7), intracardiac blood a median of 22.4 (IQR: 20.7-26.0), and TF a median of 29.2 (IQR: 25.2-35.7) (Figure 1). Intracardiac blood exhibited the lowest median Ct value, which was significantly different from the median Ct values of the other sample types ($P < 0.05$).

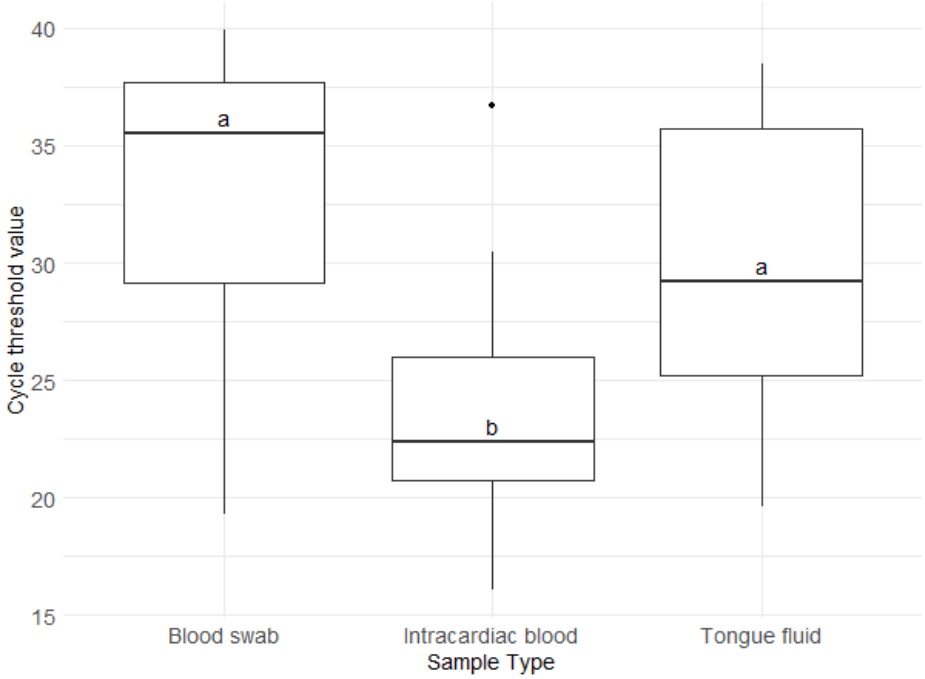


Figure 1. Distribution of cycle threshold values for the collected sample types. Groups with different alphabets are statistically different ($\alpha = 0.05$).

In the model analysis, litter size and the presence of stillborn piglets were used as predictor variables, while litter PRRSV status was the response variable. Small litters had 12.2 times higher odds ($P < 0.001$) of having a PRRSV-positive piglet compared to large litters. Holding stillborn presence constant, there was a 51.9% probability of detecting PRRSV-positive piglets in small litters compared to 8.1% in large litters. Similarly, litters with at least one stillborn piglet had 12.5 times higher odds ($P < 0.001$) of having a PRRSV-positive piglet compared to litters without stillborn piglets. Holding litter size constant, there was a 52.2% probability of detecting a PRRSV-positive piglet when at least one stillborn was present, compared to 8.0% when no stillborns were present. No significant interaction between litter size and stillborn presence was found ($P = 0.076$).

When considering at least one TF PRRSV-positive result and litter size as predictors to assess the odds of having a PRRSV-positive liveborn littermate, litters with at least one TF-positive result had 17.6 times higher odds ($P < 0.001$) of having a PRRSV-positive liveborn piglet compared to litters without stillborn piglets. Holding litter size constant, there was a 63.6% probability of detecting PRRSV-positive liveborn piglets when at least one TF result is PRRSV-positive compared to 9.0% when stillborn were absent or 4.0% when TF result was PRRSV-negative.

Similarly, small litters had 7.0 times higher odds (P = 0.002) of having a PRRSV-positive liveborn piglet compared to large litters. Holding the TF results constant, there was a 20.8% probability of detecting a PRRSV-positive liveborn littermate in small litters compared to 3.6% in large litters.

In conclusion, litters with stillborn piglets and small litter size have a higher probability of detecting PRRSV in the farrowing room. Moreover, TF from stillborn piglets are a reliable indicator of the PRRSV status of their liveborn littermates, indicating that TF can be an effective risk-based approach for PRRSV detection.

Veterinarians and producers are encouraged to collect TF, targeting stillborn piglets and small litters to increase the likelihood of detecting PRRSV. This risk-based sampling strategy within the first few hours post-farrowing enhances the effectiveness of PRRSV monitoring programs in breeding herds and supports timely interventions, such as McREBEL and cross-fostering. Lastly, while TF were individually collected in this study to test the hypothesis, collecting them as an aggregated sample, similar to PF, is recommended. This approach increases the likelihood of detecting the virus, allowing for a larger number of animals to be screened.

SHIC-Funded Study to Optimize PRRSV Surveillance Evaluates Sensitivity of Tongue Tip Testing in Sow Herds

May 2, 2025 – With the goal of optimizing PRRSV detection, Drs. Igor Paploski and Cesar Corzo at the University of Minnesota led a study investigating the use of tongue tip samples from dead piglets for PRRSV monitoring during sow herd stabilization. The Swine Health Information Center-funded study sought to determine how to best utilize this sample type to optimize sensitivity of virus detection. Results showed that testing tongue tip fluids yielded more sensitive PRRSV detection compared to tongue tissue homogenates. Tongue tip fluids had notably lower Ct values especially when samples were kept frozen compared to refrigerated. The results demonstrate that sample processing and storage significantly impact the diagnostic sensitivity of tongue tips.

Find the industry summary for SHIC study #23-068 on this page.

PRRSV causes significant economic losses in the US at approximately $1.2 billion annually due to reproductive failure, abortion, and high pre-weaning mortality among piglets. Approximately 30% of US breeding herds experience a PRRSV outbreak every year. Tongue tips from dead animals, particularly piglets, are being considered as an alternative specimen to monitor PRRSV during sow herd stabilization; however, questions still exist regarding how to best process these samples to optimize sensitivity for virus detection. This study aimed to describe the impact of different tongue tip processing and testing protocols to optimize the sensitivity and specificity of PRRSV detection in sow herds.

To conduct this study, samples from seven sow farms were collected between two to five months after the onset of a PRRSV outbreak, including tongue tips from 20 piglet mortalities collected at each farm. Samples from five farms were used to test different pooling strategies (individual testing and pools of five and 20) and laboratory processing techniques (testing tongue tip fluids versus tongue tissue homogenate). Samples from the other two farms were used to simulate

different storage and shipping conditions (frozen versus refrigerated) and test samples at different time points (1, 4, and 7 days). The samples were tested by PCR at the University of Minnesota Veterinary Diagnostic Laboratory.

A total of 100 tongue tips were collected from the first five farm visits. Within-farm PRRSV prevalence on dead piglets ranged from 0% to 100% when testing tongue tip fluid individually, and from 0% to 45% when testing tongue tissue homogenate individually. The results of tongue tissue homogenate were compared to tongue tip fluid, which was considered the gold standard. When testing tissue homogenate individually, the sensitivity was 36%, specificity was 100%, positive predictive value was 100%, and negative predictive value was 76%.

Additionally, the study quantified the impact of sample pooling. When testing tissue homogenate in pools of five, the sensitivity was 75%, specificity was 100%, positive predictive value was 100%, and negative predictive value was 86%. The authors found that pooling samples reduced diagnostic accuracy but acknowledged that pooling may still bring value to producers as it allows testing of more animals at a reduced cost. Practitioners and producers are therefore advised to discuss their goals and objectives for the testing with pathologists to determine the most appropriate strategy.

Further, the study assessed the effects of storage conditions and time elapsed between collection and testing on Ct values. A total of 40 tongue tips were collected from two additional farms. Results showed that Ct values from frozen samples were lower than those from refrigerated samples stored for the same length of time. For each day that elapsed since collection, Ct values of the samples increased by 0.2 units on average. This reinforces the importance of keeping tongue tips frozen during shipping but also shows that refrigerated samples still yield positive results. Minimizing delays in handling and shipment is crucial, as these factors impact the sample’s Ct values for each elapsed day since sample collection.

Tongue tips are an easy-to-collect sample type that targets animal mortalities, which may have a higher likelihood of infection, and diminishes welfare concerns during sample collection. This study provides valuable insights into how sample processing and submission circumstances impact PCR PRRSV testing results of tongue tips. The findings directly address the practical challenges faced by veterinarians and producers in managing PRRSV outbreaks. By quantifying the effects of various processing and storage factors, the results provide actionable insights to improve diagnostic accuracy. The use of tongue tips, as a non-invasive sample source from dead animals, offers a valuable tool for PRRSV surveillance, provided the optimized protocols are implemented.

SHIC-Funded Study Establishes Oral Fluid Sampling Guidelines for Group-Housed Sows

November 14, 2025 – Funded by the Swine Health Information Center, a study establishing oral fluid sampling guidelines for group-housed sows was recently finalized. Led by Dr. Jeff Zimmerman at Iowa State University, the project goals were to characterize group-housed sow behaviors associated with oral fluid sampling and establish best practices for sample collection as a function of gestation stage, parity and pen size. The results determined that oral fluids sampling can be easily conducted in group-housed sows with two important recommendations to

maximize participation: 1) providing two ropes per pen and 2) allowing a sample time of 60 – 90 minutes.

Find the industry summary for Swine Health Information Center project #24-008 here.

In recent years, there has been a shift in some breeding herds to housing sows in groups, prompting the need for validating practical and cost-effective disease surveillance protocols in this population. The goal of this study was to develop sampling guidelines to optimize the collection of oral fluids for group-housed sows.

The project was conducted on a commercial breed-to-wean sow farm (6,500 head) across 12 pens with each pen holding 56 mid-gestation females sorted by parity. Oral fluids (using two ropes per pen) were collected for four consecutive days across the 12 pens: three pens of gilts, three pens of parity one sows, and six pens of multiparous sows. Sow behavior towards the ropes was characterized by individually marking a sub-set of animals and a 90-minute video observation was recorded. A food coloring dye was used to ensure detection of the environmental target in the oral fluids samples.

Results confirmed that oral fluids can be routinely collected from group-housed gestating sows using cotton ropes, a process used successfully in growing pig populations. In all groups and on all sampling days, the volume of oral fluid collected during the study was more than adequate for diagnostic testing. However, sampling time in group-housed sows should be extended to 60 to 90 minutes to maximize participation, a longer duration than what is recommended for use when sampling growing pigs.

The longer sampling time is needed for sows due to their larger size and the fact that fewer sows can access the ropes at any given time when compared to growing pigs. The use of two ropes per pen is recommended to provide adequate access and reduce competition across sows. In addition, to reduce diagnostic costs, the two sample ropes from the same pen can be pooled prior to testing.

This study showed that diagnostic targets in the pen environment are transferred into pen-based oral fluid samples, confirming previous report findings in a study conducted with finishing pigs (Tarasiuk et al. 2024). This explains why pathogens not shed via the oral cavity (for example, PEDV) are consistently detected in oral fluids. As pigs explore their surroundings, diagnostic targets in the pen environment are picked up; as a result, these targets are deposited in the oral fluid sample and detected by diagnostic testing. These results highlight the ease of oral fluid collection and provide guidance for producers on best practices to routinely monitor herd health and detect emerging diseases in group-housed sows through oral fluids.

Reference

Tarasiuk et al. 2024. Pen-based swine oral fluid samples contain both environmental and pig-derived targets. *Animals* 14(5):766. https://doi.org/10.3390/ani14050766.

Prioritize Swine Bacterial and Viral Pathogens

SHIC-Funded Study Results in Disease Index on Relative Burden of Endemic US Swine Pathogens

October 7, 2025 – The Swine Health Information Center funded a project to generate a data-driven swine disease index through monitoring swine pathogen activity using confirmed tissue-based diagnoses from Iowa State University Veterinary Diagnostic Laboratory. This initiative aimed to provide a transparent, automated, and reproducible method to help veterinarians, producers, and stakeholders prioritize disease threats based on real-world diagnostic data. Led by PhD Candidate Guilherme Cezar under the supervision of principal investigators Drs. Giovani Trevisan and Daniel Linhares, the resulting disease index monitors swine pathogen activity and identifies emerging threats. In addition, the index can be adapted and integrated into the SHIC-funded Swine Disease Reporting System for continuous monitoring.

Find the industry summary for Swine Health Information Center project #24-016 here.

To build the swine disease index, 59,950 ISU-VDL porcine cases from 2020 to 2024 were utilized. Four key factors were considered:

1. How often a disease was diagnosed
2. How often a disease appeared alongside other diseases, i.e., co-diagnosis
3. How widespread it was across US states
4. How frequently it triggered statistical alarms for unusual activity within a year

These factors were weighted and combined into a single score for each disease, updated weekly for the ongoing year, and displayed in an interactive Power BI dashboard that will be housed on the SDRS website. Investigators anticipate the Power BI Dashboard will be available in early 2026 and will display annual disease index data. The dataset used was annotated by diagnostic codes, farm type, geographical data, and accession IDs. Four normalized variables were used to build the index: disease occurrence, co-diagnoses, geographic spread, and Early Aberration Reporting System (EARS) alarms. These measures were weighted using an R-based function and combined into a single scale ranging from 0.01 to 1. Statistical validation—using resampling, Euclidean, and Manhattan distance models—ensured robust consistency across years.

Results confirmed that PRRSV and *Streptococcus suis* remain the top two-ranked pathogens, demonstrating their high activity in the US swine industry. The system also detected emerging pathogens' activity in 2024, including porcine sapovirus and porcine astrovirus, while PCV2 showed a notable decline. The dashboard allows users to track disease trends and compare rankings year-to-year, supporting real time decision-making. The index was validated using modeling to assess year-to-year consistency and detect emerging or declining disease trends. Bootstrap resampling (500 iterations) generated 95% confidence intervals for index predictions, excluding EARS due to model limitations. The interactive Power BI dashboard provides real-time visualization and weekly index updates which can be monitored by the SDRS team, and ongoing changes communicated to the industry.

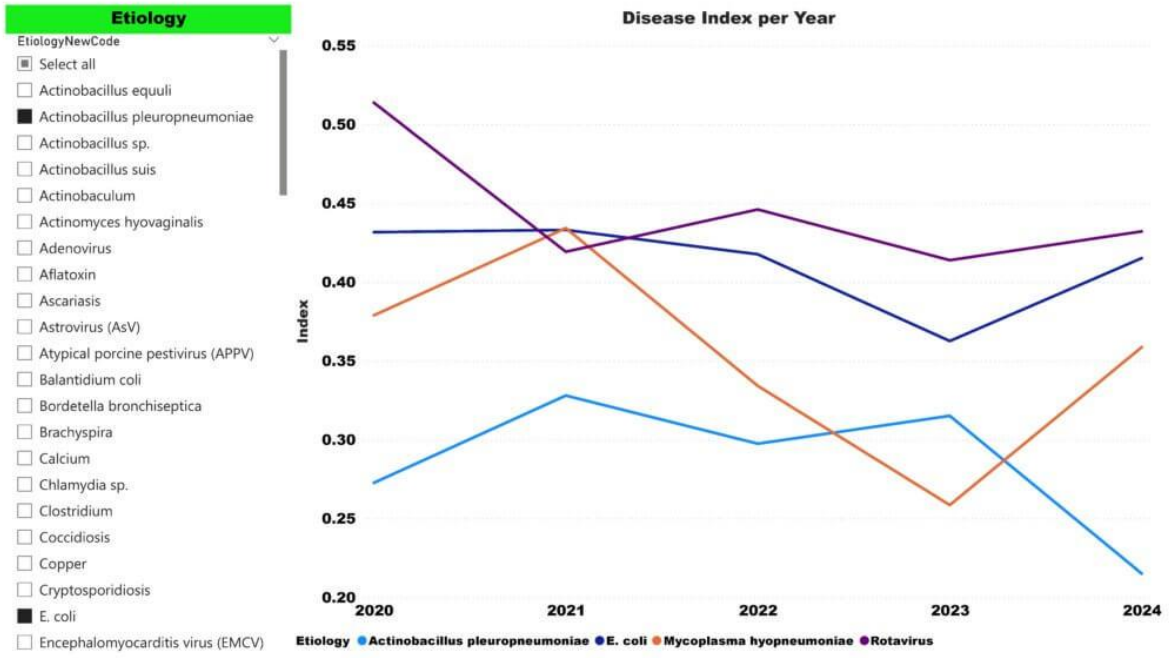
Key findings revealed high stability in pathogen indexes across years, with a Spearman correlation of 0.92. PRRSV and *Streptococcus suis* consistently ranked as top burdens,

underscoring their persistent importance. However, the method also registered new priorities: porcine sapovirus and astrovirus after they had an increased number of cases in 2022 and 2023, respectively, emerged as more significant endemic pathogens. In contrast, PCV2, traditionally considered a dominant pathogen, fell out of the top 10 by 2024. This decline may reflect improved herd immunity, vaccination, or biosecurity interventions.

Although infectious diseases dominated the rankings, the system also captured nutritional and toxicological diagnoses, which—while less common—introduce diversity to the surveillance profile. Their variability and occasional abrupt ranking shifts highlight the utility of keeping such categories under close observation for early detection of non-infectious threats.

The disease index's strength lies not only in its reproducibility but also in its adaptability. Its integration into a Power BI dashboard monitored internally by SDRS staff provides a real-time, visually accessible tool, updated weekly, that supports veterinarians, producers, and industry stakeholders in quickly identifying emerging disease threats and allocating resources efficiently. By combining multifactorial epidemiological variables rather than relying on occurrence alone, the index captures both pathogen prevalence and broader dynamics such as geographic spread and co-disease patterns.

Overall, the index presents a scalable and transparent foundation for swine disease prioritization, enabling continuous, longitudinal monitoring that differentiates between stable endemic pathogens and volatile or emerging threats. Its validation across multiple statistical models ensures consistency while maintaining sensitivity to dynamic changes. Moving forward, investigators recommend integrating the framework into SDRS, refining weighting algorithms, and considering extension of the concept to other livestock systems to further enhance animal health security. By combining epidemiological rigor with automated analytics, this study delivers a timely and flexible tool that strengthens swine health surveillance and informs science-based disease control strategies.



Wean-to-Harvest Biosecurity

SHIC Wean-to-Harvest Biosecurity: Alternative Cleaning Methods to Reduce PEDV in Livestock Trailers

January 27, 2025 – A study funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff, aimed to evaluate various cleaning protocols to mitigate porcine epidemic diarrhea virus (PEDV) spread from a contaminated trailer to the farm through foot traffic between these two areas. Efficacy was evaluated across protocols including 1) positive control (no cleaning), 2) dry clean - scrape and bake (TADD), 3) volume hose wash and disinfect, 4) power wash and disinfect, and 5) negative control. Led by Dr. Rodger Main of Iowa State University, the study found that the volume hose and power wash and disinfect protocols demonstrated significant efficacy in reducing viral load on both trailer and farm-site surfaces.

Find the study industry summary here.

PEDV has posed a significant threat to the US swine industry since its initial introduction in 2013 and requires effective biosecurity measures for disease control. Livestock trailers used for transporting pigs play a major role in PEDV epidemiology if not adequately cleaned and disinfected. The objective of this study was to evaluate the efficacy of different cleaning and disinfection methods in reducing PEDV contamination from livestock trailers to farm-site loading areas, using molecular and bioassay techniques. Effective cleaning and disinfection of livestock trailers are crucial in mitigating PEDV spread. This study simulated foot traffic between farm-site areas and trailers to mimic field conditions and determined the efficacy of various cleaning treatments.

Five treatment groups were included in the study: 1) positive control, where no trailer cleaning occurred post-inoculation with PEDV; 2) scrape and bake (TADD), where trailers were scraped and swept to remove fecal matter followed by heat up to 71ºC; 3) volume hose wash and disinfect, where trailers were flushed out with a high volume hose followed by disinfectant; 4) power wash and disinfect, where trailers were first washed with a hose to remove gross fecal matter, then power washed at 1500 psi, followed by disinfectant; and 5) negative control, where trailers were inoculated with PEDV-negative feces and received no cleaning.

Different cleaning methods were applied, followed by a simulation of foot traffic to mimic real-world conditions. Trailers were sampled post-cleaning and after foot traffic simulation. PEDV presence was quantified using qPCR to measure viral load on trailer surfaces and farm loading areas. Bioassays were conducted by inoculating naïve pigs with samples recovered from the farm site area after applying the treatments to trailers. Statistical analyses, including ANOVA and Fisher's Exact test, compared PEDV levels and positive PCR results across treatments.

Washing treatments, particularly flush-out volume hose and power wash and disinfect, demonstrated significant efficacy in reducing viral load on both the trailer and farm-site surfaces. For farm-site surface contamination, these methods achieved over 99% reduction in viral genomic copies compared to the positive control. This marked reduction is crucial in preventing infection of susceptible pigs and highlights the importance of effective washing protocols. The

power wash and disinfect method emerged as highly effective, significantly reducing PEDV levels on trailer surfaces with most samples showing negative PCR results (three of five). The volume hose wash and disinfect method also demonstrated substantial efficacy in inactivating the virus as tested through swine bioassay, though some residual fecal material was observed.

Even though the scrape and bake method reduced viral load by more than 98% compared to the positive control, this method was not effective in terms of virus inactivation as the most pigs tested on bioassay became infected with PEDV (four of five replicates). All negative control replicates were negative on PCR testing of the sampled surfaces and remained negative on the bioassay after inoculation. Positive control samples showed high PEDV levels on trailer and farm site surfaces.

Researchers noted water-based washing procedures, especially power wash and disinfect, are highly effective in reducing PEDV contamination on livestock trailers and preventing transmission to pigs. Importantly, both volume hose and power wash treatments were effective in completely producing negative pigs on bioassays, indicating effectiveness in inactivating the remaining virus harvested from the trailer and farm-site surfaces. Overall, bioassay results indicated that only the positive control and scrape and bake treatments led to PEDV infection in pigs, while the other treatments successfully prevented viral transmission.

The study underscores the importance of thorough cleaning and disinfection protocols in enhancing biosecurity in swine production systems. Moreover, findings suggest routinely cleaning and disinfecting all market haul trailers leaving terminal points of concentration by either of the water-based trailer cleaning treatments could reduce inter-premises disease transmission associated with market haul transport and elevate preparedness across the US pork industry.

SHIC Wean-to-Harvest Biosecurity: Mitigating Disease Transmission Through Vehicle Rerouting and Enhanced Sanitation

January 27, 2025 – A study led by Dr. Gustavo Machado of North Carolina State University, aimed to reduce the risk of disease transmission between farms through vehicle contacts. The study evaluated reduction of risk through rerouting vehicles while considering cleaning and disinfection events and effectiveness. Findings demonstrate that a vehicle rerouting system holds potential as a strategic tool for preventing and controlling the spread of diseases among farms through vehicle movements.

The study was funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff. Find the study industry summary here.

Substantial evidence indicates that vehicle movement is closely linked to the spread of diseases among animal production sites. To mitigate disease transmission events, vehicles undergo thorough cleaning and disinfection (C&D) procedures. However, C&D effectiveness remains a question and the frequency of C&D between farm visits is often unknown. Consequently, relying solely on vehicle C&D may be insufficient to stop the spread of diseases, and supplementary strategies are needed to prevent disease transmission events through contaminated vehicles. The

objective of this study was to reduce the risk of between-farm transmission through vehicle contacts by rerouting vehicles while considering C&D events and effectiveness.

To conduct this study, data from commercial swine farms were utilized, including farm geolocations, vehicle Global Positioning System data, PRRSV infection status, and PEDV infection status. Among the data collected were the movements of 654 vehicles in a pig-dense area of the US, including vehicles visiting farms, C&D, slaughterhouses, feed mills, and parking locations. Farm data was collected from enhanced on-farm Secure Pork Supply biosecurity plans available in the Rapid Access Biosecurity application (RABapp™). The investigative team (Drs. Galvis and Machado) ranked and reorganized vehicles delivering animals and feed to farms according to several conditions, including disease status of visited farms, vehicle contact network communities, C&D events, and shipment time efficiency.

Using these conditions, researchers simulated vehicle movements for one week, indicating each vehicle was cleaned and disinfected after each shipment. They reconstructed the between-farm contact network by vehicle movements from observed and simulated data and compared 1) the number of contacts from PRRSV-positive and PEDV-positive farms to disease-free farms and 2) the number of contacts between farms from different network communities (group of farms densely interconnected). In addition, researchers calculated the frequency of vehicles visiting C&D stations and traveled distances.

Implementing the rerouting system led to a substantial decrease in the median number of at-risk contacts between farms. For vehicles transporting feed, at-risk contacts were reduced by 42% when C&D effectiveness was 0% and reduced by 89% when C&D effectiveness was 50%. For vehicles transporting pigs to market, at-risk contacts were reduced by 25% when C&D effectiveness was 0% and reduced by 45% when C&D effectiveness was 50%. Vehicles transporting pigs between farms only showed a remarkable reduction after C&D effectiveness was above 50%, with 33% fewer at-risk contacts. Finally, when C&D effectiveness was increased to 100%, at-risk contacts dropped below 5% for vehicles transporting feed and pigs to market, and below 37% for vehicles transporting pigs to farms.

The researchers' rerouting system also reduced the interactions between farms from distinct network communities. At-risk contacts were reduced by 17% when C&D effectiveness was 0% and reduced by 99.9% with C&D effectiveness at 100%. Furthermore, the rerouting system increased C&D visits by up to 81% and increased the distance traveled per vehicle up to 54%.

Despite the potential benefit of reducing the risk of disease spread between farms, the rerouting system would increase transport costs due to increased C&D events and the distance traveled per vehicle. Given the severe economic impact of PRRSV, PEDV, and other endemic infectious diseases on swine production, the costs and logistics of a vehicle rerouting system will require a close economic examination to justify the potential health benefits of reducing disease transmission compared to continuing traditional vehicle movement schedules and C&D protocols.

This study demonstrates that combining vehicle rerouting movements with stringent C&D practices effectively reduces contact between disease-positive and disease-negative farms.

Further, rerouting reduces at-risk contacts between farms from different network communities, thereby reducing the probability of disease dissemination. Ultimately, the rerouting system could be integrated into regular vehicle shipment schedule operations as an additional tool for preventing and controlling the spread of livestock diseases among farms via the indirect contact network of vehicle movements.

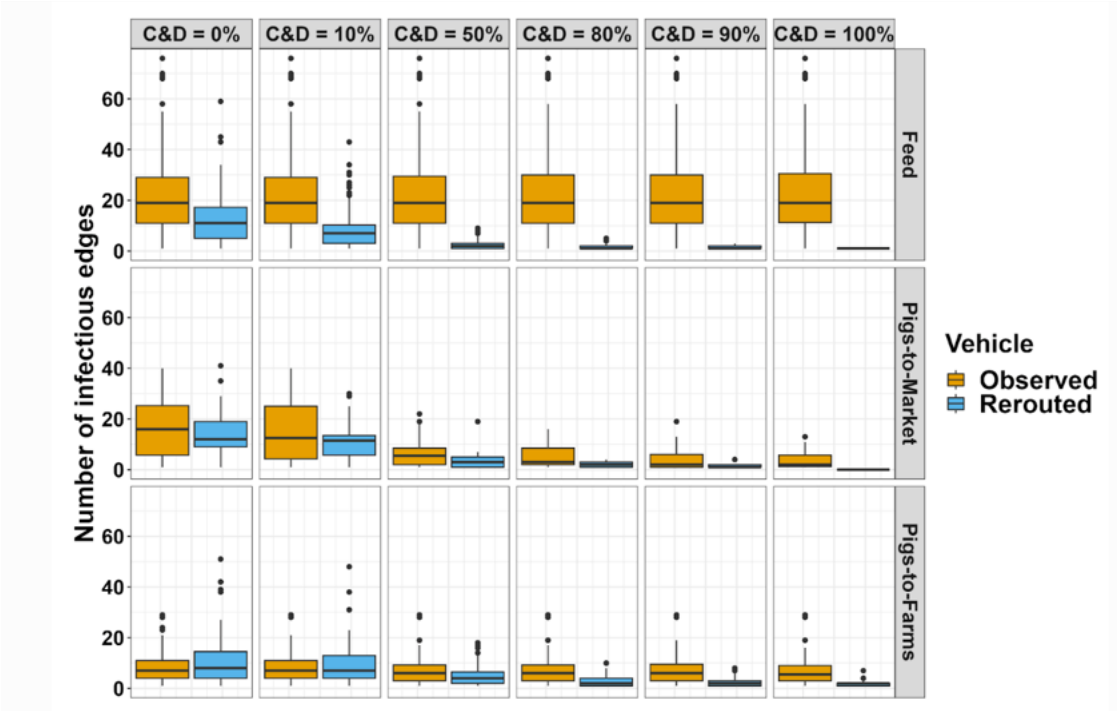


Figure 1. Infectious edges within the vehicle contact network. Box plots displaying the number of connections, named infectious edges or at-risk contact, from PRRSV-positive and PEDV-positive farms to disease-free farms within the vehicle contact network for one week.

SHIC Wean-to-Harvest Biosecurity: Evaluating Self-Vaccinating Technology for Growing Pigs

April 2, 2025 – A study funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff, sought to determine if an environmental enrichment (EE) device could be used to self-vaccinate pigs through natural behavior and reduce labor requirements. Led by Dr. John McGlone at Texas Tech University collaborating with Dr. Rebecca Robbins and Dr. Jessica Seate and a team of students, the EE device was developed to allow pigs to self-administer liquids, such as vaccines, through pig rooting, investigating, and natural play behaviors. Through measuring antibody response after self-vaccination compared to hand-vaccination, researchers investigated efficacy of vaccine delivery to pigs for erysipelas, ileitis, influenza, and *Mycoplasma hyopneumoniae*. Researchers determined efficacy varies by pathogen, with erysipelas and ileitis vaccines showing similar efficacy between self and hand-vaccination.

Find the industry summary for project #23-052 on this page.

This study sought to determine if an EE self-administration device could deliver vaccines and generate robust antibodies in growing pigs against *Lawsonia intracellularis* (ileitis), *Mycoplasma hyopneumoniae* (Mhp), influenza A virus (IAV), and *Erysipelothrix rhusiopathiae* (erysipelas). For each vaccine trial, 36 growing pigs at approximately 200 pounds were utilized over a period of up to 49 days after vaccination. Oral fluids and serum antibodies were collected at baseline and post-vaccination to compare vaccine efficacy between the EE self-vaccination technology and traditional vaccine administration by a person. Assays for serum IgG and IgA were compared across three treatments, including 1) non-vaccinated controls, 2) pigs with individual vaccination by oral gavage or intramuscular injection, and 3) self-vaccinated group.

Pigs were raised in an experimental finishing barn similar to commercial conditions. The herd was naïve for PRRSV, PEDV, PEDCoV, TGEV, and Mhp at the time of the study. No Mhp, IAV or ileitis vaccines were being used in the sow herd; however, some pigs had background titers to ileitis prior to the study. All pigs received erysipelas bacterin at 21 days of age. Three pens (four pigs/pen) were utilized per treatment in a single barn. Each treatment group was accommodated in blocks of three adjacent pens, with contact possible through fencing within the treatment group. An empty pen was placed between treatment blocks to prevent contact between treatment groups. Pen configuration was to ensure no inadvertent exposure occurred between controls and vaccinates or between vaccination routes. The pig was the experimental unit in this study.

Pigs were randomly assigned to one of three treatments groups: 1) Control pigs that received no vaccine or exposure to the EE device, 2) Hand-vaccinated pigs receiving either IM injections of commercially licensed vaccines (Mhp and IAV) or 2.5 mL of vaccine delivered orally by hand with a syringe (erysipelas and ileitis), and 3) Self-vaccinated pigs exposed to a EE device attached to each pen which pigs could operate by pressing a panel with their snouts.

At the time of vaccine administration, 15 mL of MP (maternal pheromone) was sprayed on the front panel of the EE device to encourage pig interaction. When the panel was pressed, the device delivered a spray volume of up to 4 mL. Cameras were installed overhead, and network video recorders were used to record the self-vaccinated group to determine if all pigs received the vaccine. Sample collection was conducted at specific intervals post-vaccination to monitor antibody development.

Results for Mhp and IAV showed that self-vaccination with either antigen did not generate serum or oral fluid antibodies equivalent to the hand-vaccinated pigs. When erysipelas vaccines were tested, self-administered pigs developed both oral and serum antibodies equal to those of hand-vaccination. Pigs that self-administered the ileitis vaccine developed only oral fluids antibodies. It was determined that some vaccines have similar efficacy between self-administration compared to labor-intense individual vaccinations. However, other vaccines did not readily induce antibody synthesis.

Overall, findings suggest that self-administration of killed vaccines, such as IAV and Mhp, may not be effective when delivered via the EE device. Inactivated vaccines typically rely on systemic immunity and often require adjuvants or higher doses to enhance efficacy. These characteristics pose challenges for self-vaccination formats without precise dose controls. In contrast, live attenuated vaccines stimulate both systemic and mucosal immunity and can

replicate locally at the administration site, making them more suitable for self-vaccination. Vaccine formulations or administration methods could be adapted to allow self-vaccination of select vaccines. Alternatively, an EE device may be modified to allow different methods of administration such as subcutaneous or intramuscular routes.

Using EE for self-vaccination of select vaccines has the ability to reduce labor requirements, eliminate the need for needles, provide benefits to animal welfare during immunization, and allow pen-level vaccinations or delivery of other animal health products. Self-vaccination via an EE device not only reduces labor demands but also offers a less stressful and more enriching experience for pigs compared to traditional hand-vaccination methods. This approach has the potential to improve vaccine compliance, biosecurity, and overall animal welfare in commercial swine operations using emerging technology being examined for application in the industry.

SHIC Wean-to-Harvest Biosecurity: Industry-Wide Assessment of Bioexclusion Practices Across US Swine Farms

April 2, 2025 – A study funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff, recently defined biosecurity practices used across wean-to-harvest sites through an industry-wide questionnaire and developed a rapid-risk assessment tool for producers. Led by Dr. Gustavo Silva at Iowa State University, the study assessed current bioexclusion practices among a diverse group of producers across swine-producing states in the US. Further, the study developed methods that veterinarians, production managers, and producers could implement to improve on-farm biosecurity. Findings showed that biosecurity on wean-to-harvest sites is inconsistent across the industry and that tools for increasing biosecurity could include relatively simple practices such as bench entry.

Find the industry summary for project #23-029 here.

Two primary objectives of the study were to 1) assess the current bioexclusion practices used at wean-to-harvest sites across the US, ensuring a diverse group of producers from different swine-producing states are included and 2) develop a tool that veterinarians, production managers, and producers can use to assess biosecurity on their sites quickly.

Data to characterize current biosecurity practices was collected through a questionnaire completed by 21 herd veterinarians, representing production systems and independent producers. The questionnaire was developed with input from industry experts and was comprised of 69 questions on bioexclusion practices, covering site characteristics, vehicle movements, people movement, manure removal, water entry, and sanitation. A weighted method ensured the results reflected all respondents' answers.

Results of the questionnaire included data representing 15.7 million pigs across 3,680 sites in 13 states. Of the 3,680 sites, 10.3% were nurseries, 52.9% were finishing sites, and 36.8% were wean-to-harvest sites. Most farms (93.3%) reported using all-in-all-out and mortality disposal was mostly off-site (65.3%). Close to half (47.3%) of all employees visited more than one site daily. While most sites have shower facilities (63.8%), fewer sites require employees to shower in or out (57.6% and 56.9%, respectively). Manure is removed about 1.5 times per year, often by

third-party companies. Most sites rely on well water (87.7%) with most not performing any water treatment (64.7%).

Questionnaire results on transport biosecurity revealed trucks hauling pigs are generally washed and disinfected, with 100% of trucks hauling weaned pigs cleaned between loads. For feeder trucks, 60.9% are washed and 63.9% are disinfected between every load. For market hog trucks, 78.3% are washed, and 52% are disinfected between every load.

For developing the biosecurity assessment tool in Objective 2, researchers enrolled 139 wean-to-harvest sites to assess biosecurity practices and their relationship with lateral introduction of PRRSV, PEDV, PDCoV, and TGEV. Farms were required to be stable or negative for PRRSV and key enteric viruses, including PEDV, PDCoV, and TGEV, to participate. Participating producers were asked to complete a biosecurity questionnaire with 115 questions covering risk events, biosecurity management practices, herd demographics, truck sanitation, and farm location.

The 139 sites were across nine companies in six states, including 44 nurseries from three companies, 44 finishers from three companies, and 51 grow-finish sites. Findings demonstrated that PRRSV outbreak rates were highest in grow-finish sites (27/44; 61.4%), followed by wean-to-finish (27/51; 52.9%) and nurseries (15/44; 34.1%). No outbreaks of PEDV or coronaviruses were reported in nurseries or wean-to-finish sites, but grow-finish sites had a 2.3% break rate for coronaviruses and a higher rate for PEDV (11.4%).

Additional key findings included that nursery sites had 92% lower odds of reporting a PRRSV outbreak than finishers, and biosecurity practices like bench entry, truck washing, and downtime between loads reduced outbreak risk. Hauling animals with unknown status for PRRSV increased the odds of reporting an outbreak by 12 times, stressing the need for careful animal health monitoring before transportation.

While most sites involved in the study reported implementing biosecurity measures such as vehicle washing and employee training, researchers found gaps remain, especially in communication and compliance auditing. Information gained from Objective 2 revealed that nursery sites have a significantly lower risk of PRRSV outbreaks than grow-finish sites. This emphasizes the need for stronger biosecurity in the finisher phase. Simple, cost-effective measures like bench entry—where employees change footwear or clothing before entering different areas—can help reduce the spread of PRRSV and are relatively easy to implement. Researchers note more data is needed to refine biosecurity recommendations and help producers improve their practices, enhance surveillance, and build a more resilient industry.

Information collected through Objective 1 allowed researchers to understand and characterize the implementation frequency of bioexclusion practices on wean-to-harvest sites. Results are aligned with the reality of biosecurity measures being better established and more frequently implemented on sow farms than in wean-to-harvest populations. At wean-to-harvest sites, practices remain inconsistent and less rigorously enforced, where gaps in practices like hand hygiene, disinfection, and supply decontamination persist. As a result, the risk of pathogen

introduction is heightened, revealing the need for stronger adherence to biosecurity protocols across this stage of production.

These findings highlight the need for targeted biosecurity measures, especially in the finisher phase, where the risk of outbreaks is higher. Results underscore the importance of implementing effective biosecurity practices, such as regular washing, downtime, and preventing sick animal transport, to mitigate the risk of PRRSV transmission.

SHIC Wean-to-Harvest Biosecurity: Waterless Decontamination for Transport Trailers

September 4, 2025 – A study funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff, evaluated the effectiveness of a waterless trailer decontamination method using modified vaporous hydrogen peroxide (mVHP) in combination with an industrial vacuum system. The study, conducted by Dr. Erin Kettelkamp, Swine Vet Center, evaluated the effects of the vacuum plus mVHP on PEDV detection and inactivation using varying disinfectant contact times. Results showed that mVHP treatment paired with a vacuum system reduced the relative PEDV viral load via PCR detection on contaminated trailers while no difference was detected between contact times. Further research is needed to assess the impact of this technology on virus inactivation and its potential application and scalability in the field.

Find the industry summary for project #24-003 here.

Effective biosecurity protocols for swine transport are critical to controlling endemic pathogens like PEDV and preparing for foreign animal diseases such as African swine fever. The combination of an industrial vacuum and mVHP treatment presents a promising alternative to traditional trailer sanitation methods. Unlike current wash and thermo-assisted drying and decontamination procedures, this system is portable, waterless, and scalable, significantly reducing labor, infrastructure, and water usage associated with existing practices. This technology may be particularly valuable during disease outbreaks, when the rapid and thorough biocontainment of contaminated swine transport vehicles is critical.

Current trailer disinfection methods involving power washing, chemical disinfectants, and TADD are labor-intensive, water-dependent, and impractical for rapid or mobile deployment during disease outbreaks. The study of mVHP, which has been used successfully in military and biosafety level 4 laboratory settings due to its effectiveness in neutralizing biological agents across diverse materials without equipment degradation, shows promise. Hydrogen peroxide-based aerosol disinfectants have previously been shown to inactivate swine pathogens in work done by Dr. Kettelkamp. However, broader adoption of hydrogen peroxide-based disinfectants in swine production requires further research and optimization for field conditions. Effective field implementation of mVHP disinfection requires prior removal of organic material, such as using a portable industrial vacuum system described herein.

For this pilot study, two scenarios were evaluated: 1) mock-swine trailer under *in-vitro* conditions (i.e., chamber) and 2) mock-swine trailer under field-simulated conditions (i.e., shroud). For the second scenario, a miniature insulated trailer shroud was designed to mimic

conditions for potential field application. A miniature aluminum trailer model was contaminated with PEDV fecal inoculum in both scenarios. An industrial-grade vacuum was used to remove organic material, followed by applying mVHP treatment across different contact times.

PEDV inoculum (USA/NC49469/2013; 10^4 $TCID_{50}$/mL) was mixed with feces and shavings to prepare the contamination material. Aluminum trailer models (1:16 scale) were contaminated with PEDV fecal inoculum and treated with mVHP for 30, 60, or 120 minutes. Four replicates per treatment duration were performed, with positive controls held at ambient temperature. Pre-marked trailer surfaces were sampled before and after treatment to confirm PEDV contamination and to assess differences in PEDV RNA detection via quantitative PCR. Bioassays were conducted via oral inoculation with post-treatment environmental samples, utilizing liquid that was recovered from the trailer after treatment. Pigs were observed for clinical signs and evidence of PEDV infection to determine if the virus had been inactivated with each treatment. The main effects of disinfectant treatment and contact time, as well as their interaction, were assessed.

Overall, study results demonstrated that application of mVHP following vacuum removal of bulk material reduced detectable levels of PEDV RNA as measured by PCR from contaminated trailer surfaces compared to untreated controls. No differences in PEDV detection levels via PCR Ct values were observed across different contact times. Further, similar numerical results were observed between the chamber and shroud scenarios.

The antiviral efficacy of mVHP treatment against PEDV could not be determined, as all environmental trailer samples failed to produce PEDV infection under *in-vivo* conditions, including the positive controls. All pigs remained clinically healthy during the bioassays and tested negative for PEDV infection. Limitations in virus viability and bioassay sensitivity warrant refinement in inoculum preparation and validation to ensure accurate assessment of disinfection efficacy for virus inactivation.

In this pilot study, mVHP treatment of contaminated trailers showed a reduction of detectable PEDV genetic material via PCR. The impact of mVHP treatment on PEDV infectivity was inconclusive; therefore, additional research is needed to validate virus inactivation capabilities and to improve the standardization of contamination methods to optimize bioassay procedures. With continued development, this approach could play an important role in improving transport biosecurity and disease outbreak response readiness for the swine industry.

SHIC Wean-to-Harvest Program Supports PRRS Biosecurity Enhancement for Fall Season

September 26, 2025 – The Swine Health Information Center, along with the Foundation for Food & Agriculture Research and the Pork Checkoff, launched the Wean-to-Harvest Biosecurity Research Program in the fall of 2022. Goals of the research program were to investigate cost-effective, innovative technologies, protocols, and ideas to enhance biosecurity implementation during the wean-to-harvest phases of swine production. Results received to date provide opportunities for US pork producers to understand potential risks, identify steps to prevent PRRS transmission, and make changes to immediately enhance their herd biosecurity as the fall respiratory disease season approaches.

At wean-to-harvest sites, biosecurity practices remain inconsistent and less rigorously enforced than at sow or boar stud sites, increasing the risk for disease introduction and transmission. The Wean-to-Harvest Biosecurity Research Program addresses several key biosecurity areas, including bioexclusion (keeping disease off the farm), biocontainment (keeping disease on the farm after an outbreak to lessen risk to neighbors), and transportation biosecurity. A total of 24 projects have been funded through this program to provide a comprehensive approach to advancing biosecurity of US farms. The Wean-to-Harvest Research Program reflects SHIC's responsiveness to an identified swine health vulnerability and its collaborative efforts to leverage producer Checkoff dollars to safeguard the health of the US swine herd.

Projects focusing on disease introduction risks, using PRRSV as one of the targeted pathogens at wean-to-harvest sites, have identified key knowledge and tools that producers and veterinarians can apply at the farm today to combat PRRS transmission and introduction into the herd. Outcomes relevant for fall biosecurity are summarized here from two projects, including an industry-wide assessment of bioexclusion practices led by Dr. Gustavo Silva and an assessment of manure pumping effects on disease onset led by Dr. Daniel Linhares, both at Iowa State University.

Investigations of factors influencing the risks of disease introduction and transmission at wean-to-harvest sites and during transportation have provided key takeaways informing biosecurity enhancement for PRRS management and control:

1. Biosecurity practices at nursery sites reduced the likelihood of reporting a PRRSV outbreak by 92% compared to finisher sites.
2. Simple, cost-effective measures such as bench entry, where employees change footwear or clothing before entering different areas, reduce risk of PRRSV spread.
3. Layering biosecurity practices, such as implementing showers combined with bench entry, can work together to reduce the risk of pathogen contamination through additive barriers.
4. The likelihood of a PRRSV outbreak is greater when employees cohabit but are employed at differing locations.
5. Monitoring PRRSV status before and after transportation of swine could decrease the likelihood of a PRRS outbreak as hauling pigs with unknown PRRS status poses on-farm transmission risks.
6. Washing trucks between loads of weaned piglets significantly reduces the likelihood of a PRRS outbreak, and the combination of washing trucks and downtime between loads is even more effective.
7. Manure pumping and land application is a risk for PRRSV introduction into farms, with the risk being higher when manure is near nursery sites compared to grow-finish sites.
8. The risk of PRRSV introduction through a manure pumping event increased if conducted on a site where pigs had been placed for less than 16 weeks.
9. Monitoring PRRS status through testing oral fluids in wean-to-harvest populations is a useful tool for detecting the virus around manure application.

Read more about these projects by searching for 23-029 and 23-031 on this page.

PRRS remains an industry-wide swine health challenge, and as emerging variants continue to be detected in the US, identifying risks and implementing biosecurity steps to prevent the introduction and spread of the virus are critically important. Proactively enhancing wean-to-harvest biosecurity can assist in the control of emerging and endemic diseases across the US pork industry.

While the Wean-to-Harvest Biosecurity Research Program is no longer accepting new applications, many projects are ongoing, and outcomes will be published as soon as they become available for stakeholder awareness and application on-farm. SHIC continues to invite research proposal submissions that address its five strategic pillars and priorities outlined within the 2025 Plan of Work, spanning multiple facets of swine health. Targeted research on key priority areas, such as biosecurity for wean-to-harvest production, provide knowledge for identifying emerging threats and solutions to reduce impact on pork producers.

SHIC Wean-to-Harvest Biosecurity: Investigating Novel Farm Entry Systems

November 5, 2025 – A study funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff, assessed the development of an effective and practical biosecurity entrance system. Led by Dr. Teng Lim at the University of Missouri, various biosecurity interventions were evaluated for their effectiveness, including air showers, disinfectant spraying, disinfectant fogging, and their combinations, on reducing bacterial and viral contamination of cloth, skin, and hair surfaces. While full-body showering was confirmed as the most effective method, a system combining air showers with disinfectant spraying and hair nets performed similarly, revealing opportunities and challenges with novel methods.

Find the industry summary for Swine Health Information Center project #23-049 here.

Traditional biosecurity measures such as shower-in/shower-out and Danish entry systems (DES) are effective but can be difficult to consistently implement due to time requirements and compliance by farm personnel. Farm-specific coveralls and human hygiene are critical barriers to pathogen entry. However, overlooked aspects such as worker hair, clothing, and dirty hands remain significant reservoirs for pathogen transmission. Human hair is a naturally shedding material that can carry and release pathogens when not properly covered with hair nets or sanitized through physical (showering) or chemical means. Since a single lapse in protocol can lead to pathogen introduction, developing alternative or supplemental methods that are practical, efficient, and acceptable to workers is essential.

Objectives of this project were to evaluate a combination of innovative biosecurity-effective entry systems for commercial pig farms as replacement options for the strenuous shower-in and shower-out system. The study was designed to evaluate the effectiveness of multiple biosecurity interventions—including air shower (AS), disinfectant spraying (DS), disinfectant fogging (DF), and their combinations—with and without integration of the DES and hair nets (HN). Another treatment was the Modified-DES (MO.DES), which was the DES but instead of hand washing, it utilized hand sanitizer. Three representative surfaces, including coverall or t-shirt, leather or pigskin (representing human skin), and faux fur (representing human hair), were contaminated with two bacteria, *Staphylococcus aureus* (Gram-positive) and *Escherichia coli* (Gram-negative),

and two viruses, canine distemper virus (CDV, enveloped) and feline calicivirus (FCV, non-enveloped), to assess the efficacy of the treatment methods.

A commercial AS unit was installed for personnel decontamination. For the DS and DF components, a 7-ft × 4-ft outdoor storage shed was repurposed as a dedicated chamber for disinfectant application. Slightly acidic electrolyzed water (SAEW) was used as the disinfectant and was prepared at available chlorine concentrations of 50, 100, 200 and 300 mg/L. SAEW was generated by electrolyzing tap water with a brine/electrolyte solution containing 107 g NaCl and 40 mL of 12 M HCl in 500 mL distilled water, using a commercial electrolyzed water generator.

Two entry protocols were evaluated: the Danish entry system, which involved the use of hand soap, farm-specific clothing, and dedicated footwear; and the modified Danish entry system, which used hand sanitizer and hair nets in addition to farm-specific clothing and footwear. Treatments were tested with and without the Danish entry system, hair nets, and a modified Danish entry system using hand sanitizer.

For the evaluation of bacterial load reduction, standard plate count methods were used to evaluate the effectiveness of the individual and/or combined treatment systems in reducing *E. coli* and *S. aureus* contamination from cloth, skin, and hair surfaces. For the viral load reduction test, cycle threshold (Ct) values were measured using real-time PCR on samples recovered from control and treated sample surfaces, and were evaluated for the effectiveness of the individual and/or combined treatment systems.

Overall, results demonstrated that while the single-step methods including air showers, disinfectant spraying, and disinfectant fogging were largely ineffective on their own, integrating the Danish entry system or hair nets significantly enhanced both bacterial and viral reductions. The bacterial reduction study (*E. coli* and *S. aureus*) revealed that disinfectant spraying and air showering with disinfectant spray achieved over 2-log reduction, while Danish entry system or hair net-enhanced combinations reached 3–4-log reductions. While the full shower remained most effective, particularly for hair (5-log reduction), the air shower plus disinfectant spray plus hair net treatment performed similarly. The modified Danish entry system eliminated bacteria to undetectable levels on hands. Across all treatments, *E. coli* exhibited consistently higher susceptibility to treatment than *S. aureus*.

For the viral reduction tests (FCV and CDV), only Danish entry systems or hair net-based combinations achieved meaningful reductions, with two combinations performing close to the full shower protocol:

1. air shower, disinfectant spray and Danish entry system
2. air shower, disinfectant spray and hair net

Incorporation of Danish entry system markedly increased viral Ct values (higher Ct values indicate low viral load), with mean Ct values above 35, significantly higher than controls and single-step treatments. Combinations containing Danish entry system, particularly air shower plus Danish entry system, disinfectant fogging plus Danish entry system, and the combination of air shower, disinfectant spray and Danish entry system, produced Ct values >35 with several

undetectable replicates, representing significantly greater viral reduction than all non-Danish entry system treatments.

Overall, results of this study demonstrate that Danish entry systems and hair nets are critical additions for effective microbial control during farm entry. Further, the use of an alcohol-based hand sanitizer as part of a modified Danish entry system and multi-step combinations can offer practical, effective alternatives in settings where full-body showering is not feasible.

SHIC Wean-to-Harvest Biosecurity: Understanding Caretaker Needs for Conducting Biosecurity Practices

November 5, 2025 – A study funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff, assessed pig caretaker motivation and resources for practicing biosecurity in the wean-to-market phases of production. Led by Dr. Michael Chetta at Talent Metrics Consulting, the study revealed that greater emphasis on recognition, rewards, and resources positively influences caretakers' biosecurity compliance. Additionally, new technologies and improved building designs were found to reduce caretaker demands while simplifying adherence to biosecurity protocols. Researchers observed that caretakers exhibit higher levels of trust when adequate resources, fair compensation, and recognition are provided. Conversely, concerns related to pay, disease threats, and equipment limitations were shown to negatively affect caretaker performance and overall work engagement.

Find the industry summary for Swine Health Information Center project #24-093 here.

Understanding what motivates farm caretakers is key to improving biosecurity. Earlier research provided support for the idea that caretakers generally want to follow biosecurity rules, but their motivation mostly came from within (personal values and beliefs) rather than from outside rewards or recognition. This previous work explored the motivations and barriers that determine whether caretakers consistently perform biosecurity control measures, and identified key drivers of motivation (Attitude strongest, Social Norms weakest), job resources which exert the greatest positive influence (Supervisor Support & Job Control) and least positive influence (Rewards), and the job demands determined to be most strongly acting as barriers which can prevent biosecurity compliance (Physical Workload & Demanding Contact with Animals).

Building on this previous work, the new study described herein conducted a more focused and in-depth analysis of those previously identified variables of interest. Goals and objectives of the in-depth analysis were to conclusively identify the job aspects most important to the role, as perceived by caretakers, and to communicate where pork producers' targeted interventions would be most efficient and appropriate.

To conduct the analysis, a sample of 35 participants were recruited from four commercial pork producers based in the Midwest. Combined, these corporations have facilities in 11 states and three rank among the top 25 largest pork producers in the US. Data was collected between November 1, 2024, and April 1, 2025. Individuals who were actively employed caretakers in the wean-to-market phases of swine production were eligible to participate in the study. All 35 participants were invited to complete a survey questionnaire and an interview. Although only 28

individuals completed the survey, interview participation was higher (n = 35) and comprised the total sample size of 35.

The interviews were structured and contained five items to investigate:

1. the work caretakers do
2. their feelings on biosecurity (attitude)
3. their supervisor's duties (supervisor support)
4. supervisor's behaviors/actions (social norms)
5. biosecurity adherence

The survey questionnaire focused on aspects of the caretaker experience that were found in previous research as being the most influential on attitudes and behaviors related to biosecurity compliance, such as resources/support, feedback from supervisors, rewards, and the physical demands of the work. Surveys were available in both English and Spanish to accommodate participant language needs. The survey sample population included caretakers directly employed or contracted by one of the five participating pork producers (78.6%, 22/28) as well as owners (21.4%, 6/28).

Overall results of the quantitative analyses provide support for the idea that caretakers perceive biosecurity compliance as a high priority. Caretakers in the study often pointed out that simple mistakes, inattention, or lack of action by others were the most common reasons for breaking biosecurity protocols. Many also noted that there are very few rewards or recognition for doing things right, sometimes only punishments for getting things wrong. In other words, there is little external motivation to reinforce the importance of following biosecurity procedures.

Caretakers consistently confirmed that biosecurity is important and that compliance results in keeping the animals healthy. The sentiment most found while they spoke of biosecurity was trust (e.g., in supervisors, protocols, training, resources, facilities, and equipment). Job resources and support were identified as important to caretakers as they deal with the demands of their role. The physical nature of the work and continuous vigilance required to monitor animals for injury or illness may hinder their ability to consistently and correctly comply with biosecurity. The results strongly suggest that increasing caretaker resources as a potential intervention strategy could positively increase the consistent and correct execution of biosecurity protocols. Specifically, two areas identified as opportunities focused on 1) being rewarded for following biosecurity procedures, and 2) performance being rewarded properly.

With these outcomes, focus can more conclusively move away from training and motivation as areas of deficiency and focus on recognition, rewards, and resources to positively impact biosecurity compliance. The study reinforced that when these elements are lacking, performance and compliance can decline. Furthermore, technological upgrades and modernized facilities were viewed as crucial for reducing physical demands and simplifying biosecurity procedures.

With a focus on employee motivation and attitudes, this research will aid in the creation of interventions and processes to improve resources, recognition, and effective supervision that ultimately impact how caretakers do their jobs. By learning more about the challenges caretakers

face and how biosecurity is impacted, the industry can better design systems that support workers, strengthen farm practices, and further protect animal health.

SHIC Wean-to-Harvest Biosecurity: Tool to Mitigate Airborne Pathogen Spread on Farm

November 5, 2025 – A study funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff, investigated the development and evaluation of an electrostatic precipitator (ESP) prototype to mitigate airborne spread of pathogens under farm conditions. Led by Dr. Montserrat Torremorell at the University of Minnesota, the study evaluates the utility of an ESP to remove airborne particles from aerosols, including PRRSV. The ESP demonstrated high effectiveness, comparable to or slightly exceeding a MERV-16 filter, in removing airborne particles and over 99% removal of PRRSV. While the analysis showed potential for the ESP as a biosecurity tool, economic considerations, challenges related to scalability, adapting the design to swine farms, and maintenance protocols will require further commercial exploration.

Find the industry summary for Swine Health Information Center project #23-009 here.

Study objectives were to develop an ESP prototype designed with the goal of installation and use in a swine farm and evaluate its general performance, ability to resist the farm environment, identify prototype shortcomings, and measure energy use. Overall, intended outcomes were to evaluate the potential feasibility of an ESP as a biosecurity measure to minimize pathogen introduction through aerosols and/or maximize the biocontainment of airborne viruses post-outbreak.

The study focused on assessing the detailed capabilities of the ESP system to remove airborne particles. Results demonstrated that the technology is highly effective at removing general airborne particulate matter. When compared to the MERV-16, widely considered the gold standard for high-efficiency filtration in controlled environments, the ESP prototype achieved similar or enhanced performance using its non-mechanical, electrostatic method. These results suggest potential opportunities for farms to shift to technologies that would be highly effective without the rapid pressure drop and replacement burden associated with using mechanical air filtration.

A commercially available ESP was used and tested for its ability to collect airborne particles in the ASHRAE 52.2 wind tunnel in the UMN Department of Mechanical Engineering. The ESP was assessed in a controlled laboratory setting to assess the particle collection efficiency and to confirm particle size distribution. The size distribution measurements were conducted using a Size Mobility Particle Scanner and Optical Particle Scanner, covering a particle range from 10 nm to 10 µm. After laboratory characterization of the ESP was completed, the ESP was installed within a wean-to-finish barn. The barn was mechanically ventilated and used air filtration in the inlets, which were located in the attic. To evaluate the ESP performance, the filter bank in one of the ventilation boxes was replaced with the ESP setup.

To evaluate the ESP's performance in capturing viruses in the field, PRRSV was aerosolized and introduced at the ESP inlet. PRRSV strain VR2332 was grown and titrated to $10^{6.75}$ $TCID_{50}$/mL

and the suspension was spiked with a fluorescein physical tracer dye at 0.3 g/L. Two trials were performed at a temperature of 15°C (59 °F) with 47% relative humidity. The airflow rate was maintained at 1200 cfm. After collection, samples were analyzed for viable virus by titration and for viral RNA through PCR testing.

Results demonstrated that ESP collection efficiency was above 99% for particles greater than 1 µm. For particles less than 1 µm, collection efficiency varied by temperature, with higher efficiencies generally observed at lower temperatures. The ESP was also highly effective at removing PRRSV with removal efficiencies higher than 99%.

An assessment of the on-farm feasibility of using the ESP under field conditions included a cost comparison of purchasing, installing and operating the equipment compared to those of air filtration. Other considerations included operational sustainability as well as the upkeep and maintenance of the equipment. Unlike disposable mechanical filters, ESPs operate by electrically charging and collecting particles onto plates, which must be regularly cleaned to maintain efficiency.

The economic analysis included assumptions on acquisition, installation, operation, maintenance and replacements costs for the ESP and filter systems. Investigators concluded that the ESP system had a $299,553 greater net present value over a 15-year period, resulting in approximately $0.25 additional cost per weaned pig, when compared to air filtration. This costing model is based on the assumptions around current technology. Future engineering advances may make this model more economically viable in the future.

Scalability of the ESP for on-farm use involves moving the technology from laboratory- or pilot-scale units to systems capable of handling the significant air volumes necessary for large commercial farms. This requires robust engineering solutions that maintain high efficiency of ESP while operating continuously under real-world weather and climate variability. Farms have differing building designs and adoption of the use of this technology requires innovative retrofitting solutions that do not compromise the structural integrity or operational flow of the facility.

Overall, the ESP tested in this study was highly effective at removing airborne particles with collection efficiencies similar and marginally superior to those of a MERV-16 filter. The path to commercialization and more broad scale use of ESP is dependent upon successfully resolving the complex logistical and engineering challenges of scalability, design integration, long-term maintenance, and cost-effectiveness for producers. Further commercial exploration is needed to fully optimize ESP designs and maintenance protocols for practical applications to improve biosecurity within commercial pig farms.

List of Research Projects Funded Through Wean-to-Harvest Biosecurity Program in 2025

1. Principal Investigator: Cesar Corzo, University of Minnesota
    - Title: Market hog trailer contamination risk at the harvest plant: An observational project assessing plant and trailer positivity rate and associated factors
    - Start Date: July 1, 2025; Project Duration: 12 months

Japanese Encephalitis Virus

SHIC Highlights Vector Control Strategies for Pork Producers

April 28, 2025 – As the US anticipates the annual surge in mosquito populations, pork producers are urged to implement robust control strategies to reduce mosquito populations near swine farms and minimize potential production impacts. Changes in environmental conditions, specifically during high rainfall seasons, may result in increased mosquito populations that can be a risk for emerging disease and other swine production challenges. Through global disease monitoring by the Swine Health Information Center, heightened awareness for mosquito control stems from the recent 2025 re-emergence of Japanese encephalitis virus in Australia, a stark reminder of the potential impact of this mosquito-borne pathogen.

In February 2025, JEV was reported at two piggeries in southern Queensland, Australia, marking the first detections of the virus in AU commercial swine since July 2022. With no cases detected in piggeries during 2023 or 2024, this re-incursion of JEV into Australian piggeries requires close monitoring. Recent detections in mosquito populations in Goondiwindi, Inglewood, and Monto, as well as in mosquito and feral pig populations in New South Wales, have raised concerns about further potential spread of JEV, particularly with wet season conditions increasing mosquito activity.

The US is currently negative for JEV, a mosquito-borne virus which has waterbirds as a natural reservoir host but is capable of infecting pigs, humans, and horses. As a transboundary disease risk for US introduction, JEV is transmitted through the bite of infected mosquitos and can cause reproductive failure, delayed farrowing, stillbirths, mummified fetuses, abortions and weak piglets in swine breeding herds. In December 2024, SHIC, along with the Foundation for Food & Agriculture Research, funded six research projects to enhance US prevention, preparedness, mitigation and response capabilities for JEV.

Understanding the biology and lifecycle of mosquitos can aid in the development of mitigation and control strategies to reduce risks of pathogen transmission as well as improve swine health and welfare. In August 2024, SHIC, in collaboration with the American Association of Swine Veterinarians, hosted a webinar entitled "Mitigation Strategies for Mosquitos as an Emerging Threat to Swine Health" in response to a significant increase in Midwest mosquito populations over the summer of 2024. The goals of the webinar were to understand the role of mosquitos as a vector for disease transmission and to take actions to control mosquito populations near swine farms.

As part of the webinar, Dr. Rademacher at Iowa State University shared information with producers detailing mosquito control strategies in *Management of Site Insect Levels to Minimize Carcass Impact*. This publication emphasizes an integrated pest management approach instead of reliance solely on chemical mitigation. Effective environmental management includes diligent control of standing water, a breeding ground for larvae, and vegetation management around buildings, which serve as resting sites for mosquitoes. Ventilation adjustments within barns can also play a crucial role in mosquito population control. He encouraged producers to consult with entomologists, who can offer expert pest identification and control strategies.

Site maintenance is also essential for effective mosquito mitigation. This includes establishing rock barriers for proper water drainage around buildings, maintaining short grass, and controlling weeds around all production facilities. Particular attention should be paid to curtain pockets, which can retain water. Operating stir fans at night during peak mosquito season in naturally ventilated barns and running tunnels at night in tunnel-ventilated barns can help mitigate mosquito populations within barns. Proper adjustment of misters, waterers, and sprinklers is vital to prevent water pooling in all barn types.

Chemical mitigation should be integrated into a comprehensive pest management strategy, with adult mosquito spraying considered the least effective component. Utilizing non-residual and residual sprays, with strict adherence to label instructions, is critical. Fogging devices, employing oil or water-based pyrethrins, are recommended for adult mosquito infestations within buildings. Residual sprays should be applied to resting surfaces, not directly on animals. To mitigate resistance, rotating the mode of action groups of chemical mitigants is essential.

Additional information regarding mosquito lifecycle and control strategies can be found here.

SHIC-Funded Research Reveals JEV Threat Remains High with Mosquito Control Essential

July 25, 2025 – A recent study funded by the Swine Health Information Center underscores the significant threat Japanese encephalitis virus (JEV) poses to the global swine industry. The study, led by Dr. Natalia Cernicchiaro at Kansas State University, in collaboration with USDA Agricultural Research Service scientists at the National Bio and Agro-Defense Facility, included a systematic literature review and meta-analysis on JEV vector and host competence. Key findings from experimental studies reveal that at least nine additional mosquito species can be potential vectors for JEV, nearly half of the mosquitoes exposed to JEV became infected, and that one in four infected mosquitoes can transmit JEV to hosts. *Culex* species of mosquitos may pose the greatest risk to humans and animals, including swine. Findings emphasize the need for robust surveillance and integrated mosquito management strategies for US pork producers. The full report published by *Parasites & Vectors* can be accessed here.

Japanese encephalitis is an emerging zoonotic disease transmitted by JEV-infected mosquitos. It is considered a significant human and animal health threat. The virus is primarily maintained in its natural life cycle between mosquitoes and waterbirds, while occasionally spilling over into swine, horses, and humans. JEV infections in swine result in reproductive disease outcomes on sow farms, such as stillbirths, mummified fetuses, and abortions. While JEV has not been detected in the US, its recent spread globally, coupled with the presence of competent mosquito vectors and susceptible hosts in the US, elevates the risk of incursion.

Considering the recent expansion of JEV into mainland Australia and increased global research activity, this systematic review summarizes new experimental data on mosquito vector competence published between 2016 and 2023, building on a 2018 review previously published by the investigators. All reports included in the review were peer-reviewed literature and screened for relevance to vector competence, with a focus on JEV infection, dissemination, and transmission rates as the primary outcomes of interest. The study population was limited to mosquito vectors, and only experimental studies were eligible.

The updated meta-analysis revealed several crucial points for US pork producers and stakeholders to consider. First, the study found an overall JEV infection rate of 45.4% across 51 unique mosquito species, meaning that nearly half of the mosquitoes exposed to JEV in experimental settings became infected. This highlights the significant potential for virus amplification in mosquito populations around livestock, including pig farms.

The transmission rate across 30 experimentally tested mosquito species was 22.7%, indicating that roughly one in four of the tested infected mosquito species are capable of transmitting JEV to susceptible hosts, such as animals and humans. This underscores the importance of mosquito control measures in commercial swine operations to reduce the risk of an outbreak if the virus ever enters the country.

While vector competence for JEV varied by mosquito species, *Culex* mosquitoes exhibited the highest infection (51.9%) and transmission (27.8%) rates among all the mosquito species tested experimentally. These species are usually common in human and livestock settings, making them high-priority targets for surveillance and control.

The review identified an additional nine to 12 new mosquito species with demonstrated competence for JEV, expanding the list of potential mosquito vectors beyond those identified in the previous review. This continuous identification of new competent species emphasizes the dynamic nature of JEV epidemiology and the importance of ongoing systematic reviews to maintain up-to-date information essential for effective surveillance programs.

Data on which mosquito species are most likely to carry and spread JEV can help focus surveillance and control efforts on the species that pose the greatest risk. Some mosquito species can serve as early warning signals of JEV activity and may play key roles as primary or secondary vectors. However, infection rates alone are not enough, factors such as mosquito abundance, feeding habits, lifespan, and proximity to humans and animals are also important.

Understanding how efficiently mosquitoes spread JEV is essential for assessing the risk of the virus appearing in new areas. Identifying the species most capable of transmitting JEV allows for targeted control strategies to reduce infections and prevent the spread of the virus to vulnerable regions.

In their conclusion, the researchers state, “This review provides updated data not only on newly reported species showing competence for JEV but also on the level of competence observed in previously identified species. These findings offer valuable insights that go beyond what individual studies can provide, helping to synthesize the evidence base in a way that is accessible and actionable for policymakers, public health authorities, and disease modelers. Ultimately, the goal is to support evidence-based decision-making with the most current and comprehensive data available.”

If referencing this article’s findings, please cite the original study by Edache et al., 2025 published in Parasites & Vectors.

SHIC/FFAR JEV Research: Lessons from Australia's Japanese Encephalitis Virus Outbreak for the US Swine Industry

September 4, 2025 – Funded by the Swine Health Information Center, in collaboration with the Foundation for Food & Agriculture Research, a study entitled, "Epidemiology of JEV in Australian Intensive Piggeries," has recently revealed important lessons learned from the 2021-2022 Australian experience with Japanese encephalitis virus. Led by Dr. Brendan Cowled of Ausvet Pty Ltd, the study sought to understand how and why JEV spread in Australian pigs and make recommendations to assist the US industry in preparedness should JEV ever arrive in the US, a highly relevant effort due to similarity in production methods and environmental conditions for mosquito vectors in the two countries. Among outcomes were key lessons identified to help the US swine industry respond and adapt to a potential JEV outbreak. The research focused on understanding the transmission and epidemiology of JEV within farms and assessed farm-level risk factors for JEV in the Australian outbreak using quantitative and qualitative approaches for data collection and analysis.

Find a summary of project #25-053 here.

JEV is a mosquito-transmitted virus that impacts domestic swine industries and human health. It can lead to severe production impacts in commercial swine, including reproductive failure, reduced conception, abortion, mummified and stillborn piglets, shaker piglets, deformed and weak piglets, prolonged gestation and boar infertility. The virus is present in the western Pacific and Asia but has not been identified in the US, where it poses an emerging risk to pork production.

Recommendations for US industry preparedness and response to JEV
The investigators have proposed a comprehensive suite of recommendations in their full report. These are divided into preparation for a possible outbreak, response to a confirmed outbreak and what to do if JEV becomes established in the US. However, they detail important recommendations that could be considered by swine farmers and industry largely in advance of any JEV outbreaks to enhance preparedness:

1. Improve surveillance for JEV in the US by educating swine farmers on how to recognize JEV and how to report it.
2. Explore the potential to include JEV testing in existing public health surveillance programs such as sentinel chicken flock and mosquito monitoring.
3. Develop comprehensive integrated mosquito management protocols for farms. This will improve carcass quality but will also help reduce the impacts of JEV (and potentially other arboviruses) should it ever emerge in the US.
4. Encourage open discussion between the swine industry, pharmaceutical industry, and EPA and/or FDA to consider pre-empt emergency registration of insecticidal treatments for use in a JEV outbreak. Collaborate with USDA for potential gaps in research to support the registration of a future swine vaccine from Australia or southeast Asia depending on JEV type.
5. Continue strategic discussions between the swine industry and USDA to assess the modernization of the red book for JEV (FADPreP JEV Response plan) based on Australian experience.

6. Ensure proactive engagement between public health authorities and the swine industry to share industry concerns, and to assess practical, evidence-based approaches with relevant health authorities in advance, to minimize industry impacts whilst effectively managing risk.

In the event of JEV becoming established in the US, it may be possible to develop machine learning or other AI approaches to predict the occurrence of seasonal JEV outbreaks. These should be developed if JEV is established to provide early warnings, allowing proactive application of surveillance and control activities such as mosquito mitigation (e.g., insecticidal use) or vaccination of breeding stock (if/when a vaccine becomes available).

Quantitative Assessment
For the quantitative approach, industry, environmental, and meteorological data were used to quantify measurable disease outcomes, identify patterns, correlations and risk factors. Further, artificial intelligence (machine learning) was used to provide real time predictive models for early identification of future JEV outbreaks. The study period included in the risk factor analysis was from July 3, 2021, to March 25, 2023, well before and after the outbreak occurred in Australian piggeries.

Researchers analyzed data from six JEV-affected sow units at both the individual sow- and site-levels. Sow-level information included the site at which they were housed (sow unit), parity, farrowing and service dates, outcomes of service (i.e., farrowed, repeat mating, etc.) and details on litters produced by successful matings. The outcome variable for the site level analysis included the weekly rate of services that resulted in four or more mummies at farrowing.

Initial outbreak investigations highlighted that heterogeneity of reproductive outcomes over time could be indicative of JEV infection. Clinical prevalence rates varied from 13.4% to 43.0% in affected sows. Notably, mummified fetuses were the most common clinical sign observed. Mummified fetuses were used as the case definition for the site-level risk factor analysis as it appeared to be an accurate indicator of JEV infection. Using mummies within the analysis was also supported by the qualitative study in which the only clinical sign reported by 100% of pig veterinarians as being present was excessive mummified fetuses in a litter. The lack of consistency for other clinical signs may be due to management or reporting.

In addition, land cover types (inland wetlands, grasslands, farmlands), elevation, and hydrological accumulation using count-based models were evaluated to investigate incidence rate ratios. Implementing machine learning, the researchers developed a model to predict high-risk periods for JEV using a broad range of real-time climatic and environmental variables. Results showed climatological factors relevant to bird ecology were associated with an increased JEV risk. Statistically significant risk factors included long-term cumulative rainfall, mean proportion of inland wetlands, and the service month, including their interactions. For example, inland wetlands became a risk factor when interacting with increased rainfall. Conversely, more temperate grasslands offered protection, even with heavier rain.

The study demonstrated the predictive power of the machine learning model as an early warning system, accurately forecasting the timing of JEV outbreaks in severely affected sites. In the

process, the team identified key influential predictors for the model, such as minimum temperature and cumulative rainfall. Further research on the machine learning model could include a composite outcome (i.e., not just mummified fetuses), and incorporation of later data from the 2025 JEV outbreak, which would increase the generalizability of the model.

Qualitative Assessment

For the quantitative approach, industry, environmental, and meteorological data were used to quantify measurable disease outcomes, identify patterns, correlations and risk factors. Further, artificial intelligence (machine learning) was used to provide real time predictive models for early identification of future JEV outbreaks. The study period included in the risk factor analysis was from July 3, 2021, to March 25, 2023, well before and after the outbreak occurred in Australian piggeries.

The interview participants included 11 veterinarians, two industry professionals, and two medical entomologists who were all involved in the response to the Australian outbreak. Veterinary participants represented a broad range of swine production systems within Australia. This included the two largest swine farming integrator companies collectively managing over 90,000 sows and veterinarians serving various smaller swine operations. Participants located in different areas experienced the outbreak in varied ways.

Key findings included the significant role of environmental and farm management factors influencing transmission, variability in clinical presentations and prevalence across farms, and barriers to timely detection, diagnosis and control. Early detection and effective mosquito control on farms were identified as critical components for mitigating future outbreaks and minimizing economic impacts. The Australian experience demonstrates that JEV introduction can occur without clear warning, with the virus silently circulating among birds and mosquitoes and infecting people for months before being detected in domestic swine.

One of the key challenges observed during the Australian outbreak was the variability in clinical presentation across infected farms. Participants noted that the clinical signs, severity, and timing of disease onset did not consistently align with literature descriptions or with other farms. While classic signs such as reproductive failure in sows and boars and neurological signs and deformities in piglets were observed on many farms, other farms displayed only mild or subclinical cases, which went undetected until antibody assays were conducted.

Further, the extent of disease was not uniform within or between herds – some animals were severely affected (50 – 60% of litters affected) while others were subclinical or exhibited very mild signs. Infected gestating sows showed no clinical signs until they farrowed. While initial surges in cases often declined rapidly after four to six weeks, some herds saw impacts for 10 to 12 weeks. These variable clinical presentations, combined with their subclinical nature until sows farrowed, highlight the challenge of detecting JEV infections early based solely on clinical signs. This is particularly true in completely naïve populations, where sows show no outwards signs of illness, and the first indication may be the sudden appearance of congenital abnormalities at birth.

Once JEV was detected, farm management practices focused on minimizing the impact of the outbreak through supportive animal care and vector control. Animal management strategies were primarily aimed at supporting affected animals and mitigating long-term reproductive impacts. A key management strategy employed by many of the participants was to rest affected sows for at least one estrus cycle before re-mating. Participants observed that rested sows showed significantly better reproductive outcomes compared to those that were mated immediately post-farrowing. In contrast, boars affected by infertility were often culled without time to recover, primarily due to the immediate need to increase breeding capacity. However, farms that chose to retain affected boars reported mixed outcomes; while some boars regained fertility after at least 70 days, others remained infertile.

Without a vaccine approved for swine, mosquito control emerged as the central pillar of the swine farm response in Australia. Producers relied on emergency permits and off label use while facing supply shortages as demand from the swine industry and public health programs exceeded availability. While chemical control is essential, it should not be the sole focus, and an integrated pest management approach is required. For example, environmental measures such as removing standing water, managing vegetation, and using biological larvicidal agents (e.g., Bacillus spp.), chemical larvicides (e.g., aquatain) or insect growth regulators (e.g., methoprene) proved highly effective in controlling mosquito populations on swine farms. Mechanically ventilated systems were more effective at excluding mosquitoes. In the US, integrating routine mosquito control into farm biosecurity standards should be a key activity in preparedness and prevention.

Once JEV is introduced into a new country, endemicity is likely to occur given local mosquito and bird populations can maintain virus circulation. Therefore, rather than aiming for eradication or containment, it may be more practical for the swine industry to implement sustainable management practices from the outset. Australia experiences point to a focus on maintaining vigilance through ongoing surveillance for early detection of JEV emergence in mosquito, bird, or feral swine populations, integrating mosquito control into routine farm operations, ensuring access to veterinary insecticides, repellents and vaccines, and using accurate and reliable diagnostic tools. Human vaccination and bite avoidance measures to reduce the risk of infection in people should also be prioritized.

As JEV's global range expands due to changing weather and migratory patterns, Australia's experience offers critical lessons for commercial swine industries like the US. This study offers invaluable insights to help the US swine industry prepare for, respond to, and adapt to a potential JEV outbreak, ultimately reducing economic impacts and safeguarding herd health.

H5N1 Influenza Risk to Swine

SHIC/FFAR/NPB H5N1 Request for Research Proposals Nets 51 Reponses

January 8, 2025 – The Swine Health Information Center partnered with the Foundation for Food & Agriculture Research and the Pork Checkoff to fund a $4 million research program to enhance prevention, preparedness, mitigation, and response capabilities for H5N1 influenza in the US swine herd. Announced in November 2024, the RFP invited qualified researchers to submit proposals that address the 10 H5N1 Risk to Swine research priorities outlined below. In response to the RFP which closed December 31, 2024, a total of 51 proposals were received from 35

different institutions across six countries. Proposals will undergo competitive review for funding recommendations based on value to US pork producers. This is the largest number of responses to a SHIC RFP to date.

The emergence of H5N1 Influenza A clade 2.3.4.4b in dairy cattle, persistent outbreaks in commercial poultry, and the recent identification of H5N1 in a backyard pig in Oregon highlights the potential threat to the US swine industry. Research priorities for H5N1 Risk to Swine are designed to further strengthen US swine industry prevention and preparedness as well as inform response efforts should H5N1 be introduced into the commercial swine herd.

The 51 proposals are expected to address H5N1 Risk to Swine research priorities described in the detailed Request for Research Proposals found here, including topic areas of 1) vaccines for swine, 2) clinical presentation in pigs, 3) mammary transmission, 4) diagnostic surveillance, 5) introduction and transmission risks, 6) caretakers of pigs, 7) biosecurity practices, 8) safety of pork, 9) mitigating production impact, and 10) pig movements.

Upon completion of the competitive review process, project awards are expected to be announced in spring 2025. Projects demonstrating the most urgent and timeliness of completion, providing the greatest value to US pork producers, and showing efficient use of funds are prioritized for funding. Results will be shared with producers and veterinarians as soon as they become available.

Critical research investments are necessary to understand and prevent H5N1 incursion, ensure rapid detection of H5N1 if introduced, protect animal and caretaker health, inform stakeholder response, mitigate production losses on the farm, identify effective control measures, and develop clear messaging to consumers on the safety of pork. Outcomes from the funded proposals will provide critical information that producers, veterinarians, and industry stakeholders can use to better prevent incursion and develop preparedness plans if H5N1 is identified in commercial swine herds within the US.

SHIC, FFAR, and Pork Checkoff Fund 10 H5N1 Risk to Swine Projects to Address Emerging Disease Threat

July 22, 2025 – The Swine Health Information Center, in collaboration with the Foundation for Food & Agriculture Research and the Pork Checkoff, has recently funded 10 projects addressing research priorities and topics within its H5N1 Risk to Swine Research Program. Goals of the program are to enhance prevention, preparedness, mitigation, and response capabilities for H5N1 influenza in the US swine herd. The priority areas addressed through the funded projects include vaccine development and cross-protection, clinical presentation of pigs across different production phases, potential for mammary transmission, diagnostic surveillance, introduction and transmission risks, and biosecurity practices. The 10 new projects were initiated in summer 2025 and are 12 to 18 months in duration. Research outcomes from the funded projects will be shared with producers and veterinarians as soon as they become available.

The SHIC/FFAR/NPB H5N1 Risk to Swine Research Program request for proposals was announced on November 6, 2024, and received 51 proposals from 35 different institutions across six countries by the submission deadline of December 31, 2024. Proposals underwent a

competitive review process across the first several months of 2025 by subject matter experts on influenza and the swine industry. Funding awarded across the 10 new projects totals $2.1 million of the $4 million total available for this collaborative research program. Funding timely research is an essential component of SHIC providing project outcomes that drive action for emerging disease prevention, preparedness, mitigation, and response for the US swine industry.

SHIC/FFAR/NPB H5N1 Risk to Swine Research Program projects funded and initiated in response to the RFP include:

Vaccine Development and Cross-Protection

Development of a vaccine against highly pathogenic avian influenza viruses for use in pigs
Principal Investigator: Hiep Vu, University of Nebraska-Lincoln
Objective: To develop an innovative vaccine strategy for inducing a robust immune response and effectively controlling HPAI H5N1 influenza viruses in pigs.

Evaluation of cross-protective N1 swine antibodies against HPAI H5N1 clade 2.3.4.4b virus
Principal Investigator: Juan Mena, University of Minnesota
Objective: To evaluate whether natural infection with endemic swine influenza A virus strains or immunization with commercial swine IAV vaccines confer immune cross-protection against HPAI H5N1.

Role of Prior Immunity to endemic swine viruses on H5N1 infection in pigs
Principal Investigator: Daniela Rajao, University of Georgia
Objective: To investigate the effect of IAV vaccination and prior exposure to endemic swine IAV strains on infection susceptibility and transmission of HPAI H5N1 in swine.

Clinical Presentation and Mammary Transmission in Pigs

Preparing the US Swine Industry for HPAI H5N1: Quantifying and comparing H5N1 vs H1N1 spreading, shedding, and detection in groups with or without immunity to H1N1.
Principal Investigator: Luis Gimenez-Lirola, Iowa State University
Objective: To quantify and compare the transmissibility, shedding, and detection of H5N1 versus H1N1 in swine and evaluate the impact of prior infection with H1N1 on the course of H5N1 infection and spread in pigs.

Pathogenesis and transmission studies in piglets and sows infected with different genotypes of 2.3.4.4b clade H5Nx viruses
Principal Investigator: Tamiru Alkie, Canadian Food Inspection Agency, National Centre for Foreign Animal Disease
Objective: To assess the pathogenesis of H5Nx (x denotes N1, N2 or N5) in weaned piglets following different virus exposure routes, as well as intramammary infection of lactating sows and suckling piglets.

Evaluating H5N1 risk to swine: mammary transmission and clinical presentation in lactating sows
Principal Investigator: Cody Warren, The Ohio State University

Objective: To evaluate the replication potential of diverse H5N1 strains in swine mammary tissue as well as assess clinical signs, shedding and transmission in lactating sows and suckling piglets.

Investigation of susceptibility of porcine mammary gland to highly pathogenic avian influenza (H5N1) virus infection and transmission risk of virus from sows to nursing piglets
Principal Investigator: Yan Zhou, University of Saskatchewan
Objective: To investigate whether HPAI H5N1 virus can replicate and transmit through the mammary route in pigs as well as examine pathogenesis of H5N1 in farrowing sows.

Diagnostic Surveillance
An efficient and rapid automation workflow to detect influenza subtypes using RT-qPCR assay via 96-well Veriflex heat blocks on QuantStudio 7 Pro
Principal Investigator: Rahul Nelli, Iowa State University
Objective: To develop and validate the sensitivity of a multiplex PCR assay for IAV and its subtypes including H5N1 as well as establish a rapid workflow for simultaneous detection of IAV, PRRSV and *Mycoplasma hyopneumoniae* using robotic automation.

Introduction and Transmission Risks/Biosecurity Practices
Pathogenesis and interspecies transmission of H5N1 influenza virus in swine
Principal Investigator: Angela Bosco-Lauth, Colorado State University
Objective: To characterize the pathogenesis and shedding of poultry and dairy cattle H5N1 strains in infected swine, as well as the potential for interspecies transmission between swine and either birds or rodents.

Enhancing Biosecurity in Swine Operations: Investigating Wildlife Interactions on Swine Farms
Principal Investigator: Igor Paploski, University of Minnesota
Objective: To characterize wildlife interactions with mortality management structures on swine farms, identify risk factors for wildlife interactions, and develop interventions to mitigate risk of H5N1 through wildlife.

Critical research investments are necessary to understand and prevent H5N1 incursion on swine farms, ensure rapid detection of H5N1 if introduced, protect animal and caretaker health, inform pork industry stakeholder response, mitigate production losses on farm, identify effective control measures, and develop clear messaging to consumers on the safety of pork. Outcomes from the funded projects will provide critical information that producers, veterinarians, and industry stakeholders can use to better prevent incursion and develop preparedness plans if H5N1 is identified in US commercial swine herds.

Collaborative H5N1 Swine Industry Working Group Remains Vigilant

August 6, 2025 – Response Preparation and Protection of the US Swine Herd Key Missions. The US swine industry has proactively united to combat the potential threat of H5N1 influenza, a highly pathogenic avian influenza (HPAI) that has impacted poultry flocks and dairy herds, humans, and a few pigs on an isolated Oregon hobby farm. Since March 2024, a dedicated working group, comprised of representatives from the American Association of Swine Veterinarians (AASV), National Pork Board (NPB), National Pork Producers Council (NPPC),

and Swine Health Information Center (SHIC), has been working continuously. Their mission: to prevent and prepare for a potential H5N1 outbreak response in commercial US swine herds.

Collaboration: A Unified Front Against H5N1
The emergence of H5N1 in dairy cattle in March 2024 was an eye-opening occurrence, prompting the immediate formation of the swine industry working group. Dr. Heather Fowler, director of producer and public health, NPB, emphasizes the need for multi-species, interdisciplinary collaboration to adequately prepare for and respond to an H5N1 outbreak. Dr. Marisa Rotolo, director of swine health, NPB, echoes this, highlighting how the outbreak has prompted livestock commodity groups to strengthen relationships and share knowledge across the barnyard.

This unified approach ensures a more efficient and effective response. As Dr. Fowler states, “By collaborating we are not only sharing the load but also making sure the right people are involved in the conversation at the right time.” This synergy leverages the unique strengths and expertise of each organization, ultimately benefiting producers and veterinarians. AASV, for instance, has leveraged its committees, comprised of global experts in influenza viruses, to review and provide feedback on the draft response plan, ensuring it is as realistic and useful as possible.

Single H5N1 Diagnosis in U.S. Backyard Pig
In October 2024, the US swine industry learned of the first detection of H5N1 influenza in a pig on a small backyard mixed-species farm in Oregon. NPPC and SHIC immediately shared this detection with pork industry stakeholders. SHIC prepared and deployed both a timely eblast and monthly newsletter article. While the detection on the Oregon farm was isolated and the crossover to swine limited, it reinforced efforts by SHIC, NPB, NPPC, and AASV to remain diligent in ongoing endeavors to monitor H5N1 spread and learn more about its risks to commercial swine.

“Ensuring timely and valuable communications across all stakeholder audiences is part of the SHIC mission to minimize the impact of emerging diseases,” said Dr. Megan Niederwerder, executive director of SHIC. “Confirmation of H5N1 in a backyard pig by USDA raised questions regarding this emerging threat and coordinating communications to inform veterinarians and producers was critical.”

Proactive Measures and Key Learnings
Stakeholders recognized the importance of being at the forefront of planning. Dr. Abbey Canon, director of public health and communications, AASV, notes that swine veterinarians and producers understood it’s best to be at the table and be part of the planning process, a foresight commended by USDA and state animal health officials.

A critical realization for the working group has been the complex nature of an H5N1 response, extending beyond the swine industry itself. Dr. Anna Forseth, director of animal health, NPPC, points out that the process has been far more than just what is best for the swine industry alone, considering the zoonotic potential, susceptibility in other species, and the foreign animal disease classification for poultry.

Early on, SHIC started gathering broad input with industry partners from veterinarians, pork producers, and state/federal animal health officials on potential gaps in knowledge and research priorities for H5N1 in commercial swine operations. “We wanted to understand what research questions would generate the highest value data and information for US pork producers,” noted Dr. Niederwerder.

Organizational Contributions and Achievements
Each participating organization has played a vital role in the working group’s efforts:

National Pork Board: NPB has supported the development of an H5N1 response guide and facilitating regular calls across industry groups to ensure timely updates. They have created a dedicated H5N1 landing page on PorkCheckoff.org and disseminated existing resources like the Secure Pork Supply plan. Crucially, NPB has partnered with SHIC and the Foundation for Food & Agriculture Research (FFAR) to fund a significant research initiative focused on H5N1, aiming to fill critical knowledge gaps.

National Pork Producers Council: NPPC took the lead in drafting the comprehensive guidance response plan, presenting it to USDA in January 2025. This plan underwent rigorous review and feedback from a wide array of stakeholders, including AASV’s influenza committee and Board, NPB and NPPC Boards, and public health professionals, ensuring broad acceptance and practical applicability.

Swine Health Information Center: SHIC has been at the forefront of timely information dissemination and research prioritization. Upon the first detection of H5N1 in a backyard pig in Oregon in October 2024, SHIC and co-sponsor AASV immediately alerted stakeholders and organized a webinar, “H5N1 Influenza Risk to US Swine,” to provide the latest information and address concerns. SHIC also spearheaded the H5N1 Risk to Swine Research Program, a $4 million initiative in partnership with the Foundation for Food & Agriculture Research and the Pork Checkoff, to fund targeted research addressing crucial knowledge gaps. The overwhelming response to their Request for Proposals, with 51 submissions from 35 institutions across six countries, underscores the industry’s commitment to scientific understanding. SHIC has funded 10 projects from the submissions with work scheduled to begin in summer 2025.

American Association of Swine Veterinarians: AASV’s dedicated committees, comprised of leading experts, have provided invaluable scientific and practical input into the response plan. They advocate for continued participation in existing influenza A virus surveillance programs, emphasizing their role in early detection and rapid response to emerging threats. AASV also actively promotes preparedness programs like AgView® and the Secure Pork Supply Plan as well as co-sponsoring timely webinars on H5N1.

Lessons from Other Livestock Industries
The swine industry has closely observed the H5N1 responses in the poultry and dairy sectors, gleaning valuable lessons to inform its own strategy.

From the Poultry Industry

The poultry industry's experience with H5N1, where it is classified as a foreign animal disease, has provided key insights:
Significant Investment: The substantial USDA investment ($1 billion) in the poultry response highlights the financial commitment required for combating widespread outbreaks, particularly concerning biosecurity, indemnity, and vaccine development.
Program Value: The National Poultry Improvement Plan (NPIP) demonstrates the value of established programs in maintaining exports and controlling disease spread, offering a potential model for the swine industry's U. S. Swine Health Improvement Plan (U.S. SHIP).
Biosecurity and Indemnity: The poultry experience has raised questions about the level of biosecurity that may be required for swine farms and how current industry programs could integrate with indemnity considerations.
Vaccine Discussions: The ongoing discussions around vaccine development for poultry are closely monitored, as understanding an industry need, development timelines, and potential trade barriers will be crucial for any future swine vaccine strategy.

From the Dairy Industry
The dairy industry's H5N1 experience, where the virus is regulated differently, has offered unique lessons:
Movement Restrictions: While not universal, the implementation of quarantines and movement restrictions for certain dairy cattle types has highlighted potential challenges for the swine industry, which relies heavily on interstate movements.
Patchwork State Requirements: The emergence of varied state-specific import requirements in the dairy sector serves as a warning for the swine industry, emphasizing the need for coordinated, national guidelines.
Exhibition Sector Focus: The dairy experience has underscored the vulnerability of the exhibition sector due to frequent commingling and human interaction, leading to a specific focus on this area within the swine guidance response plan.
Worker Safety and Surveillance: The enhanced focus on worker safety and surveillance in dairy operations reinforces the importance of similar measures in swine production.
Pork Safety Studies: The need for milk and beef safety studies in dairy suggests that similar pork safety studies will be crucial if H5N1 were to enter the swine herd.

Recommendations for Pork Producers and Veterinarians
The working group's efforts translate into actionable recommendations for pork producers and veterinary practitioners:
Stay Informed: Dr. Marisa Rotolo strongly encourages producers and veterinarians to stay up to date with H5N1 developments.
Enhance Biosecurity: This is paramount. Drs. Forseth and Rotolo shared recommendations include implementing practices aimed at preventing interaction between pigs and other species, paying particular attention to potential introduction pathways such as wild birds, contaminated feed or water, raw milk feeding, or shared labor/equipment with poultry or dairy facilities.
Participate in Surveillance: AASV recommends active participation in IAV surveillance programs to monitor virus evolution and epidemiology, enabling early detection and rapid response to emerging threats.

Engage in Preparedness Programs: Producers are urged to sign up for AgView®, participate in the Secure Pork Supply Plan, and explore the Certified Swine Sample Collector Program. These initiatives provide crucial tools for disease preparedness and response.
Prioritize Worker Health: Consistent recommendations include not coming to work when sick and getting annual influenza vaccinations, protecting both human and animal health.

Parallels and Differences in Disease Response
While H5N1 preparedness and response planning share similarities with efforts surrounding foreign animal diseases like African swine fever (ASF), foot-and-mouth disease (FMD), and classical swine fever (CSF), there are key distinctions.

Dr. Rotolo highlights that the ultimate response to H5N1 detection in any livestock species rests with federal and state partners. While H5N1 is a foreign animal disease for poultry and typically results in depopulation, the approach for dairy herds has differed, with no depopulation. This suggests that a similar approach might be taken for swine, unlike the typical eradication strategy for ASF, CSF, and FMD.

Dr. Forseth notes that common parallels include potential quarantine, movement restrictions, establishment of surveillance zones, surveillance for epi-linked premises, and potential trade implications. However, the emerging and somewhat unknown nature of the virus in swine underscores the importance of the working group's proactive planning to define the precise response.

The Enduring Commitment: Protecting People, Pigs, and the Planet.
The sustained interest in the H5N1 swine working group, even after a year of continuous collaboration, is a testament to the shared passion and common goal of its members. Dr. Fowler said it's about, "Shared passion, shared goal, and good people." Dr. Rotolo adds that the inherent susceptibility of pigs to influenza A, combined with the ongoing transmission of novel strains, makes it as important as ever for the swine industry to remain vigilant and ready to adapt to changes in disease threats. The constant domestic and international threat of H5N1, particularly with wild birds as uncontrollable vectors, keeps the mission at the forefront.

The Influence of Zoonotic Potential
The zoonotic nature of H5N1 significantly influences the working group's goals and information sharing. It necessitates a comprehensive One Health approach, integrating animal health, human health, and environmental health. Dr. Fowler emphasizes the importance of protecting people, pigs, and the planet in the face of a zoonotic pathogen with multiple animal hosts. This aspect fosters crucial collaboration with partners in other species and industry groups, as well as with human health colleagues.

"The zoonotic component is very important. This virus is challenging because of its ability to change. A change may make it more difficult to control in animals or more of a threat to people. A large component of the response plan focused on worker safety and public health," Dr. Forseth remarks.

The swine industry's long-standing, successful relationship with public health partners has been invaluable, ensuring that worker safety and public health are central to the response plan. AASV actively supports recommendations for people working with swine to take all available precautions, including vaccination, biosecurity, and personal protection, to prevent bidirectional influenza transmission.

"The swine industry is lucky to have a long, successful working relationship with our partners in public health, especially veterinary public health and zoonotic diseases," Dr. Canon states. "Labor is a top issue in pork production, and we want to protect our people and make sure they feel safe coming to work. Public health professionals were involved in drafting this response from the beginning, and animal and human health goals are aligned."

Looking Ahead: Continued Vigilance, Research, and Refinement
The working group remains committed to its mission. NPB will continue to engage in H5N1 learnings, particularly concerning research updates on the epidemiology of the virus, to better inform and prepare producers. NPPC plans to continue conversations with USDA and further refine the guidance response plan. AASV is focused on disseminating more details about the plan to swine veterinarians and producers, having already initiated these conversations at events like the World Pork Expo in June 2025.

SHIC will shepherd H5N1 research projects; 10 projects were selected for funding in 2025 with awards totaling $2.1 million. Projects were initiated in summer of 2025. "Awarded projects are addressing diverse H5N1 research questions, such as the clinical signs in pigs across different production phases, the potential for mammary transmission in sows, if endemic influenza provides cross-protective immunity, vaccine efficacy, diagnostic test sensitivity, and transmission risks through wildlife exposure," commented Dr. Niederwerder.

The overarching message for pork producers, veterinarians, and industry stakeholders is clear: the swine industry is proactively addressing the H5N1 threat. Efforts are underway to protect the US swine herd, ensuring the safety of workers, and safeguarding the industry's future. The working group welcomes feedback as it continues to work on behalf of the industry to protect people, pigs, and the planet.

List of Research Projects Funded Through H5N1 Risk to Swine Program in 2025

1. Principal Investigator: Hiep Vu, University of Nebraska-Lincoln
    - Title: Development of a vaccine against highly pathogenic avian influenza viruses for use in pigs
    - Start Date: April 14, 2025; Project Duration: 18 months
2. Principal Investigator: Rahul K. Nelli, Iowa State University
    - Title: An efficient and rapid automation workflow to detect influenza subtypes using RT-qPCR assay via 96-well Veriflex heat blocks on QuantStudio 7 Pro
    - Start Date: April 15, 2025; Project Duration: 12 months
3. Principal Investigator: Daniela Rajao, University of Georgia
    - Title: Role of Prior Immunity to endemic swine viruses on H5N1 infection in pigs
    - Start Date: April 15, 2025; Project Duration: 18 months

4. Principal Investigator: Juan Mena, University of Minnesota
    - Title: Evaluation of cross-protective N1 swine antibodies against HPAI H5N1 clade 2.3.4.4b virus
    - Start Date: April 15, 2025; Project Duration: 12 months
5. Principal Investigator: Tamiru Alkie, CFIA-NCFAD
    - Title: Pathogenesis and transmission studies in piglets and sows infected with different genotypes of 2.3.4.4b clade H5Nx viruses
    - Start Date: April 15, 2025; Project Duration: 18 months
6. Principal Investigator: Yan Zhou, University of Saskatchewan
    - Title: Investigation of susceptibility of porcine mammary gland to highly pathogenic avian influenza (H5N1) virus infection and transmission risk of virus from sows to nursing piglets
    - Start Date: April 15, 2025; Project Duration: 18 months
7. Principal Investigator: Angela Bosco-Lauth, Colorado State University
    - Title: Pathogenesis and interspecies transmission of H5N1 influenza virus in swine
    - Start Date: May 15, 2025; Project Duration: 18 months
8. Principal Investigator: Igor Paploski, University of Minnesota
    - Title: Enhancing Biosecurity in Swine Operations: Investigating Wildlife Interactions on Swine Farms
    - Start Date: May 15, 2025; Project Duration: 18 months
9. Principal Investigator: Luis Gimenez-Lirola, Iowa State University
    - Title: Preparing the US Swine Industry for HPAI H5N1: Quantifying and comparing H5N1 vs H1N1 spreading, shedding, and detection in groups with or without immunity to H1N1
    - Start Date: July 1, 2025; Project Duration: 18 months
10. Principal Investigator: Cody Warren, The Ohio State University
    - Title: Evaluating H5N1 risk to swine: mammary transmission and clinical presentation in lactating sows
    - Start Date: July 1, 2025; Project Duration: 12 months

Center Outreach and Industry Engagement

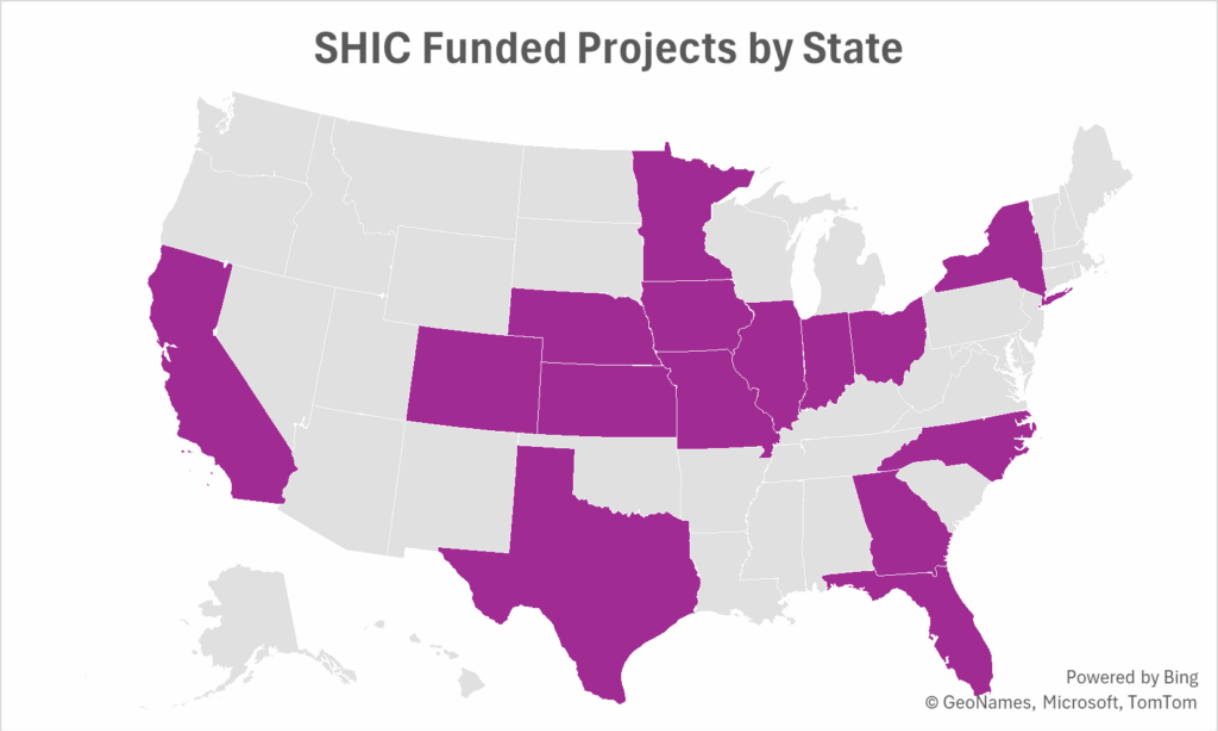
Broad Reach Improves SHIC Research Results for Producer Benefit

May 28, 2025 – The Swine Health Information Center will celebrate its 10th anniversary in July 2025. Launched in 2015 with Pork Checkoff funding, SHIC's mission is to protect and enhance the health of the US swine herd. This is accomplished by minimizing the impact of emerging disease threats through preparedness, coordinated communications, global disease monitoring, analysis of swine health data, and targeted research investments.

Research serves as a cornerstone of SHIC's effort to protect and enhance the health of the US swine herd. "SHIC received the greatest number of research proposals and awarded the highest dollar amount for research projects in a single year in 2024," said SHIC Executive Director Dr. Megan Niederwerder. "Matching funds and external grants have enabled SHIC to leverage Pork Checkoff investment and at the same time, expand both research breadth as well as funding capacity to increase return on investment."

SHIC has made it a priority to broaden the reach of its requests for proposals, encouraging participation from a growing number of organizations across diverse regions within and outside of the US. Broadening the reach of RFP awareness will expand the network of scientists conducting critical swine health research, increase competitiveness of funding awards, and advance innovation for pork producers in the protection of herd health.

Between 2023-2025, SHIC has awarded research funds to 49 principal investigators at 15 universities, seven private companies, and one government entity to do relevant swine-health related research. These 23 organizations represent different perspectives, diverse expertise, and are located across three countries – the US, Canada, and Australia. The US-based projects come from organizations in 15 states: California, Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, New York, North Carolina, Ohio, and Texas.



"No single researcher, institution, company, or even country has all the answers," said SHIC Associate Director Dr. Lisa Becton. "By intentionally expanding SHIC's reach, we can take advantage of great talent not only in the US but in other countries to perform key research needed to benefit US pork producers. For example, utilizing the expertise of researchers in Australia for Japanese encephalitis virus, where it is an ongoing concern, helps address US producers' concerns and provide practical information on disease presentation and risks for this emerging threat."

SHIC's H5N1 Risk to Swine Research Program RFP, funded in collaboration with the Foundation for Food & Agriculture Research and the Pork Checkoff which closed in December 2024, brought in 51 proposals, the highest number received for a single RFP at the time. The subsequent RFP, SHIC 2025 Plan of Work Research Program, closed in April 2025 and broke the new record with 57 proposals. Engaging researchers and organizations focused on the swine industry as well as allied industries will result in high quality data to help fulfill SHIC's mission and serve pork producers well.

SHIC Executive Director Among US Delegation Representing Pork Industry at 92nd WOAH General Session

June 27, 2025 – The 92nd General Session of the World Assembly of Delegates for the World Organisation for Animal Health recently convened from May 25 – May 29, 2025, bringing together international animal health authorities to establish global standards impacting livestock industries worldwide. The US pork industry was well-represented within the US delegation, underscoring the critical role of international collaboration in safeguarding domestic swine health and trade. Delegation members representing the US pork industry included Dr. Megan Niederwerder, executive director, Swine Health Information Center, Dr. Dusty Oedekoven, chief veterinarian, National Pork Board, Dr. Anna Forseth, director of animal health, National Pork Producers Council, and Dr. Liz Wagstrom, consultant, National Pork Producers Council.

The General Session of the World Assembly, comprising delegates from WOAH member countries, convenes at least annually, with the General Session held over five days each May in Paris, France. Delegates are responsible for adopting international standards in animal health, with a strong emphasis on facilitating international trade, electing WOAH's governing bodies, adopting resolutions pertaining to the control of major animal diseases, examining and approving annual reports, and appointing the Director General of WOAH. Delegates also explore ways WOAH can collaboratively shape a sustainable future for global animal health and welfare.

The General Session's comprehensive agenda featured an Animal Health Forum on Vaccines and Vaccination. Taking place over the first two days of the General Session, the Forum on Vaccines and Vaccination was structured around vaccine adoption as an outcome of vaccine availability, vaccine access and vaccine demand at both the farm and national level. Plenary sessions also covered the activities of the Wildlife and Antimicrobial Resistance Working Groups, as well as updates from the Terrestrial Animal Health Standards, Aquatic Animal Health Standards, and Biological Standards Commissions.

Given WOAH's designation as the global authority on animal health, the standards developed and adopted during the General Session directly influence US swine producers through their impact on international trade and disease control strategies. Consequently, having Drs. Niederwerder, Oedekoven, Forseth, and Wagstrom serve as delegation members representing the US viewpoint provides benefits to the domestic swine industry.

A significant focus for all US pork industry representatives was activities and discussions on African swine fever, including their attendance at a special session dedicated to ASFV regionalization and zoning. The Special Session hosted by the USDA (USA), CFIA (Canada), and SAG (Chile) covered the processes and application for ASF regarding regionalization and zoning, the application of zoning during an outbreak to support trade, and the development of zoning protocols. This critical discussion highlighted ongoing efforts to mitigate the spread of ASF and facilitate safe trade in the context of disease outbreaks. In addition, the WOAH ASF vaccine standard was adopted during the meeting and is available for review here. The standards are focused on development and production of safe and effective ASFV vaccines as a part of the strategy to control ASF globally.

The WOAH Terrestrial and Aquatic Animal Health Codes are foundational documents that provide internationally recognized standards for improving animal health and welfare, and veterinary public health. These codes include provisions for safe international trade in animals and animal products. Complementary manuals provide standardized approaches for the diagnosis of diseases listed within these codes. Diseases of particular concern to swine producers, explicitly addressed in the Terrestrial Animal Health Code, include African Swine Fever virus, Classical Swine Fever virus, Porcine Reproductive and Respiratory Syndrome virus, Foot and Mouth Disease virus, Pseudorabies virus, and zoonotic diseases such as Japanese Encephalitis virus.

Further details regarding the 92nd WOAH General Session are available here.

SHIC Delivers Swine Health Information at Leman Conference

August 25, 2025 – The Allen D. Leman Swine Conference, an annual educational event for the global swine industry, will take place September 20-23, 2025, at the RiverCentre in St. Paul, Minnesota. Swine veterinarians, pork producers, and other swine professionals will convene to attend the Leman Conference and learn the latest information and research outcomes in swine production, biosecurity, and animal health management. The Swine Health Information Center, a Leman Conference Program Partner, will have an informational display near the registration desk at the event. Drs. Megan Niederwerder and Lisa Becton will each chair breakout sessions sponsored by SHIC, covering both on-farm and transport biosecurity.

On Monday, September 22, 2025, the main conference breakout session entitled “Opportunities for on-site biosecurity practices,” is scheduled from 3:30 – 5:00 p.m. The session is sponsored by SHIC and Dr. Megan Niederwerder will serve as chair. Presentations for this session include:

Environmental contamination in dead boxes and composting bins of wean-to-finish farms
Dr. Igor Paploski, University of Minnesota
Airborne biosecurity: Comparison of air filtration and an electrostatic precipitator technology
Mark Schwartz, University of Minnesota and Schwartz Farms
Uncovering the gaps: Insights from PRRS outbreak investigations
Dr. Christine Mainquist-Whigham, Pillen Family Farms and DNA Genetics

On Tuesday, September 23, 2025, the main conference breakout session entitled “Addressing the market hog trailer biosecurity challenges,” is scheduled from 10:30 a.m. – 12:00 p.m. The session is sponsored by SHIC and will be chaired by Dr. Lisa Becton. Presentations for this session include:

Trailer contamination and re-contamination
Dr. Cesar Corzo, University of Minnesota
Market hog trailer cleaning and disinfection: An economic and epidemiologic assessment
Dr. Ben Blair, University of Illinois
A production system approach to optimizing transport biosecurity, economics, and health
Jeremiah Mallard, Christensen Farms

Coordinated communication and broad dissemination of swine health information is one of SHIC's main priorities. Working with the Leman Conference team offers the opportunity to expand SHIC's reach by sharing outcomes from work conducted because of the Center's research priorities. In addition to the sponsorships and chairing sessions, SHIC's display table provides the opportunity to offer information and connect with Conference participants.

SHIC to Co-Host a Special Session at the 2026 NAPRRS/NC229 International Conference of Swine Viral Diseases

December 4, 2025 - The Swine Health Information Center is co-hosting a special session entitled, "Novel Tools & Technologies to Address Emerging Diseases of Swine" at the upcoming NAPRRS/NC229 International Conference of Swine Viral Diseases (ICSVD) scheduled for January 16 – 17, 2026, in Chicago, IL. This annual educational symposium draws together academic researchers, industry professionals, veterinarians, producers, and swine disease diagnosticians to present the latest research results and advances in emerging viruses, swine health, biosecurity, diagnostics, and applied swine disease management on the farm.

SHIC has invited four principal investigators and two graduate students to provide project updates and research results from SHIC-funded studies. Coordinated communication and broad dissemination of swine health information to industry stakeholders is part of SHIC's mission to minimize the impact of emerging disease threats. Working with the NAPRRS/NC229 Planning Committee offers the opportunity to expand SHIC's reach by sharing outcomes from studies conducted because of the Center's research priorities. Moderating the session will be Dr. Megan Niederwerder, SHIC's Executive Director, and Dr. Lisa Becton, SHIC's Associate Director.

Topics and presenters for the SHIC special session at the NAPRRS/NC229 Symposium include:

SHIC's Role in Mitigating Emerging Disease Threats – Dr. Megan Niederwerder and Dr. Lisa Becton
Evaluating H5N1 Risk to Swine: Mammary Transmission and Clinical Presentation in Lactating Sows – Dr. Cody Warren, The Ohio State University
Vector Competence and JEV Pathogenesis & Immunity in Domestic Pigs – Dr. Angela Bosco-Lauth, Colorado State University
Design and Evaluation of an Autonomous LAMP-based Viral Smoke Detector for Onsite Monitoring of Emerging Viruses in Swine Farms – Dr. Igor Paprotny, University of Illinois, Chicago
Improving Next-generation Sequencing for Detection of Emerging Swine Viruses – Dr. Leonardo Caserta, Cornell University

Lightning Talks:

Assessing Viral Environmental Contamination in Mortality Management Structures – Rafael Medeiros de Ávila Melo, University of Minnesota
Assessment of Viral Contamination in Trailers During Pig Unloading at a Harvest Facility – Lucas Ferreira, University of Minnesota

Launched in 2003 as the International PRRS Symposium, the NAPRRS/NC229 ICSVD has continually strengthened collaboration within the international swine-disease community. What began as a gathering focused on PRRS has evolved into a comprehensive forum addressing other emerging and transboundary viral diseases affecting global pork production. For those interested in attending, complete information on registration and hotel accommodation can be found here.

List of Organizations and Meetings with SHIC Engagement

Following is a partial list of organizations and meetings where SHIC's research and programs were presented or discussed.

Pork producers

- Partial list of producers/companies: AMVC Swine Health Services; Carthage Veterinary Service; Christensen Farms; The Maschoffs; New Fashion Pork; JBS; Pipestone; Pork Veterinary Solutions; Prestage Farms; Schwartz Farms; Seaboard Foods; Smithfield Foods, Hog Production Division; Triumph Food Group; Tyson's Pork Group; Swine Vet Center; Livestock Veterinary Services; Topigs Norsvin; 21st Century Pork Club; NC Swine Veterinary Group
- Iowa State University Pork Industry Center and Swine Medicine Education Center
- State Pork Producer Associations, individually and through State annual meetings
- NPB's Board of Directors
- NPB's Swine Disease Research Task Force
- Pork Industry Forum
- World Pork Expo
- Pork Leadership Institute
- Allen D. Leman Swine Conference
- US SHIP House of Delegates

Allied industry

- American Feed Industry Association
- Boehringer Ingelheim Vetmedica
- DSM-Firmenich
- Medgene
- Merck Animal Health
- National Association of Farm Broadcasters
- National Institute for Animal Ag
- The Meat Institute
- Seek Labs
- SES
- Tetracore, Inc.
- Thermo Fischer Scientific
- Zoetis

Veterinarians

- 2025 AASV annual meeting
- AASV/CTED PEDV Elimination Task Force
- Swine Medicine Education Center, Iowa State University
- North Carolina Veterinary Medical Association Swine Meeting
- NAPRRS/NC229 International Conference for Swine Viral Diseases

US Centers for Disease Control and Prevention
- Centers for Disease Control and Prevention Veterinary Division
- Centers for Disease Control and Prevention Arboviral Diseases Branch Division of Vector-Borne Diseases

US Food and Drug Administration
- NWS Drug Approval Process and Availability

US Animal Health Association, including allied industry, USDA and State Animal Health Officials
- 2025 USAHA/AAVLD Annual meeting
- Committee on Animal Health Surveillance and Info Systems
- Committee on Poultry
- Applied Animal Health, Public Health Research and Extension Veterinarians Symposium
- Committee on Foreign and Emerging Diseases
- Committee on Animal Emergency Management
- Committee on Swine
- Global Animal Health and Trade Committee

Research Funding Partners
- Foundation for Food & Agriculture Research, funded through the US Farm Bill
- USDA National Institute of Food and Agriculture Tactical Sciences for Agricultural Biosecurity
- USDA National Institute of Food and Agriculture Animal Health and Disease
- USDA National Animal Disease Preparedness and Response Program

Veterinary Diagnostic Laboratories, Colleges of Veterinary Medicine, and Academics
- Cornell University College of Veterinary Medicine
- Kansas State University Department of Diagnostic Medicine/Pathobiology
- Kansas State University Department of Statistics
- Kansas State University Biosecurity Research Institute
- Iowa State University Veterinary Diagnostic Laboratory
- Iowa State University Veterinary Diagnostic and Production Animal Medicine
- North Carolina State University, College of Veterinary Medicine and College of Agriculture and Life Sciences
- Ohio Animal Disease and Diagnostic Laboratory, Ohio State University
- Ohio State University College of Veterinary Medicine
- South Dakota State University Veterinary Diagnostic Laboratory
- Texas A&M University Institute for Infectious Animal Diseases
- University of Arizona College of Veterinary Medicine
- University of Connecticut
- University of Georgia Center for the Ecology of Infectious Diseases
- University of Georgia Global Infectious Disease Intelligence Consortium
- University of Illinois at Urbana-Champaign Department of Pathobiology
- University of Minnesota Center for Animal Health and Food Safety
- University of Minnesota Veterinary Diagnostic Laboratory
- University of Minnesota Veterinary Population Medicine
- University of Saskatchewan College of Veterinary Medicine

State Animal Health Officials
- Numerous State Veterinarians/State Animal Health Officials

US Department of Agriculture
- USDA Ag Research Services Director
- USDA Ag Research Services, National Animal Disease Center
- USDA Ag Research Services Foreign Arthropod Borne Animal Disease Research Unit
- USDA Ag Research Services Zoonotic and Emerging Disease Unit
- USDA Ag Research Services Plum Island Animal Disease Center and National Bio and Agro-defense Facility
- USDA Ag Research Services Virus Prion Research Unit
- USDA Animal and Plant Health Inspection Service (APHIS), Administrator
- USDA APHIS ASF Technical Working Group
- USDA APHIS ASF Slaughter Plant Working Group
- USDA APHIS, Deputy Administrator, Veterinary Services
- USDA APHIS One Health Coordination
- USDA APHIS Trade Sector
- USDA APHIS Veterinary Services Leadership Team and Veterinary Services staff
- USDA Center for Epidemiology and Animal Health
- USDA National Animal Health Laboratory Network
- USDA National Import Export Services
- USDA National Wildlife Services
- USDA National Veterinary Services Laboratory, Foreign Animal Disease Diagnostic Laboratory

US Department of Homeland Security
- Customs and Border Protection
- Science & Technology Directorate

International
- Canadian Food Inspection Agency
- Canadian Pork Council
- Canadian West Swine Health Intelligence Network, Canada
- Manitoba Pork, Canada (PEDV Elimination)
- OPORMEX, Mexican Pork Organization
- SunPork Fresh Foods, Australia
- Australian Pork Limited
- US Delegation, WOAH, World Organization for Animal Health, France
- National Service of Agrifood Health, Safety and Quality (SENASICA), Mexico

Presentations at Industry Meetings

SHIC's executive and associate directors participate in external events which help share the Center's information and messaging. Whether participating themselves or coordinating subject matter experts on SHIC-related topics and SHIC-funded research projects, these events amplify SHIC's presence. An example is the National Hog Farmer's Global Virtual Hog Industry Conference. Numerous conference and online presentations have similar impact and reach.

Invited presentations conducted by SHIC Staff:

1. “Swine Health Information Center Programs and Research.” National Pork Board, Pork Leadership Initiative Meeting, Des Moines, IA; January 29, 2025.
2. “Strengthening Biosecurity for Disease Prevention and Control.” ABSA International and USDA ARS meeting, National Harbor, MD; February 10-13, 2025.
3. “Advancing Swine Health and Biosecurity through Targeted Research Programs.” North Carolina Pork Council annual meeting; February 26, 2025.
4. “SHIC Update on Japanese Encephalitis Virus Prevention and Preparedness for the US Swine Industry.” National Institute for Animal Agriculture Annual Conference, Animal Disease Issues & Emergency Management Council, Kansas City, MO; April 7 – 9, 2025.
5. “Swine Health Information Center Role in Emerging Disease Monitoring and Surveillance.” Iowa State University Swine Medicine Education Center student rotation, virtual meeting; April 16, 2025.
6. “Industry collaboration on PEDv research.” National Hog Farmer Feedstuffs 365 virtual presentation; April 18, 2025.
7. “Role of the Swine Health Information Center in Mitigating Emerging Disease Threats to the US Pork Industry.” Manhattan Rotary Club, Manhattan, KS; May 8, 2025.
8. “Fending off FMD.” 2025 National Hog Farmer Global Hog Industry Virtual Conference; May 21, 2025.
9. “Hog Producers are Watching New World Screwworm.” Farm Here Daily, Virtual Podcast; July 22, 2025.
10. “Swine Health Information Center Wean-to-Harvest Biosecurity Research”, University of Vermont Biosecurity Modeling Project, virtual meeting; August 11-12, 2025.
11. “Swine Health Information Center 2025 Update.” State Pork Association virtual meeting; August 18, 2025.
12. “SHIC H5N1 Risk to Swine Research Program.” Foundation for Food & Agriculture Research Multi-Species Research Opportunity Discussion, Virtual; September 30, 2025.
13. “Swine Health Information Center.” Foundation for Food & Agriculture Research Annual Meeting, Food Animal Panel, Washington, DC; October 29, 2025.
14. “Swine Health Information Center H5N1 Risk to Swine Research Program Update.” 2025 US Animal Health Association Annual Meeting, Committee on Swine, Denver, CO; November 4, 2025.
15. “Biosecurity Considerations for Disinfection & Decontamination.” West Virginia Department of Agriculture FAD Preparedness Webinar Series, Virtual; November 17, 2025.

Federal Grant Applications Submitted

1. Niederwerder, Megan, Lisa Becton, Rhea Schirm. Submitted August 27, 2025. “Advancing Early Warning Systems for Biological Threat Surveillance in US Swine Populations.” USDOD Defense Advanced Research Projects Agency Special Topic: Ag x Biological Technologies Office. Total Requested Funding Amount: not required in submission. Video Submission Number: 8-25-1189.
2. Niederwerder, Megan, Lisa Becton, Rhea Schirm. January 1, 2026 – December 31, 2029. “Rapid threat detection and biosecurity enhancement to combat emerging disease risks within cull sow market channels.” USDA National Institute of Food and Agriculture: Agriculture and Food Research Initiative Competitive Grants Program. Total Requested Funding Amount: $650,000. Tracking Number: GRANT14542831.

Webinars on Emerging Swine Disease Issues

SHIC/AASV Webinar Addresses Practical Approaches for Transport Biosecurity

March 3, 2025 – The Swine Health Information Center, in collaboration with the American Association of Swine Veterinarians, hosted a webinar highlighting practical approaches for transportation biosecurity on February 18, 2025. Presenters provided applied information on transport biosecurity strategies for swine disease prevention and control. Topics included alternative livestock trailer cleaning methodologies to manage the risk of PEDV introduction, cost effective trailer cleaning and disinfection based on PEDV prevalence and system connectivity, rerouting vehicles as an alternative strategy for transport biosecurity, and implementation of routine market haul transport biosecurity for PEDV control on farm.

View the webinar here.

Presenters offering their expertise included Dr. Edison Magalhaes, Iowa State University, Dr. Ben Blair, University of Illinois Urbana-Champaign, Dr. Gustavo Machado, North Carolina State University, and Dr. Pete Thomas with Iowa Select Farms. Sharing of information and strategies gained from the SHIC-funded Wean-to-Harvest Biosecurity Research Program assists producers and their veterinarians in developing the best strategies and practices for biosecurity within and between their farms or systems.

First, Dr. Edison Magalhaes reviewed key results from the US SHIP Transport Biosecurity survey identifying the ongoing need to assess and validate different methods of trailer decontamination for PEDV control. Specifically, the trailers hauling growing pigs for run out loads were shown to be less frequently washed between loads and present an opportunity for improved sanitation.

Dr. Magalhaes went on to share experimental data from an evaluation of trailer cleaning methods for the ability to remove PEDV from a contaminated trailer. The project used a small-scale trailer model to evaluate various washing and decontamination methods. Trailers were uniformly contaminated with slurry containing PEDV-infected feces. Five cleaning methods were assessed including scrape and bake, high volume wash, power wash with disinfectant, and two control treatments. To mimic the transmission and spread of PEDV via personnel, foot traffic between the trailer and the farm site was simulated and samples were collected for PCR and bioassay testing pre- and post-cleaning. Results showed both high volume wash and power wash with disinfectant were most effective in reducing PEDV trailer contamination.

Dr. Blair shared information on determining the best practices that balance disease control and economic feasibility across different swine production scenarios. Two system types were evaluated using computer simulations to model swine production under various conditions. The first scenario focused on a single production system with 24,000 sows across eight sites. The second scenario evaluated a region with 24,000 sows divided into 4 geographically related systems but operationally independent. Simulations evaluated how washing different proportions of trailers at an 80% washing efficacy rate would affect the spread of PEDV.

Scenarios were conducted with PEDV prevalence levels ranging from low (5%), moderate (10%) and high (20%) to see how PEDV prevalence impacted the effectiveness of trailer washing on disease reduction. This study found washing 100% of trailers resulted in the lowest mean number of infected premises in the mixed flow system. In the geographically segregated system, washing zero trailers was the most cost-effective strategy. For interconnected systems or during high PEDV prevalence periods, thorough washing of all trailers is essential. However, in more isolated systems or when PEDV prevalence is low, producers could save costs without compromising biosecurity by washing fewer trailers. Overall, the study showed that optimal strategies depend on individual production settings and regional disease prevalence pressures within that system.

Dr. Machado shared information from recent work examining the role of vehicles in transmitting swine diseases and the potential to rerouting vehicles as an alternative disease mitigation strategy. To mitigate disease transmission events, vehicles undergo cleaning and disinfection (C&D) procedures but C&D effectiveness and the frequency of C&D between farm visits is often unknown. Consequently, relying solely on vehicle C&D may be insufficient to stop the spread of diseases, and supplementary strategies are needed to prevent disease transmission events by contaminated vehicles.

Using GPS data from farms to trace vehicle movements in several pig-dense areas and incorporating PRRSV and PEDV infection status of commercial swine farms, Dr. Machado's study simulated vehicle movements for 1 week. Vehicle movements included visits to farms, slaughterhouses, feed mills, and parking areas. Rerouting vehicles based on risk decreased deliveries per vehicle and the connectivity among vehicle networks while increasing C&D visits and the distance traveled. Given the severe economic impact of PRRSV, PEDV, and other endemic infectious diseases on swine production, the costs and logistics of a vehicle rerouting system will require a close economic examination. The potential health benefits of reduced disease transmission should be evaluated across traditional versus rerouted vehicle movement schedules.

Dr. Pete Thomas shared the history and challenges associated with PEDV within Iowa Select Farms and the impact of implementing increased transport biosecurity. He noted the gilt acclimation program for PEDV ended in 2022, resulting in a subsequent increase in sow farm outbreaks. Prior to 2023/2024, market hog trailers were washed every fourth load using volume flush and disinfectant. The estimated cost of a PEDV outbreak using 2018 – 2022 data from their system was calculated at $1.15/pig annually due to losses in weight gain and nursery mortality rates.

In week 46 of 2023, the company started washing all market trucks and noted a significant reduction in PEDV outbreaks including farm rebreaks. The washing of all market trucks reduced the break rate from 6% to 2% in 2023-2024. After focused efforts were made for transport sanitation, a significant reduction in outbreaks was noted from 20% (2018-2019) to 2% (2023-2024). In summary, the study showed an 11x reduction in PEDV breaks in marketing after implementing consistent trailer washing. Farms also saw a reduction in rebreak rates in weaned and feeder pigs.

Transportation biosecurity and sanitation play a key role in reducing disease spread and improving the overall health and productivity of swine herds. While the information presented offers valuable guidance, producers are encouraged to adapt biosecurity strategies to their unique production contexts and continuously refine their practices based on ongoing assessments and expert advice. Decontamination strategies should be tailored to address the disease risk within individual farms and production systems.

Additional steps that can enhance biosecurity include performing an assessment of current biosecurity measures with a focus on areas of improvement, tailor decontamination strategies based on disease prevalence in the area considering efficacy and cost, evaluation of rerouting strategies for disease prevention, and then adjusting strategies as needed depending on emerging data and best practices.

SHIC/AASV Webinar on FMDV Incursions in EU: Situation Update and Considerations for US Prevention Set for April 25

April 3, 2025 – The Swine Health Information Center in collaboration with the American Association of Swine Veterinarians will host a webinar titled FMDV Incursions in EU: Situation Update and Considerations for US Prevention. The webinar will be held on Friday, April 25, 2025, from 10:00 am to 11:30 am CST.

Foot-and-mouth disease virus has recently been identified in three European countries after maintaining decades of negative status and poses an emerging disease threat for swine production. The goal of the webinar is to provide the latest information on FMDV including an overview of the virus, clinical signs, global circulation, risks to swine, control and mitigation efforts. Further, the webinar will provide key links to available resources in support of efforts for prevention and preparedness for FMDV and other foreign and emerging diseases.

Confirmed presenters include:

Jonathan Arzt, DVM, MPVM, PhD, Research Veterinary Medical Officer, United States Department of Agriculture ARS
Overview of the FMDV including clinical signs, diagnosis and impact

Maria Sol Perez Aguirreburualde, DVM, PhD, Deputy Director & International Research Development Manager, University of Minnesota
Global FMDV circulation

Patrick Webb, DVM, Assistant Chief Veterinarian, National Pork Board
Available resources for FMDV prevention and preparedness efforts

Gyula Balka, DVM, PhD, Associate professor Department of Pathology
University of Veterinary Medicine, Budapest, Hungary
Status update of FMD in Hungary: clinical observations, challenges, and mitigation and control efforts

Denise Wuellner, DVM
PIC Deutschland, Health Assurance, Central and Eastern Europe
Status update of FMD in Germany: clinical observations, challenges, and mitigation and control efforts

This webinar, hosted by SHIC and the American Association of Swine Veterinarians, is conducted by the Swine Medicine Education Center at Iowa State University.

SHIC/AASV Webinar Addresses FMDV in the EU and Domestic Prevention/Preparedness

May 27, 2025 – The Swine Health Information Center, in collaboration with the American Association of Swine Veterinarians, hosted a webinar on April 25, 2025, highlighting the recent incursion of foot and mouth disease virus in the EU and the global threat it poses for swine production. The webinar entitled "FMDV Incursions in EU: Situation Update and Considerations for US Prevention" had 325 registrants globally and is now available for on demand viewing. Information is provided about the virus, global presence of FMDV, status updates for Germany and Hungary, and a review of available producer resources for prevention and preparedness of emerging and foreign animal diseases.

The identification of FMDV in three EU countries after maintaining decades of negative status raises concern about a potential emerging threat to swine health. Understanding the clinical signs, epidemiology, biosecurity, and prevention steps for FMDV can help producers protect their herd health. Presenters offering their expertise included:

Dr. Jonathan Arzt, research veterinary medical officer, USDA Agricultural Research Service
Dr. Maria Sol Perez Aguirreburualde, deputy director and international research development manager, University of Minnesota
Dr. Denise Wüllner, health assurance, central and eastern Europe, PIC
Dr. Gyula Balka, associate professor, University of Veterinary Medicine, Budapest, Hungary
Dr. Patrick Webb, assistant chief veterinarian, National Pork Board

First, Dr. Arzt provided a clinical and epidemiological overview of FMD in pigs. Clinical signs of FMDV in pigs include depressed activity, vesicles of the coronary bands, lying down versus standing or moving, and fever that could exceed 105°F. Dr. Arzt noted characteristic lesions for FMDV include blanching, white discoloration, and vesicles around the coronary band of the hooves as the most common lesion in pigs. The presence of vesicles on the tongue, snout, and haired skin on front or hind limbs near pressure points is also common, but less consistent than coronary bands. The primary site of FMDV infection in pigs is the oropharynx (tonsils).

Dr. Arzt stated that infection progresses rapidly after a 24-hour incubation period with vesicles typically appearing within 48 to 72 hours. Lesions will mature and slough affected tissues within 14 days. Unlike ruminants, pigs are not competent long-term carriers of FMDV and typically clear the virus within 14 to 21 days post-infection. He noted that pigs are contagious 24 hours before clinical signs are noted through 14 days post-infection.

Identifying FMDV can be a challenge, Dr. Arzt stressed, as there are four vesicular diseases with similar presentation: FMDV, Senecavirus A, swine vesicular disease, and vesicular stomatitis. Early stage FMD vesicles have characteristic blanching, whiteness, and swelling whereas SVA vesicles tend to have a yellow tinge and are often less fluid filled. All vesicular diseases in pigs are visually and clinically indiscernible however and PCR testing is required for differentiation.

Dr. Arzt reviewed the potential of FMDV being spread through feedstuffs. While infectious FMDV can be recovered from contaminated feed for at least 40 days under cold storage conditions, stability varies based on the strain and type of storage. Through research funded by SHIC, he noted that a high viral dose is required in feed to result in infection through consumption of contaminated feed. Dr. Arzt said the high amount of virus required to cause infection in this scenario was not likely to occur in production settings of contaminated feed ingredients. Dr. Arzt referenced contaminated pork or meat items as higher risks for oral consumption and FMDV infection.

In her presentation on global FMDV circulation, Dr. Perez reviewed current FMDV distribution, and the various serotypes across regions and countries. Status categories include FMD-free with vaccination, FMD-free without vaccination, and endemic for those regions with persistent infections. Due to data gaps, she advised caution when reviewing available information as not reported may indicate "…no recent evidence" versus a proven disease-free status.

Dr. Perez noted that various lineages of FMDV have moved rapidly from country to country. The lineages SAT 2/V to Algeria, O/EA-3 to Libya, and Ind-2001e MYMBD21 across South Asia show viruses can escape static control plans in weeks. In addition, wildlife interfaces matter, evidenced by concurrent SAT 1 + SAT 3 spillovers in South Africa from water buffalo reservoirs. These reservoirs can topple disease control zoning and resulting outbreaks may demand broader vaccine formulations for control and mitigation.

Producers and practitioners are encouraged to stay aware of global FMDV status. Globally, Dr. Perez recommends continuous genomic surveillance, flexible regional vaccine banks, and cross-border contingency planning to guide prevention and preparedness activities.

Dr. Wüllner provided an overview of the sole case of FMDV in Germany detected in January 2025 that disrupted a 14-year freedom of the virus for Europe and a 37-year freedom for Germany. Dr. Wüllner noted Germany had been struggling with blue tongue virus serotype 3 (BTV3) in ruminants since 2023 and this ongoing issue complicated the FMDV diagnosis since the two viruses can have a similar clinical presentation.

Dr. Wüllner said clinical signs of BTV3 in cattle include inflammation of the teat skin, mucous membranes in the eyelid area, oral cavity, and genitalia. In addition, detachment of mucous membranes in the tongue and mouth as well as vesicles on the coronary band can be other clinical signs. The clinical manifestations of BTV3 in cattle resemble the symptoms of FMDV, she stated.

The individual FMDV case was detected at a small farm with 14 head of water buffalo located near Berlin. Initially, the herd owner noted death loses in three animals and BTV3 was suspected.

The third death loss led to post-mortem examination and testing for BTV3 at the official national laboratory. The BTV3 test results were negative. When the probable diagnosis was disproved, differential diagnoses were considered and a test for FMDV was subsequently ordered. The outcome was positive for FMDV. Investigation and testing occurred over a three-day period in January. Dr. Wüllner stated that all samples were forwarded to the national reference lab to confirm the results and on January 10, 2025, FMDV serotype O was confirmed.

Disease control measures were implemented and the remainder of the water buffalo herd was depopulated on the same day as FMDV confirmation. Carcasses were safely disposed of through movement in sealed trailers to rendering plants. All susceptible animals on farms within 1 km of the FMD outbreak site were culled, including one pig farm with 244 head.

Dr. Wüllner shared Germany has a national system providing affected animal owners compensation for loss. This includes financial help for specialist companies to perform culling. After culling, the farm was disinfected, and lime was applied to surrounding grass fields where fences were raised. The German Federal Ministry for Food and Agriculture (BMEL) issued a standstill order for all animals in the Brandenburg/Berlin area for seven days and further zones were established to halt animal movements. Monitoring in restricted zones began and all farms within the affected area were tested a total of three times, with testing occurring every seven days. In the surveillance zone, farms were tested twice every 14 days. She noted there is no intensive livestock production in this zone.

Due to the limited nature of the outbreak, rapid response actions, and subsequent protocols implemented, the World Organization for Animal Health reinstated Germany's status of "free from FMDV without vaccination" on April 14, 2025, upon request from the German government. Official recognition of WOAH animal health status is significant to international trade.

Dr. Balka described the recent FMDV outbreaks in Hungary. He compared the size of Hungary to that of Indiana and stated that there are currently five outbreaks of FMDV within the country. The first outbreak occurred in Kisbajcs in March 2025. Initially, dairy heifers exhibited loss of appetite and fever with moldy bedding being suspected as the potential cause. As specific clinical signs also appeared within the herd, affecting heifers, milking cows as well as fattening animals, the official veterinarian was notified and suspicion of FMDV lead to herd testing and halting animal movements pending confirmation. Once the official outbreak was confirmed three days after the first non-specific clinical signs were noted, additional steps such as reporting to the EU and WOAH, a 72-hour movement ban, and establishing restriction zones were implemented. FMDV confirmation led to culling of infected animals and disinfection of the dairy farm.

Following the Kisbajcs outbreak, FMDV was also identified on farms in Levél, Darnózseli, Dunakiliti, and Rábapordány, with the last outbreak being confirmed on April 17, 2025. Clinical signs of FMDV in cattle in Hungary included excessive salivation/drooling, being off feed, fever, audible tutting noises, and painful lesions on the tongue, nose, and teats.

Once FMDV was identified in Hungary, a suspension of FMD-free without vaccination status was initiated. Importation of susceptible animals into restricted areas as well as exports to EU or

third countries are prohibited. Every susceptible species within the surveillance zones (10 km) must be kept inside. Fairs, exhibitions, and events presenting all animal species are prohibited until May 5, 2025. Slaughter (not obligatory) of pigs in the restricted areas at appointed slaughterhouses (after negative testing within 48 hours) is prescribed. Affected farmers were compensated by the government. Smaller border crossings have been closed while larger ones undergo disinfection.

Dr. Balka noted that the route by which FMDV was introduced into Hungary is currently unknown. Dr. Balka stated there is no connection between the Germany and Hungary FMDV outbreak strains. The first outbreak in Hungary was near the border with Slovakia and the fifth FMDV outbreak in Hungary was 60 km from the nearest infected site despite strict biosecurity measures.

As an additional step to manage the FMDV outbreak, from the second case, vaccination began on the days of outbreak confirmation to try to decrease viral shedding from animals while performing depopulation of infected herds, Dr. Balka stated. Of the three primary and two secondary outbreaks in Hungary (secondary had contact with primary), 9312 cattle and nearly 10,000 pigs in the vicinity were culled. Additional biosecurity steps included the use of drive-over disinfection mats at border crossings, disinfectant use at burial sites, prohibition of hunting, and restricted personal traffic in the national parks where high value traditional breeds are kept. Dr. Balka offered this resource for updates on FMD in the EU.

Dr. Webb highlighted resources for FMDV prevention and preparedness efforts available from the National Pork Board's Pork Store. These include 12-in. by 18-in. laminated posters containing information on FMD (English – #04868, Spanish – #04868S), classical swine fever (English – #04897, Spanish – #04897S), and African swine fever (English – #-04895, Spanish – #04895S). The posters are designed to highlight signs and symptoms of FMD and how to report suspect cases. NPB has also prepared a disinfectant booklet including information on products labeled for foreign animal diseases, outlining characteristics of common swine disinfectants, dose rates, and contact time required.

A wide variety of employee training materials are available from the Center for Food Security and Public Health for FMD including fact sheets, summaries, images, and PowerPoint presentations. In addition, Secure Pork Supply offers additional videos and documents for employee training. Resources for FMD, CSF, and ASF information along with additional information on FMD vaccination are all available on the SPS website. The SPS website has four videos available in English and Spanish: Introduction to Biosecurity, Do Not Bring Disease to the Site, Perimeter Buffer Area, and Line of Separation and Biosecure Entry. Additional training materials are available for manure management, mortality management, non-farm personnel, pig transport, and truck washing.

Dr. Webb stated that enhanced biosecurity training and implementation of those steps are key to success for disease prevention and preparedness. With the beginning of the exhibition season, Dr. Webb highlighted biosecurity resources for weigh-in or tagging events, exhibitions and sales, all available at the NPB website.

Dr. Webb emphasized the need for producers to have completed their biosecurity focused SPS plans. In addition, the swine industry in the US also offers AgView, a free, opt-in technology solution for producers to deliver traceability data to state animal health officials in emergencies, Certified Swine Sample Collector training for barn staff sample collection, and US SHIP, the Swine Health Improvement Plan modeled after the US Poultry Improvement Plan.

This webinar, hosted by SHIC and the American Association of Swine Veterinarians, is conducted by the Swine Medicine Education Center at Iowa State University.

SHIC/AASV Webinar on New World Screwworm Set for June 13

May 27, 2027 – The Swine Health Information Center in collaboration with the American Association of Swine Veterinarians will host a webinar titled Emerging Risk of New World Screwworm and Efforts to Prevent Re-introduction into the US. The webinar will be held on Friday, June 13, 2025, from 10:00 am to 11:30 am CDT.

In November 2024, USDA's Animal and Plant Health Inspection Service was notified by Mexican officials of a positive detection of New World screwworm in Mexico. NWS is a parasitic fly whose larvae feed on the living tissue of warm-blooded animals, causing serious wounds, infection, and even animal death. First discovered in a cow in the southern Mexico state of Chiapas, NWS has moved north to Oaxaca and Veracruz, within 700 miles of the US/Mexico border. As of May 11, 2025, US Secretary of Agriculture Brooke Rollins issued a suspension of live cattle, horse, and bison imports through US ports of entry along the southern border due to the continued and rapid northward spread of NWS in Mexico.

The intent of the webinar is to provide the latest information on NWS, including an overview of the parasite, the fly lifecycle, clinical signs of infestation, the status of NWS in Mexico, and efforts to mitigate incursion into the US. Join experts during this webinar as they share information on NWS and how it could impact the US pork industry.

Confirmed presenters include:

Cody Egnor, DVM, Veterinary Medical Officer, United States Department of Agriculture
Overview of NWS, status of detection in Mexico and current USDA response and mitigation efforts
Kathy Simmons, DVM, Chief Veterinarian, National Cattleman's Beef Association – *A cattle producer perspective of the emerging risk and impact for incursion of NWS into the US*
Trey James, DVM and/or **Nancy Adams**, DVM, Texas Animal Health Commission Epidemiology Department – *State animal health official response efforts for outreach, prevention and preparedness against NWS*
Moisés Vargas-Terán, DVM, International Animal Health Expert consultant for OMSA, FAO, IAEA, WHO, and the IDB – *Technical Overview of NWS Control: Veterinary and Producer Perspectives in Mexico*

SHIC/AASV Webinar on New World Screwworm Provides Valuable Perspective on Threat

July 2, 2025 – The Swine Health Information Center in collaboration with the American Association of Swine Veterinarians hosted a webinar on June 13, 2025, entitled "Emerging Risk of New World Screwworm (NWS) and Efforts to Prevent Re-introduction into the US." The webinar had 727 registrants from around the globe, 529 attended live from 18 countries, and it is now available for on demand viewing. The webinar provided the latest information on NWS, including an overview of the parasite, the fly lifecycle, clinical signs of infestation, impact to producers, Texas prevention and preparedness activities, and a status update for NWS in Mexico. To date, NWS has not been identified in the US since it was eradicated from the Florida Keys in 2017.

The identification of NWS in Oaxaca and Veracruz, within 700 miles from the US/Mexico border, raises concern about this potential emerging threat to swine health. Increasing awareness and understanding of this parasitic fly as well as prevention and mitigation steps for NWS infestation help US pork producers protect their herd health.

Presenters offering their expertise included:
Cody Egnor, DVM, veterinary medical officer, United States Department of Agriculture
Nancy Adams, DVM, Texas Animal Health Commission Epidemiology Department
Kathy Simmons, DVM, chief veterinarian, National Cattlemen's Beef Association
Moisés Vargas-Terán, DVM, international animal health expert consultant for OMSA, FAO, IAEA, WHO, and the IDB

The myiasis caused by New World Screwworm, *Cochliomyia hominivorax*, is a parasitic fly whose larvae infest and feed on the living tissue of warm-blooded animals, including humans. In his presentation, Dr. Egnor emphasized that, unlike other flies, NWS maggots feed exclusively on living tissue. Female flies lay 200-300 eggs around wounds or natural orifices like the eyes, ears, nose, anus, umbilicus, and genitalia. These eggs hatch within 12 to 24 hours, and the emerging larvae burrow deep into the flesh, tearing at tissue with hook-like mouth parts, leading to severe inflammation and secondary infections. The entire life cycle can be as short as 21 days in tropical climates.

Dr. Egnor highlighted clinical signs of NWS infestations characterized by visible larvae in the wound, often numbering in the hundreds, accompanied by a bloody discharge and foul odor. Affected animals can exhibit depression, reduce feed intake, self-isolate, and show agitated behavior like head shaking. Untreated infestations can be fatal within seven to 14 days, with nearly 100% mortality in newborns with umbilical infestations. NWS is not contagious from animal to animal, but multiple animals in a group can become infested. Multiple infestations in a single wound are common and can attract other blowfly species. While roughly 84% of cases are in cattle, 4% of NWS infestation cases have been identified in swine. Humans can also be infested by NWS. A review of animal husbandry practices such as branding, ear tagging, tick control, wound care, castration, births, and performance of practices seasonally can help prevent infestation.

USDA has actively focused on the use of Sterile Insect Technique (SIT) to reduce and eliminate the flies in affected locations. This method involves the release of sterile flies into the wild population to reduce NWS wild flies' reproduction and eventually eliminate wild flies from the environment. Prevention activities include robust regulatory controls, active field surveillance for myiasis, sterile flies, and stakeholder engagement. Dr. Egnor stated that NWS is a reportable disease in the US and USDA has resources available for producers to assist in the identification of the fly, how to report a suspect case, and information on USDA's preparedness activities in the NWS Redbook.

Dr. Simmons provided a historical perspective of NWS in the US and its impact on the cattle industry, stating that NWS caused significant economic losses from the 1930s – 1970s. The US successfully eradicated NWS in 1966, though sporadic outbreaks occurred until the 1970s, with the last US outbreak in 2016 in the Florida Keys. Freedom from NWS provides an estimated $1 billion in economic benefits to US livestock producers and $3.7 billion to the general economy annually. If NWS was identified in the US, eradication would be a significant challenge due to the size of the US cattle herd, speed and distance of cattle movements, and the increased wildlife populations that interface with livestock. Mexico exports, on average, 1.2 million head of cattle to the US each year. The closure of the southern border to cattle, bison, and horses due to NWS in Mexico has affected the livelihood of many US cattle feeders who depend on Mexican cattle to fill their feedyards. This is especially significant due to the lowest numbers since 1951 for the US cattle herd.

Dr. Simmons highlighted the USDA's efforts to prevent NWS introduction with increased measures initiated on February 1, 2025, to require a comprehensive treatment and inspection process for all cattle entering the US from Mexico to mitigate the risk of NWS. Further protection efforts occurred on May 11, 2025, when US Secretary of Agriculture Brooke Rollins announced a temporary border closure for live cattle, bison, and horses from Mexico. Additional efforts have been focused on the use of SIT which involves the propagation and release of sterile male flies into NWS activity areas, reducing the reproduction rate and causing eventual die-out of the flies. Currently, Panama has the only operating sterile NWS fly production site, producing flies at the rate of 100 million to 117 million sterile flies per week, but many more flies are needed to cover the expanded affected areas. Additional facilities to produce sterile NWS flies and approval of products to combat NWS are urgently needed, per Dr. Simmons.

Dr. Adams stated that the potential impact of NWS in the US would be substantial, with estimated costs to eradicate reaching $1.27 billion, and annual producer and consumer impact near $540 million. Losses attributed to NWS could include increased production costs due to animal deaths, decreased livestock production, and higher needs for veterinary services, medication, insecticides, and labor. The US cattle industry is particularly vulnerable, as it relies on Mexican cattle imports, which have been significantly reduced due to NWS mitigation protocols and border closures affecting cattle.

The Texas Animal Health Commission (TAHC) has developed resources for producers and veterinarians to assist in surveillance and rapid detection of NWS suspect cases. Protocols include detection of maggots deep in living tissues and wounds. Kits have been developed and can be provided for the collection of samples if NWS is suspected. NWS is a reportable disease

in the US and veterinarians and producers are instructed to report any suspect cases to the appropriate state or federal animal health officials.

TAHC is focusing on preparedness efforts in collaboration with USDA APHIS and other agencies to refine response plans, develop strike teams, identify potential US sterile fly production facilities, and monitor SIT effectiveness. Outreach materials and training for veterinarians and producers are being developed to enhance awareness, reporting, and management of NWS. Producers are advised to regularly monitor animals, inspect pets and vehicles when traveling from infested areas, keep wounds clean and covered, and use repellents. It is critical not to move suspected infested animals.

Dr. Vargas-Teran reviewed the history of NWS control using SIT between Colombia and Panama, creating a barrier using sterile insects for prevent northern NWS flies' incursion. A significant change occurred in Panama in April 2022 north of the control barrier, with the significant increase in NWS cases that reinfected the entire country, in 2023. NWS has since spread rapidly through Central America, reaching Costa Rica, Nicaragua, Honduras, Guatemala, El Salvador, and Belize. In July 2024, Mexico implemented an emergency prevention plan to prevent the disease introduction into the country.

However, on November 1, 2024, the first case was detected and confirmed in a quarantine station in Mexico in the Chiapas state, near the Guatemalan border. By May 2025, NWS had spread to seven Mexican states (Chiapas, Tabasco, Campeche, Quintana Roo, Yucatan, Oaxaca, and Veracruz). This prompted the suspension of live cattle, bison, and horse imports through US southern border ports due to the presence of NWS cases. Chiapas has the highest number of active cases with cattle being the primary species impacted.

Dr. Vargas-Teran noted that the response of veterinarians and producers in Mexico focus on modified timing of production practices, such as branding, to reduce the potential for NWS infestation. Affected animals are either treated with topical and/or injectable medications to kill the flies with additional wound management steps as needed. An increased veterinary workforce has been deployed to perform active surveillance in the field for NWS and collection kits for larvae are provided in the number of 150,000. Producer education and outreach are ongoing in the field, especially in areas with active cases. He noted that animals are not the only species affected as there have been at least eight human cases in Mexico and producers should be aware of this potential human health threat.

Presently, the goal of SIT in Mexico is to stop the northward progression of the disease with aggressive fly releases in affected areas and the establishment of a sterile fly barrier at the Tehuantepec Isthmus, to push back the disease to the international border between Panama and Colombia, where the previous sterile fly barrier was operating. It would take approximately eight to 12 months to have additional fly production available for use in Mexico to strengthen the strategy. Other control efforts are focused on animal quarantine and halting illegal animal movements.

For more information, resources are available from the USDA APHIS website on New World Screwworm, the TAHC NWS Fact Sheet, and the Panama-United States Commission for the Eradication and Prevention of Screwworm (COPEG).

Communication Channels and Information Sharing

Website Activity and Impact through www.swinehealth.org

Activity on www.swinehealth.org. NOTE: In GA4, (not set) is a widespread glitch failing to identify specific webpages.

1. Top pages on SHIC website with number of views: January 1 – December 31, 2025
    - (not set) – 19,371
    - Homepage – 11,176
    - Domestic Disease Monitoring Report – 4,973
    - Global Disease Monitoring Report – 4,497
    - Research Results – 2,672
    - Call for Research – 2,403
    - Disease Monitoring Reports Page – 2,332
    - Podcasts/Webinars page – 2,075
    - FMD in Hungary – 1,821
    - Latest News – 1,568
2. Website impact: January 1 – December 31, 2025. For comparison, 2024 totals are included in parentheses after each applicable line.
    - 269,853 events (343,680)
    - 35,659 separate users (25,314)
    - 95,179 total page views (153,156)
    - Average session duration of 0:58 (2:03)
    - Top countries
        - 12,281 users were from the USA (15,196)
        - 12,106 users were from China (1,260)
        - 5,235 users were from Singapore (not in 2024 top 10)
        - 934 users were from Canada (1,030)
        - 633 users were from the United Kingdom (427)
        - 545 users were from India (748)
        - 439 users were from Germany (270)
        - 425 users were from Australia (475)
        - 404 users were from The Philippines (627)
        - 360 users were from Brazil (not in 2024 top 10)

Press Releases and Impact

Press Releases: Five SHIC-specific press releases were issued in 2025:

- Swine Health Information Center Releases 2025 Plan of Work, Celebrates Record-Breaking 2024, and Welcomes New Grant Administrator – 2/3/2025
- Rhea Schirm Joins Swine Health Information Center – 5/8/2025

- SHIC Announces New Board Appointments and Officer Elections – 7/9/2025
- SHIC, FFAR, and Pork Checkoff Fund 10 H5N1 Risk to Swine Projects to Address Emerging Disease Threat – 7/22/2025
- SHIC Funds 12 Plan of Work Projects to Advance Emerging Disease Mission – 12/8/2025

Press release impact: Emails were sent to 260 ag news outlets for each press release. Farm broadcasters continued as a very important media outreach for SHIC, as well as national and regional livestock publications.

Individual emails are sent to the top five pork media editors as well as ten farm broadcasters with each press release. Press releases were picked up by these national editors and farm broadcasters covering the US pork industry, many times resulting in one-on-one interviews with the executive and associate directors. In 2025, more than 61 interviews with Drs. Niederwerder and Becton took place. Publications, radio networks, and stations receiving personalized emails include:

- National Hog Farmer/Farm Progress Publications - 2 editors
- PORK/Farm Journal
- Agri-Pulse - 3 editors
- Feedstuffs
- Successful Farming and associated daily e-newsletter
- Brownfield Network
- Rural Radio Network
- WHO Radio – Des Moines, Iowa
- WMT Radio – Cedar Rapids, Iowa
- KWMT Radio – Fort Dodge, Iowa
- KICD Radio – Spencer, Iowa
- WNAX Radio – Yankton, SD
- Market Talk Ag – National
- Red River Farm Network
- Agriculture of America – National
- Ag Daily News Podcast
- This Week in AgriBusiness
- Iowa Agribusiness Network

SHIC communications efforts are amplified by stakeholders who share our articles in their publications including online newsletters, social media posts, and presentations. These stakeholders include National Hog Farmer, PORK, USAHA, NPPC, NPB, and others.

Articles Prepared for Partners

When SHIC-funded research projects are completed, the principal investigator submits a final report for SHIC approval and publication on the SHIC website. In 2025, a total of 22 research reports were posted on the SHIC website. Summary articles of research reports are then prepared by SHIC for sharing with producers and veterinarians. Additional articles are developed through domestic and global disease monitoring, webinars, and other activities.

In 2025, content was provided for 63 articles for the AASV weekly e-letter, State Pork Producer Association newsletters, and other partners, including:

1. SHIC/FFAR/NPB H5N1 Request for Research Proposals Nets 51 Reponses
2. 2024 Highlights from SHIC Domestic Swine Disease Monitoring
3. SHIC Monitoring Emerging PRRSV-2 Lineage 1C.5 Clonally Expanded Clade
4. World Organisation for Animal Health Reports Recurrence of Foot-and-Mouth Disease in Germany
5. SHIC Update on Recent Detection of FMDV Serotype O in Germany
6. SHIC Wean-to-Harvest Biosecurity: Mitigating Disease Transmission Through Vehicle Rerouting and Enhanced Sanitation (Final Report)
7. SHIC Wean-to-Harvest Biosecurity: Alternative Cleaning Methods to Reduce PEDV in Livestock Trailers (Final Report)
8. SHIC-Funded Study Evaluates Tongue Tip Fluids for Pathogen Monitoring in Nursery and Grow-Finish Pigs
9. 2024 Progress Report Reveals Record Year for SHIC
10. SHIC-Funded MSHMP Assesses Evolutionary Dynamics of PEDV in US Throughout Last Decade
11. SHIC-Funded Study Develops Diagnostic Tools for Glaesserella australis
12. SHIC-Funded SDRS Analyzes VDL Data to Identify Trends for PCV2 and PCV3
13. SHIC-Funded Study Assesses Tongue Tip Fluids for Value in Growing Pig Disease Diagnosis
14. SHIC/AASV Webinar Addresses Practical Approaches for Transport Biosecurity
15. SHIC-Funded Study Develops DNA Sensors for Infectious Swine Virus Detection
16. SHIC Makes Strategic Investment with 2025 Plan of Work RFP
17. REMINDER: SHIC 2025 Plan of Work RFP Deadline Is April 30
18. Slovakia on High Alert: Third EU Country with FMD Outbreak Following Cases in Hungary and Germany
19. SHIC Monitoring FMDV Incursion in Hungary: First Outbreak in 50 Years
20. SHIC Wean-to-Harvest Biosecurity: Industry-Wide Assessment of Bioexclusion Practices Across US Swine Farms (Final Report)
21. SHIC Wean-to-Harvest Biosecurity: Evaluating Self-Vaccinating Technology for Growing Pigs (Final Report)
22. SHIC Funds Assessment of Stillborn Piglet Tongue Fluids as Risk-Based Sample
23. SHIC/AASV Webinar on FMDV Incursions in EU: Situation Update and Considerations for US Prevention Set for April 25
24. SHIC Highlights Vector Control Strategies for Pork Producers
25. MSHMP Funding Renewed by SHIC with Deliverables Outlined in Annual Report
26. SHIC-Funded Study to Optimize PRRSV Surveillance Evaluates Sensitivity of Tongue Tip Testing in Sow Herds
27. SHIC Receives 57 Responses to 2025 Plan of Work Request for Research Proposals
28. Rhea Schirm Joins Swine Health Information Center
29. SHIC/AASV Webinar on New World Screwworm Set for June 13
30. SHIC/AASV Webinar Addresses FMDV in the EU and Domestic Prevention/Preparedness
31. SHIC-Funded SDRS Yields Valuable Influenza Surveillance Data
32. Broad Reach Improves SHIC Research Results for Producer Benefit

33. SHIC/AASV Webinar on New World Screwworm Provides Valuable Perspective on Threat
34. SHIC Executive Director Among US Delegation Representing Pork Industry at 92nd WOAH General Session
35. SHIC-Funded Study First to Confirm Porcine Astrovirus 4 as a Primary Cause of Tracheitis and Bronchitis in Piglets
36. SHIC Announces New Board Appointments and Officer Elections
37. SHIC-Funded Research Reveals JEV Threat Remains High with Mosquito Control Essential
38. SHIC-Funded MSHMP Study Sheds Light on Senecavirus A Incidence in US Swine Herds
39. Celebrating 10 Years of the Swine Health Information Center's Enduring Mission: Protecting the US Swine Herd
40. SHIC, FFAR, and Pork Checkoff Fund 10 H5N1 Risk to Swine Projects to Address Emerging Disease Threat
41. Collaborative H5N1 Swine Industry Working Group Remains Vigilant
42. SHIC Delivers Swine Health Information at Leman Conference
43. SHIC Encourages Input for 2026 Plan of Work
44. New Monthly PRRSV Variant Report Launches with SHIC Support
45. SHIC Wean-to-Harvest Biosecurity: Waterless Decontamination for Transport Trailers (Final Report)
46. SHIC/FFAR JEV Research: Lessons from Australia's Japanese Encephalitis Virus Outbreak for the US Swine Industry
47. SHIC Wean-to-Harvest Program Supports PRRS Biosecurity Enhancement for Fall Season
48. SHIC Shares New WOAH Guidelines for ASF Vaccine Use and Field Evaluation
49. New World Screwworm Reported within 70 Miles of Texas Border: SHIC Provides Surveillance Information
50. Incorporating E. coli into the SHIC-Funded Swine Disease Reporting System
51. SHIC-Funded Study Results in Disease Index on Relative Burden of Endemic US Swine Pathogens
52. WOAH Confirms First ASF Case in Taiwan
53. SHIC Wean-to-Harvest Biosecurity: Investigating Novel Farm Entry Systems
54. SHIC Wean-to-Harvest Biosecurity: Tool to Mitigate Airborne Pathogen Spread on Farm
55. SHIC Wean-to-Harvest Biosecurity: Understanding Caretaker Needs for Conducting Biosecurity Practices
56. SHIC Funds Study on Real-Time Surveillance System to Regionally Detect Swine Diseases
57. SHIC-Funded Study Establishes Oral Fluid Sampling Guidelines for Group-Housed Sows
58. African Swine Fever Confirmed in Spain After Three Decades
59. SHIC Funds 12 Plan of Work Projects to Advance Emerging Disease Mission
60. SHIC Announces New Training Resources for Standardized Outbreak Investigations
61. SHIC/DHS S&T Partnership Marks Three Years of Progress in ASFV Feed Research
62. SHIC-Funded Domestic Swine Disease Surveillance Project Annual Report Leads to 2025-2026 Renewal

63. SHIC to Co-Host a Special Session at the 2026 NAPRRS/NC229 International Conference of Swine Viral Diseases

SHIC Monthly E-Newsletters and Timely E-blasts

Edition	Date Sent	# Sent	Opens	Opens %	Clicks	Click %
January 2025 newsletter	1/8/2025	3324	906	32.3%	465	4.7%
February 2025 newsletter	2/7/2025	3319	1035	37.9%	440	7.5%
Transport Biosecurity Webinar	2/11/2025	3318	1078	39.7%	390	5.7%
March 2025 newsletter	3/5/2025	3362	1178	42.7%	804	7.9%
FMD in Hungary Eblast	3/7/2025	3359	1140	41.3%	364	3.9%
April 2025 newsletter	4/2/2025	3358	1093	39.7%	498	5.8%
FMD in EU Webinar Eblast	4/11/2025	3356	1144	41.8%	386	7.1%
May 2025 newsletter	5/7/2025	3354	1108	40.7%	477	5.8%
NWS Webinar Eblast	5/27/2025	3352	1127	41.4%	326	5.1%
June 2025 newsletter	6/3/2025	3351	1046	38.6%	453	5.5%
July 2025 newsletter	7/2/2025	3347	1105	41.0%	433	6.3%
August 2025 newsletter	8/6/2025	3348	1046	39.7%	396	4.9%
September 2025 newsletter	9/3/2025	3402	1142	42.0%	405	3.4%
October 2025 newsletter	10/8/2025	3400	1104	40.8%	483	5.2%
November 2025 newsletter	11/5/2025	3398	1075	39.9%	450	4.9%
December 2025 newsletter	12/3/2025	3397	1072	40.4%	540	6.4%

Podcasts and Webinars

SHIC coordinates webinars in collaboration with AASV on emerging disease issues and “industry chatter” topics to provide information through a virtual platform that stakeholders can view in real-time or view recorded versions anytime on the SHIC and AASV websites.

SHIC coordinated three Webinars in 2025 with AASV:

- 2/18/2025: Practical Approaches for Transportation Biosecurity
- 4/25/2025: FMDV Incursions in EU: Situation Update and Considerations for US Prevention
- 6/13/2025: Emerging Risk of New World Screwworm and Efforts to Prevent Re-introduction into the US

SHIC Talk is a podcast hosted by Barb Determan and features guests on “industry chatter” topics. Five episodes were produced in 2025. SHIC Talk is available on the SHIC website as well as many popular podcast platforms. All time downloads of all SHIC Talk episodes total 3,913 as of December 31, 2025.

SHIC Talk 2025 Podcasts:

- 2/19/2025: SHIC/FFAR/H5N1 RFP Response with Drs. Megan Niederwerder and Jasmine Bruno
- 5/6/2025: Assessment of Bioexclusion Practices Across US Swine Farms with Drs. Lisa Becton and Gustavo Silva
- 6/27/2025: SHIC 10th Anniversary with Drs. Niederwerder, Becton and Mr. Mark Schwartz
- 7/21/2025: Study Confirms PoAstV4 Causes Respiratory Issues in Piglets with Drs. Megan Niederwerder and Mike Rahe
- 9/15/2025: SHIC Provides Extensive Swine Health Outreach with Dr. Lisa Becton

Title/Topic	Guest(s)	Date	Downloads
SHIC	Joe Connor	8/5/2020	196
Coccidiosis	Pittman, Schwartz	9/18/2020	168
Rapid Response Program	Holtkamp, Donovan	10/14/2020	197
ASF Research in Vietnam	Sundberg, Wagstrom, Pyburn	12/2/2020	259
PRRS 1-4-4 1c	Yeske, Linhares	2/15/2021	245
SHIC Progress	Connor, Olsen	4/20/2021	148
SHIC Fact Sheets	Leedom-Larson, Sundberg	5/26/2021	133
Morbillivirus	Arruda, Li	7/14/2021	213
Biosecurity	Clayton Johnson	1/31/2022	295
Australian JEV Outbreak	Cernicchiaro, Cohnsteadt, Sundberg	4/29/2022	179
FAD Prevention Feed Research	Sundberg, Niederwerder	5/23/2022	139
ASF Update	Niederwerder, Snelson, Wagstrom, Webb	7/27/2022	212
Wean-to-Harvest Biosecurity Program	Niederwerder, Sundberg	9/15/2022	157
SHIC 2023 Plan of Work	Sundberg, Niederwerder	1/19/2023	107
New SOIP Instrument	Derald Holtkamp	4/4/2023	155
ASF Research Results from Vietnam	Paul Sundberg	11/20/2023	111
Emerging Disease	Megan Niederwerder	2/2/2024	166
JEV Economic Assessment	Liz Wagstrom	4/1/2024	180
IAV Discussion	Niederwerder, Rotolo, Canon, Forseth	7/2/2024	208
Fan Coverings/Manure Pumping	Becton, Kettelkamp, Moraes	10/4/2024	92
SHIC/FFAR H5N1 RFP Response	Niederwerder, Bruno	2/19/2025	102
Assessment of Bioexclusion Practices Across US Swine Farms	Becton, Silva	5/6/2025	85
SHIC 10th Anniversary	Niederwerder, Becton, Schwartz	6/27/2025	56

Study Confirms PoAstV4 Causes Respiratory Issues in Piglets	Rahe, Niederwerder	7/21/2025	57
SHIC Provides Extensive Swine Health Outreach	Lisa Becton	9/15/2025	53

Media Interviews Completed

In 2025, over 61 media interviews with Dr. Niederwerder and Dr. Becton took place throughout the year. Participation in the National Association of Farm Broadcasters annual meeting and Trade Talk, World Pork Expo, AASV Annual Meeting, Leman Conference, as well as other industry events always have good interview opportunities. Eleven interviews were provided at World Pork Expo and 14 at National Association of Farm Broadcasters. Interviews have been conducted with more than 20 different media outlets and interviewers.

A new broadcast opportunity started in July 2025 at the request of WHO Radio, Des Moines, IA. SHIC provides a 4.5-minute Animal Health Update each week for their Saturday morning farm program, We Speak Farm. Twenty-seven episodes were produced and provided in 2025.

Examples of interviewers conducting interviews with SHIC staff:

- Bruce Cochrane, Reporter and Editor, Farmscape.Ca
- Mark Dorenkamp, Reporter, Brownfield Ag News
- Jesse Allen, Reporter, American Ag Network, AOA Radio Show
- Bob Quinn, Reporter, WHO Radio
- Ann Hess, Reporter, National Hog Farmer
- Sarah Muirhead, Feedstuffs
- Chad Moyer, Reporter, Nebraska Rural Radio
- George Bower, Reporter, Spencer (Iowa) Radio Group
- Jennifer Shike, Reporter, Farm Journal’s PORK
- Don Wick, Reporter, Red River Farm Network
- Susan Littlefield, American Ag Network, AOA Radio Show
- Mike Pearson, This Week in Agribusiness
- Kevin Schultz, Farm Progress
- Dustin Hoffman, Iowa Agribusiness Network
- Kiley Allan, reporter, The Mid-West Farm Report
- Von Ketelsen, reporter, KKRL radio, Carroll Broadcasting Company
- Jerry Kroeskruger, reporter, So. Minnesota
- Bob Middleton, reporter, Midwest Agricultural
- Gale Cunningham, reporter, Champaign, IL
- Joe Gill, reporter, KASM, So. Minnesota
- Cesar Delgado, Host, Back Roads of Illinois

Outlets Publishing SHIC Information

Between January 1, 2025 and December 31, 2025, there have been at least 439 additional reports that help expand the coverage of SHIC published articles and programming with their respective

readers, resulting in an average of 36 external (outside of SHIC and AASV publications) reports per month representing at least 30 different partner and media outlets.

Examples of outlets that helped amplify SHIC articles and reports:

- National Hog Farmer
- PORK/PORK Business
- Feedstuffs/Feedstuffs 365
- Community for Emerging and Zoonotic Diseases Weekly Intelligence Reports
- USAHA Daily News Alerts
- Farms.com, US
- Farms.com, Canada
- Brownfield Ag News/Radio Network
- National Pork Board
- The Farmer
- The Pig Site
- Swineweb
- American Ag Network
- Morning Ag Clips
- Red River Farm Network
- Ag Wired News
- FFAR news
- Farmscape.ca
- WHO Radio
- RFD-TV
- Spencer Radio Group
- Agriculture of America
- Farm Progress
- Pig333.com
- Global Biodefence
- DVM 360
- AgriPulse
- Drover's Daily
- KWCH Staff
- AVMA Smart Brief

SDRS Communication Multiplication

In addition to being distributed in the monthly SHIC newsletter and posted on the SHIC website, the Swine Disease Reporting System team at Iowa State University amplifies the reports' distribution. A total of 658 subscribers from 192 organizations receive the reports via email, with 81% being from the US and another 10% being from Canada and Mexico. The PDF report reaches seven countries and since the implementation of the podcast platforms (Spotify, Apple Podcast, Amazon Music, and Google podcast), the audio report has been listened to by 36 different countries (https://rss.com/podcasts/sdrs/). The SDRS report is also distributed through video format on LinkedIn, YouTube, and Instagram (https://www.instagram.com/isufieldepi/), accumulating over 20,000 views in these social media platforms.