Swine Health Information Center

Made possible by pork checkoff

PROGRAM REVIEW

RETURN ON PRODUCERS' INVESTMENT

April 2021-March 2026

The Swine Health Information Center, launched in 2015 with Pork Checkoff funding, protects and enhances 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.

SWINE HEALTH INFORMATION CENTER ORGANIZATION

- **Launched in July 2015 by the National Pork Board (NPB) in response to the porcine epidemic diarrhea virus outbreak in the US**
- **Funding for SHIC came from a $15M grant of Checkoff funds from the National Pork Board in 2015. Then in 2021, their Board renewed a grant of Checkoff funds. In 2026, NPB voted to provide $1.5M to fund SHIC.**
- **Working collaboratively with all industry organizations to support producer and veterinarian information and research to enhance the health of the national swine herd:**
  - **American Association of Swine Veterinarians (AASV)**
  - **National Pork Board**
  - **National Pork Producers Council (NPPC)**
- **Filling gaps in emerging swine disease prevention, preparedness, and response**

SHIC Executive Director
Megan Niederwerder DVM, PhD

SHIC Associate Director
Lisa Becton, DVM, MS, DACVPM

SHIC Grant and Contract Administrator
Rhea Shirm

"SHIC is uniquely agile in identifying immediate knowledge gaps and mobilizing targeted funding. Unlike broader agricultural funders, SHIC's laser focus allows it to sponsor highly specialized research—such as our specific studies on vehicle movements. Also, SHIC leadership understands what is urgent and needs funding ASAP, instead of long cycles of federal funds that can be changed to a direction that does not directly benefit the swine industry."

Gustavo Machado, DVM, MVSc, PhD
Associate Professor, Department of Population Health and Pathobiology
College of Veterinary Medicine
North Carolina State University
Fellow at the Center for Geospatial Analytics

Board of Directors

Appointed by the National Pork Board

Alayne Johnson
Pork Producer, Shady Grove Farms, Indiana

Seth Krantz, DVM
Veterinarian, Tosh Pork, Tennessee

Appointed by the National Pork Producers Council

Joseph Dykhuis, Board Vice President
Pork Producer, President of Dykhuis Farms, Inc., Michigan

Jeremy Pittman, DVM
Senior Director, US Vet Services, Smithfield, Virginia

Appointed by the American Association of Swine Veterinarians

Paul Ruen, DVM, Board President
EHF Consulting and AASV Past President, Minnesota

Jay Miller, DVM
President and CEO, The Maschhoffs, LLC - Illinois

Elected Producer Members

Kent Bang, Board Secretary/Treasurer
Bang Ag Consulting/Compeer Financial – Retired, Nebraska

Sarah Pillen, JD
Co-CEO, Pillen Family Farms and DNA Genetics, Nebraska

Pete Thomas, DVM
Director of Health Services, Iowa Select Farms, Iowa

SHIC CONTRIBUTIONS TO THE US PORK INDUSTRY

SHIC effectively balances practicality with innovation to advance emerging disease prevention, preparedness, and response. Over the past decade, its network of stakeholders, partners, and program deliverables has steadily expanded, strengthening its ability to serve the US pork industry. With a deliberate focus on meeting the needs of pork producers, SHIC maintains an intentionally agile and responsive structure—enabling rapid action on emerging threats while ensuring clear accountability for outcomes.

Collaboration remains central to SHIC's approach. The organization works closely with swine industry associations, academic institutions, veterinary diagnostic laboratories, and government agencies. While each partner brings distinct priorities, all share a common mission: safeguarding and advancing the pork industry. This coordinated approach maximizes resources, reduces duplication, and fosters a culture of shared responsibility rather than competition.

Stewardship of financial resources is equally critical to SHIC's success. By leveraging partnerships, maintaining lean operational overhead, and pursuing additional funding opportunities—such as collaborations with the Foundation for Food & Agriculture Research—SHIC extends the impact of its investments. This disciplined approach enables the organization to deliver consistent, high-quality results while providing a strong return on investment to the Pork Checkoff.

"SHIC is an important funding source for the industry. As other funding sources are diminishing, it is important to retain those that remain."

Derald Holtkamp, DVM, MS
Professor
Vet Diagnostic & Production Animal Medicine
Veterinary Preventive Medicine Graduate Programs
Iowa State University

"The idea for creating SHIC came out of the abrupt and serious impact of PEDv entering the United States swine herd. That event exposed gaps in knowledge and process for protecting our swine industry, and made many of us want to organize for more intentional and robust defense of swine health. The need for and critical work done by SHIC is as important today as when it was formed 11 years ago."

Paul Ruen, DVM
President, SHIC Board of Directors

SELECTED ACHIEVEMENTS

1. **Strengthened preparedness and response to emerging diseases through funding key research programs addressing producer-identified priorities**, including investigations of newly emerging diseases in swine, developing tools for detection and mitigation, and enhancing practical biosecurity across all sectors of the pork industry.

2. **Continued engagements with researchers and veterinary advisory groups to coordinate, develop, and enhance domestic and international swine disease reports** that provide key resources for producers, veterinarians, and industry stakeholders to be aware of changing disease status and risks for introduction. **Standardization of pathogen reporting means that US producers can more effectively understand and analyze information on emerging disease trends.**

3. Built an infrastructure that combines active emerging disease monitoring, prioritizing emerging disease threats within the Swine Disease Matrices, and providing a pathway for diagnosticians and veterinarians to detect, identify, and contain emerging pathogens. **This infrastructure facilitates early, rapid, and constant evaluation of potential threats to help producers be prepared for early responses.**

4. **Developed and enhanced standardization of outbreak investigations to identify common hazards for disease introduction and enable collective industry-wide learnings about biosecurity strengths and challenges.** Standardized input and increased ease-of-use through a web-based tool provides a universal industry resource and a model for outbreak investigations in other species impacted by emerging diseases.

5. **Implemented a comprehensive, multi-media communications strategy** that actively shares key outcomes, engages and informs producers, researchers, diagnosticians, practitioners, state, and federal animal health officials, and other industry stakeholders to effectively protect the health of the US swine industry.

STRATEGIC PRIORITIES

The Swine Health Information Center's structure brings together a highly collaborative network of expertise, including three staff members, nine Board of Directors members, and 58 Working Group participants. This framework combines strong governance and strategic decision-making with deep, discipline-specific knowledge drawn from across the pork industry.

SHIC's Board and Working Group members represent a broad cross-section of stakeholders, including veterinary practitioners, allied industry professionals, pork producers, academic institutions, USDA representatives, packers and processors, state animal health officials, and industry associations. Together, these perspectives ensure that SHIC's priorities and actions are informed by both scientific rigor and real-world industry experience.

Through their commitment of time, insight, and leadership, Board and Working Group members play a vital role in advancing SHIC's mission to protect and enhance the health of the US swine herd. Their collective contributions strengthen the organization's ability to anticipate emerging challenges and deliver meaningful, industry-wide impact.

ANNUAL PLAN OF WORK GUIDES ACTIVITIES

Each year, the SHIC board of directors develops and follows a Plan of Work outlining goals and priorities for the Center's activities. Built collaboratively and modified to meet new and emerging needs, this document reflects the Center's mission and collective expertise.

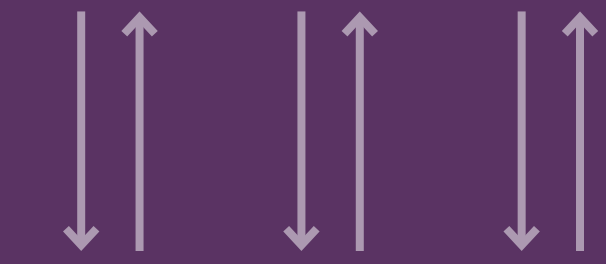
- 2021 PLAN OF WORK
- 2022 PLAN OF WORK
- 2023 PLAN OF WORK
- 2024 PLAN OF WORK
- 2025 PLAN OF WORK
- 2026 PLAN OF WORK

PROGRESS REPORT

Just as SHIC carefully plans its activities for the benefit of the US swine herd, it also reports those efforts in an annual Progress Report. These detailed Reports capture the extraordinary effort of the Center as it continues to efficiently, consistently, and tirelessly works to protect and enhance swine health.

- 2021 PROGRESS REPORT
- 2022 PROGRESS REPORT
- 2023 PROGRESS REPORT
- 2024 PROGRESS REPORT
- 2025 PROGRESS REPORT

Efficient & Effective Communication with Producers and Practitioners



- Monitor Swine Diseases
- Identify Emerging Risks
- Inform Research, Activities

MONITORING AND ANALYSIS WORKING GROUP

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 and Bacterial Disease Matrices. This Working Group 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 producer decision making.

Practitioners
Brandi Burton, DVM
Suidae Health & Production

Joe Connor, DVM
Carthage Veterinary Services

Donald Davidson, DVM, MS
Cooper Farms

Jennifer Hasty, DVM
Smithfield

Clayton Johnson, DVM
Carthage Veterinary Services

Tom Petznick, DVM
ArkCare

Gordon Spronk, DVM
Pipestone

Jonathan Tangen, DVM
The HANOR Company

Paul Yeske, DVM, MS
Swine Vet Center

Allied Industry
Micah Jansen, DVM
Zoetis

Dave Pyburn, DVM
Zoetis

Jerry Torrison, DVM, PhD, DACVPM
Longhorn Vaccines

Pork Producers
Jim Niewold – *Illinois*

Universities
Marcelo Almeida, DVM, MS, PhD - *ISU*

Andreia Arruda, DVM, PhD - *OSU*

Cesar Corzo, DVM, PhD, MS – *UMN*

Daniel Linhares, DVM, MBA, PhD – *ISU*

Rodger Main, DVM, PhD – *ISU*

Angela Pillatzki, DVM, MS, DACVP – *SDSU*

Chris Rademacher, DVM – *ISU*

Michael Rahe, DVM, MPH, PhD – *NCSU*

Albert Rovira, DVM, MS, PhD - *UMN*

USDA
Suelee Robbe Austerman, DVM, MS, PhD
USDA, APHIS, NVSL

Alexandra Buckley, DVM, PhD
USDA, ARS

Lisa Rochette, DVM, MPH
USDA, APHIS, VS

Cole Vanichek, DVM, MPH
USDA, APHIS, CEAH

Packers/Processors
Barry Wiseman, DVM, MS, PhD
Triumph Foods

SAHO
Jeff Kaisand, DVM – *Iowa*

Dennis Summers, DVM - *Ohio*

Industry Associations
Anna Forseth, DVM, MS – *NPPC*

Dusty Oedekoven, DVM, DACVPM – *NPB*

Brent Pepin, DVM, MS – *NPB*

Meredith Petersen, DVM, PhD, MPH – *NPB*

Marisa Rotolo, DVM, PhD – *NPB*

Harry Snelson, DVM – *AASV*

Patrick Webb, DVM – *NPB*

PREPAREDNESS AND RESPONSE WORKING GROUP

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. This includes identifying the appropriate SHIC activities to help provide the information and analysis necessary to support the proportional pork producer and pork industry response to these emerging swine diseases.

Practitioners
Marlin Hoogland, DVM, PhD
Marlin Hoogland Swine Veterinary Services

Brooke Kitting, DVM, PhD
Seaboard Foods

Amelia Naher, DVM, PhD
Tyson

Allied Industry
Joe Fent
PIC

Christa Goodell, DVM, MS, PhD, DACVPM
Boerhinger-Ingelheim

John Hardham, PhD
Zoetis

Dave Pyburn, DVM
Zoetis

Rolf Rauh
Tetracore

Universities
Diego Diel, DVM, MS, PhD – *Cornell*

Gene Erickson, DVM, PhD – *NC VDL (retired)*

Ying Fang, PhD, MS – *U of Illinois*

Jane Hennings, DVM, MS – *SDSU*

Derald Holtkamp, DVM – *ISU*

Giselle Cino Ozuna, DVM, PhD, DACVP

Roman Pogranichniy, DVM, MS, PhD – *KSU*

Montse Torremorell, DVM, PhD – *UMN*

Jeff Zimmerman, DVM, PhD, DACVPM – *ISU*

USDA
Bailey Arruda, DVM, PhD – *USDA APHIS*

Cody Egnor, DVM – *USDA APHIS*

Rachel Tell Sasek, DVM, PhD – *USDA NVSL*

SAHO
Catherine Harris, DVM – *North Carolina*

Jeff Kaisand, DVM – *Iowa*

Kelli Werling, DVM – *Indiana*

Industry Associations
Anna Forseth, DVM, MS – *NPPC*

Dusty Oedekoven, DVM, DACVPM – *NPB*

Brent Pepin, DVM, MS – *NPB*

Meredith Petersen, DVM, PhD, MPH – *NPB*

Marisa Rotolo, DVM, PhD – *NPB*

Harry Snelson, DVM – *AASV*

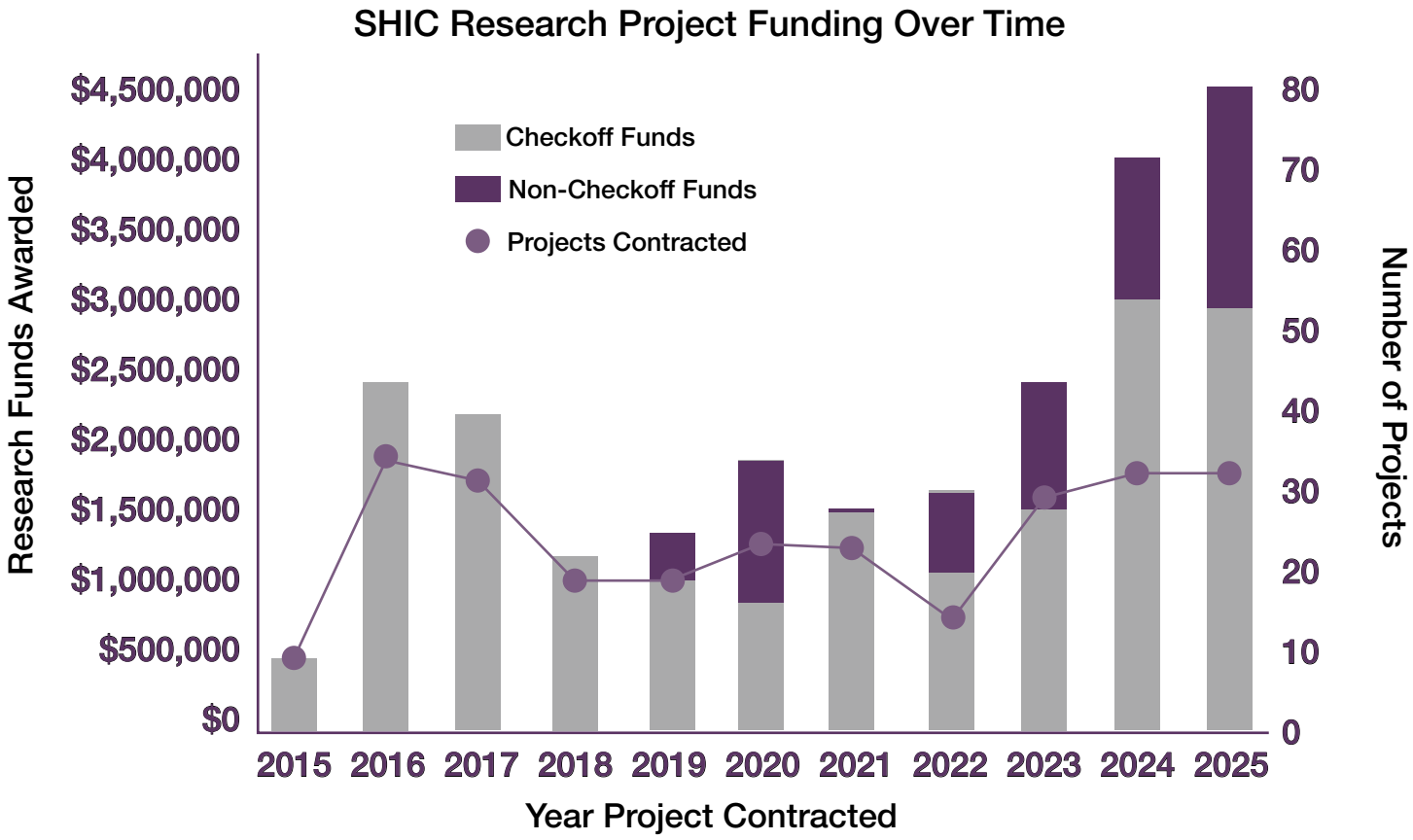
Patrick Webb, DVM – *NPB*

SHIC provides a critical, forward-looking role for the US swine industry by continuously monitoring for emerging disease threats and responding quickly as needs arise. The organization helps ensure the industry is not caught unprepared by identifying risks early and developing practical tools and information that can be rapidly delivered to producers and veterinarians. SHIC prioritizes actions that directly benefit producers at the farm level and communicates through multiple channels to ensure timely, effective outreach across the industry.

Megan Niederwerder DVM, PhD
SHIC Executive Director

SHIC RESEARCH DELIVERABLES

Results of more than 60 SHIC-funded research projects, 2021-2026 to date, as included in Appendix A provide timely information and resources to the swine industry. Presently there are 56 projects funded and still open, all with the promise to advance SHIC's mission. SHIC calls for and supports research on practical topics providing immediately applicable information. The Center keeps researchers on schedule so results are timely and adheres to a structured framework with oversight, ensuring wide acceptance of the process and results. Projects are conducted by a diverse group of researchers from a wide variety of universities and other entities around the world. From evaluating risks via the SHIC Swine Disease Matrix and assessing current diagnostic needs to enable rapid identification of pathogens, to funding the development of tests, SHIC has led the pork industry to an additional level of readiness. This puts the US industry on a different playing field than it was on prior to SHIC's inception.



"SHIC's unique emphasis on rapid-response research funding and effective communication has created a powerful collaborative effort between producers, practitioners, academia and the government. This model has had a significant impact among industry stakeholders but has also demonstrated worldwide the progressive nature of the US industry. Overall, SHIC plays an indispensable role in maintaining and improving the nations' swine herd health and competitiveness. I have certainly enjoyed working with SHIC to provide actionable projects and solutions to the industry. On a side note, other industries around the world are jealous as they wished they had a local SHIC organization."

Cesar Corzo, DVM, MS, PhD
Leman Chair in Swine Health & Productivity
University of Minnesota

SHIC-SUPPORTED ASSETS FOR THE INDUSTRY

Each of these unique assets is supported by SHIC to strengthen and benefit US pork producers.

STANDARDIZED OUTBREAK INVESTIGATION PROGRAM

The Standardized Outbreak Investigation Program is a web-based tool that strengthens swine health biosecurity by streamlining outbreak investigations and turning data into actionable insights. It centralizes diagnostic reports, animal movement data, and other key information while enabling collaboration among veterinarians, production teams, and farm staff. Features include automated site maps, integrated local weather data, customizable data collection forms, and built-in logic to flag potential biosecurity risks. Investigations can be compiled into comprehensive reports, and aggregated data highlights common industry gaps. SOIP helps users identify risks, improve prevention strategies, and enhance herd health. Access is available through a one-time request at soip@iastate.edu.

> Learn more here.

DOMESTIC SWINE DISEASE MONITORING REPORTS

SHIC's domestic disease monitoring reports are the result of the veterinary diagnostic lab data standardization project supported and developed by the Center. The report describes dynamics of disease detection by pathogen over time, specimen, age group, and geographical space. An advisory group has been formed to help give context to the data collected and interpret it. The goal is to aggregate swine diagnostic data from participating reporting VDLs then present it in an intuitive format via shared reports and web dashboards. Near real-time domestic disease reporting by SHIC helps to monitor trends for early and rapid emerging disease identification. Led by Iowa State University, the domestic disease reports currently include data for nine endemic pathogens across seven US VDLs.

> Learn more here.

GLOBAL SWINE DISEASE MONITORING REPORTS

The global swine disease surveillance report system was developed at the University of Minnesota using a private-public-academic partnership including collaboration with the USDA/APHIS Center for Epidemiology and Animal Health. While consistently published monthly, incidents of emerging swine diseases are communicated immediately, as needed. Experts reviewing the information will use their expertise to score the relevance and importance of each incident to the US pork industry. As conditions may change, so will the relevance scoring. Consistent monitoring of swine diseases at the global scale enables SHIC to identify transboundary emerging disease risks and inform the US industry to enhance awareness.

> Learn more here.

MORRISON SWINE HEALTH MONITORING PROJECT

The Morrison Swine Health Monitoring Project is the largest voluntary swine health project in the US. Primary funding for MSHMP comes from SHIC. The overarching goal of this project is to help build capacity for a voluntary and timely response to emerging pathogens. While MSHMP develops tools to help respond in a timely manner to emerging infectious diseases, the project delivers benefits that address current important diseases such as PRRSv and PEDv. Thanks to participants' willingness to share the data, MSHMP can provide aggregate and objective disease occurrence metrics for participants and the industry. MSHMP currently monitors over 35 production systems in 28 states representing more than 3.5 million sows.

> Learn more here.

SWINE DISEASE FACT SHEETS

As one of SHIC's most accessed resources, swine disease fact sheets deliver concise, science-based information on emerging and re-emerging pathogens. Supporting SHIC's mission, more than 38 fact sheets equip the industry with current insights for prevention, preparedness, mitigation, and response. Each fact sheet is grounded in a comprehensive literature review and presents pathogen-specific details, including industry significance, public health considerations, epidemiology, pathogenesis, diagnostic methods, clinical signs, and treatment in swine. Guidance on prevention and control is also included. Focused on a single disease-causing agent, these fact sheets provide a reliable, up-to-date resource to help veterinarians and producers make informed decisions to strengthen herd health management.

> Learn more here.

SHIC COMMUNICATIONS TOOLS

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 newsletters, timely e-blasts, regular articles, news releases, media interviews with Drs. Niederwerder and Becton, social media, SHIC Talk podcast and webinars, weekly animal health updates on WHO Radio (iHeart), and SHIC presentations at industry meetings, and SHIC/AASV webinars. More than 20 webinars and nearly 30 podcasts, the newest SHIC communications streams, have been published, sharing expertise on demand.

SWINE VIRAL DISEASE MATRIX

The Swine Viral Disease Matrix prioritizes endemic and foreign swine viruses and assesses diagnostic capabilities. Originating from a USDA literature review and later refined by the AASV, SHIC assumed oversight in 2015. The Matrix is a living document, regularly updated by a SHIC Working Group. Pathogens are ranked using three criteria: likelihood of introduction into the US or emergence of a domestic disease, economic effects on production post-entry, and potential effects on domestic and international markets. This prioritization helps focus industry resources on the most significant viral disease risks to the US pork industry.

> Learn more here.

SWINE BACTERIAL DISEASE MATRIX

The Swine Bacterial Disease Matrix prioritizes endemic and foreign swine bacteria and assesses diagnostic capabilities. Bacteria are scored based on five criteria: potential public health impact, need for more efficacious intervention tools, diagnostic tools available, impact on pig health, welfare and production sustainability, and market impact. This tool guides a focused look at the US pork industry's highest bacterial risks. The Bacterial Matrix complements the Viral Matrix for comprehensive swine disease prioritization. Both are important resources as part of SHIC's mission to protect and enhance the health of the US swine herd.

> Learn more here.

DIAGNOSTIC FEE SUPPORT

In cases of high morbidity/high mortality, where an etiology is unknown and the identified pathogen is not the likely the cause of the outbreak, there may be a need for further diagnostic work. In these cases, funding support for further diagnostic work may help identify newly introduced or emerging swine diseases. SHIC offers funding for additional diagnostic testing in approved cases; a description of the requirements, submission, and review process can be found here. There are risks of missing an emerging disease if a definitive diagnosis is not pursued diligently. SHIC recognizes resource limitations may be a barrier and developed this program to assist at the production level for the benefit of the national herd.

> Learn more here.

DIAGNOSTIC ASSAY CATALOG

The SHIC Diagnostic Assay Catalog highlights significant industry progress in disease detection and includes many SHIC-funded ELISA and PCR tests designed to protect US herd health. Supporting early detection and rapid response, the catalog provides veterinary diagnosticians with detailed information on available assays, including expert contacts, test availability, and application. It also summarizes the research behind each test and offers technical details such as sample types, and analytical and diagnostic sensitivity and specificity, making it a valuable resource for strengthening diagnostic readiness.

> Learn more here.

SWINE HEALTH INFORMATION ARTICLES

Since inception, SHIC has focused on dissemination of swine health information for the benefit of the US swine industry. Since 2015, over 500 swine health articles have been prepared, reviewed, and shared via SHIC's communications tools as well as distributed to industry media and partners. This includes submission of articles on SHIC research, swine health challenges, emerging disease discovery, and more. Articles are regularly shared with AASV for their weekly enewsletter.

> Learn more here.

SHIC NEWSLETTER

Each month, SHIC sends an enewsletter to more than 3,350 swine industry stakeholders. Content for the newsletter includes swine health articles, links to SHIC webinars and podcasts, as well as Domestic and Global Swine Disease Monitoring Reports, MSHMP reports, and other announcements. With an open rate averaging nearly 40%, this communications vehicle is highly anticipated by US pork producers, veterinarians, academicians, researchers, allied industry, and other stakeholders. SHIC's newsletter has a significant international audience as well.

> Learn more here.

"Working with SHIC has been a great privilege due to the team's positive attitude & vision to help producers by building and expanding strategic information on swine disease intelligence. SHIC's team has always been responsive, attentive, and professional - just what the producers need!"

Daniel Linhares DVM, MBA, PhD
Professor
Director of Graduate Education
Roy A. Schultz Professor in Swine Medicine
Vet Diagnostic & Production Animal Medicine
Veterinary Preventive Medicine Graduate Programs
Iowa State University

SHIC OUTREACH

Since 2015, SHIC has been working to protect and enhance the health of the US swine herd, developing a specialized expertise and access to information. Because SHIC's mission also includes the sharing of information generated through research and gathered through monitoring, the Center frequently engages in industry meetings, events, and conferences. SHIC also serves on several task forces and committees, contributing its unique perspective for the benefit of the industry. Whether the audience is producers, associations, allied industry, veterinarians, universities, federal/state government, or other stakeholders, SHIC engages regularly to share information for the benefit of the US pork industry. The summary presented below is a representative sample from one year of the outreach efforts made by SHIC annually.

2021-2025 OUTREACH SUMMARY	ENGAGEMENTS
Pork Producers Including production systems and producer groups	36
Associations Including state pork producer associations, working groups, committees, teams, and industry conferences	14 engaged 37 contacted
Allied Industry/Animal Health Associations Including, for example, National Grain and Feed Association and United Soybean Board	33
Veterinary Groups Including American Association of Swine Veterinarians Annual Meeting, Iowa Vet Med Association Winter Conference, Iowa State University James D. McKean Swine Disease Conference, and US Animal Health Association Committees	12
Veterinary Diagnostic Labs/Veterinary Colleges/Academicians Including Conference of Research Workers in Animal Disease and the NAPRRS/NC229: International Conference of Swine Viral Diseases	22
USDA/Governmental Agencies Including Ag Research Service, Animal and Plant Health Inspection Service, Center for Epidemiology and Animal Health, National Animal Health Laboratory Network, Customs and Border Protection, Food and Drug Administration Center for Veterinary Medicine, and state animal health officials	35
International Stakeholders Including Canadian producer associations and meetings and the World Organisation for Animal Health (WOAH)	16

SHIC COMMUNICATIONS

To ensure timely, extensive dissemination of swine health information to stakeholders, SHIC employs a diverse mix of communication channels. These include the SHIC website, enewsletter, swine health articles, news releases, media interviews, social media, the SHIC Talk podcast, webinar series, and weekly animal health updates on WHO Radio (iHeart). In addition, SHIC actively engages in industry events, providing stakeholders with direct access to critical information that supports the protection and health of the US swine herd.

Activity on SHIC Website

TOP PAGES ON SHIC WEBSITE WITH NUMBER OF VIEWS: JANUARY 1 – DECEMBER 31, 2025

PAGES	NUMBER OF VISITS
(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

** In GA4, (not set) as seen below is a widespread glitch failing to identify specific webpages.*

WEBSITE IMPACT:
JANUARY 1 – DECEMBER 31, 2025

269,853
EVENTS

95,179
TOTAL PAGE VIEWS

35,659
SEPARATE USERS

0:58
AVERAGE SESSION DURATION

SHIC WEBSITE VISITORS BY COUNTRY (TOP 10)

1. USA - 12,281
2. China - 12,106
3. Singapore - 5,235
4. Canada - 934
5. United Kingdom - 633
6. India - 545
7. Germany - 439
8. Australia - 425
9. The Philippines - 404
10. Brazil - 360

"I joined SHIC to be part of diverse team that does high quality work in an ever-changing industry. SHIC is fast paced and can turn work around at a very high quality and degree."

Rhea Schirm
SHIC Grant and Contract Administrator

SHIC/AASV WEBINARS

The Swine Health Information Center, in collaboration with the American Association of Swine Veterinarians, hosts webinars on timely swine health topics. Presenters, including pork producers, veterinarians, academicians, researchers, and other subject matter experts, provide valuable information and context on relevant swine-industry topics. Attendees are able to ask questions and completed webinars are available for on-demand viewing. Webinars are conducted by the staff at the Swine Medicine Education Center at Iowa State University.

TOPIC	LINK
Senecavirus A as an Emerging Disease Risk for FMDV - March 2026	> view webinar
Emerging Risk of New World Screwworm and Efforts to Prevent Re-introduction into the US - June 2025	> view webinar
FMDV Incursions in EU: Situation Update and Considerations for US Prevention - April 2025	> view webinar
Practical Approaches for Transportation Biosecurity - February 2025	> view webinar
H5N1 Risk to US Swine - November 2024	> view webinar
Mosquito Mitigation - August 2024	> view webinar
H5N1 IAV in Livestock - April 2024	> view webinar
Porcine Circovirus - February 2024	> view webinar
Streptococcus Equi Subsp. Zooepidemicus - December 2023	> view webinar
Porcine Sapovirus Diagnostic Experience - August 2023	> view webinar
Emerging PRRS virus Strains L1C 1-2-4 and Rosalia - February 2023	> view webinar
Undiagnosed Respiratory Disease - October 2022	> view webinar
Australia JEV Outbreak - March 2022	> view webinar
APP Incidence and Management - February 2022	> view webinar
Influenza Management Strategies - December 2021	> view webinar
F18 - Associated Gut Edema Management - September 2021	> view webinar
PRRS Strain 1-4-4 Webinar #2 - July 2021	> view webinar

SHIC TALK PODCAST

The SHIC Talk podcast, established in 2020, is hosted by Barb Determan and features guests on industry chatter topics as well as comments by SHIC's staff. SHIC Talk is available on the SHIC website as well as many of the major podcast hosting platforms. Each episode is under 30 minutes in length and contains information applicable for US pork producers addressing swine health topics.

TOPIC	LISTEN TO PODCAST
SHIC Talk Ep 27 - H5N1 Research Collaboration Update - Drs. Miriam Martin LeValley, FFAR, Megan Niederwerder and Lisa Becton, SHIC - March 2, 2026	> listen here
SHIC Talk Ep 26 Caretaker Motivation for Biosecurity - Dr Megan Niederwerder with Dr. Michael Chetta & Josh Holtkamp, Talent Metrics Consulting - January 6, 2026	> listen here
SHIC Talk Ep 25 Accessing SHIC Information with Associate Director Dr Lisa Becton and host Barb Determan - September 15, 2025	> listen here
SHIC Talk Ep 24 Study Confirms PoAstV4 Causes Respiratory Issues in Piglets with Drs Michael Rahe and Megan Niederwerder - July 21, 2025	> listen here
SHIC Talk Ep 23 SHIC 10th Anniversary with Drs Megan Niederwerder and Lisa Becton, Mark Schwartz, and host Barbara Campbell Determan - June 27, 2025	> listen here
SHIC Talk Ep 22 Assessment of Bioexclusion Practices Across US Swine Farms Drs Silva and Becton 5-6-2025 - May 6, 2025	> listen here
SHIC Talk Ep 21 SHIC/FFAR/NPB Funded H5N1 Research with Drs Niederwerder and Bruno - February 19, 2025	> listen here
SHIC Talk Ep 20 Wean-to-Harvest Biosecurity Projects with Drs Becton, Kettelkamp and Moraes - October 4, 2024	> listen here
SHIC Talk Ep 19 Influenza Discussion with Drs Niederwerder, Canon, Rotolo, Forseth - July 2, 2024	> listen here
SHIC Talk Ep 18 JEV Economic Assessment with Drs Liz Wagstrom and Lisa Becton - April 2, 2024	> listen here
SHICTalk Ep 17 Emerging Disease with Dr Megan Niederwerder - February 2, 2024	> listen here
SHIC Talk Ep 16 ASF Research Results from Vietnam - November 20, 2023	> listen here
SHIC Talk Ep 15 New Standardized Outbreak Investigation Instrument - April 4, 2023	> listen here

SHIC Talk Ep 14 2023 Plan of Work with Drs Sundberg + Niederwerder - January 19, 2023	> listen here
SHIC Talk Ep 13 Wean-to-Harvest Biosecurity Program Drs Niederwerder + Sundberg - September 15, 2022	> listen here
SHIC Talk Ep 12 ASF Update Drs Niederwerder, Snelson, Wagstrom, and Webb - July 27, 2022	> listen here
SHIC Talk Ep 11 - SHIC FAD-Prevention Feed Research - Drs Sundberg & Niederwerder - May 23, 2022	> listen here
SHICTalk Ep 10 Australian JEV Outbreak - April 28, 2022	> listen here
SHIC Talk Ep 9 Biosecurity Dr Clayton Johnson - January 31, 2022	> listen here
SHIC Talk Ep 8 Morbillivirus Drs Arruda and Li - July 14, 2021	> listen here
SHIC Talk Ep 7 SHIC Fact Sheets - May 26, 2021	> listen here

SHIC has been a valuable and reliable institution that has been equally supportive of different research groups, whether from academia or private practice. That fairness and transparency in funding makes the organization trustworthy.

Mariana Kikuti, DVM, MPH, PhD
One Health and Ecosystems Division
University of Minnesota

SHIC FACILITATES RELEVANT, ROBUST SWINE HEALTH RESEARCH

With 254 research projects funded by SHIC since July 2015, the organization's mission on behalf of US pork producers is clear: identify research gaps, fund the projects, and report the results.

SHIC has provided research funds to:

36
Organizations

109
Principal Investigators

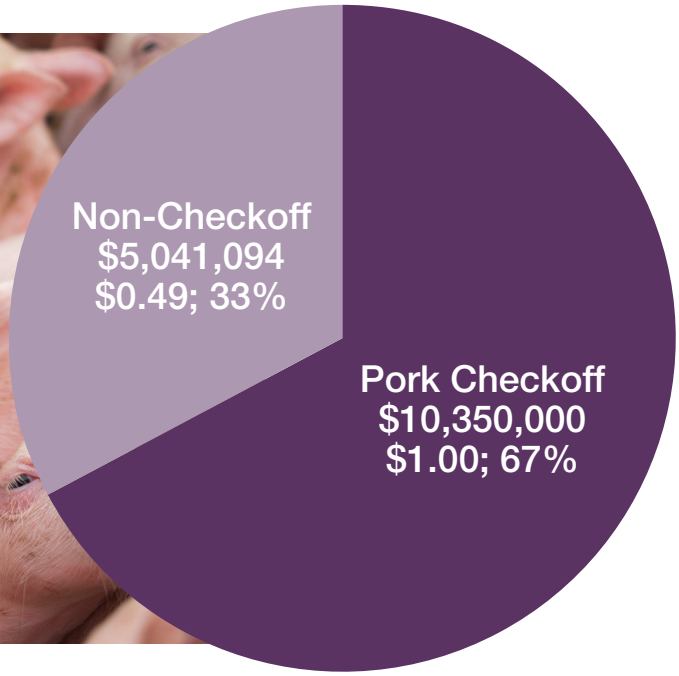
Projects have taken place in:

4
Countries
US, Australia, Canada, Switzerland

18
US States and Districts
Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Maryland, Minnesota, Missouri, Nebraska, New York, North Carolina, Ohio, South Dakota, Texas, Virginia, Washington, D.C.

Funds Awarded to SHIC 2022-2025

Global Disease Monitoring, analysis of swine health data, and targeted research investments



In addition to funding made possible by Pork Checkoff investment, SHIC has leveraged those dollars with strategic partnerships. One key funding partner is the Foundation for Food & Agricultural Research which has collaborated on Japanese encephalitis virus, H5N1 risk to swine, and Wean-to-Harvest Biosecurity Research Program projects. 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.

Whether in response to current swine health concerns or as part of programs designed to provide needed context for emerging disease challenges, all SHIC research meets rigorous standards, undergoes competitive peer review, and analyzed before publication. In collaboration with funding partners, SHIC research programs have included:

1. African swine fever virus research in Vietnam
2. Tongue tips program
3. Wean-to-Harvest Biosecurity Research Program
4. Japanese encephalitis virus program
5. H5N1 risk to swine program
6. SHIC Plan of Work research program

To reference research from SHIC's first five years, scan the code:

> "SHIC has the unique capability to monitor, assess, and react to emerging disease threats. We use a variety of mechanisms such as standardized outbreak investigation programming, global and domestic disease monitoring, and emerging disease research as needed. Our programs can also support extended diagnostic investigations for unidentified cases. SHIC's rapid communication to producers provides information on current knowledge of disease threats, research outcomes, and lessons learned. The swine industry is fortunate to have many organizations that focus on swine health and SHIC is a key component fulfilling the need to constantly monitor new and emerging threats to our industry. "
>
> **Lisa Becton DVM, MS, DACVPM**
> SHIC Associate Director

Prospective Case-control and Case-crossover Study to Determine the Events Associated with the Introduction of PRRSV and PEDV/PDCoV/TGE into Groups of Growing Pigs

Project #: 20-073 | **Principal Investigator:** Derald Holtkamp, DVM, MS | **Institution:** Iowa State University College of Veterinary Medicine | **Posted:** 5/21/2022 | **Keywords:** PRRSV, PEDV, PDCoV, wean-to-market, biosecurity

The swine industry has committed considerable effort to researching and improving biosecurity practices in swine breeding herds; however, attention to biosecurity in the wean-to-market phase of production lags. Events or characteristics of premises that are more frequently associated with introducing PRRSV and porcine enteric coronaviruses in wean-to-market premises are not well understood compared to the swine breeding herds. The objective of this study was to detect the introduction of wild-type PEDV, PDCoV, TGEV, and PRRSV into groups of growing pigs and to associate the timing of the introductions with the frequency and timing of pathogen-carrying agent entry events.

Determining the Pathways for ASF Introduction Into Boar Studs and Risk of ASF Transmission Via Semen Movements During an ASF Outbreak

Project #: 20-077 | **Investigator:** Marie Culhane | **Institution:** University of Minnesota | **Posted:** 11/1/2021 | **Keywords:** African swine fever virus, boar stud, semen, risk assessment

An African Swine Fever (ASF) outbreak in the United States would significantly impact the swine industry. This semi-qualitative risk assessment evaluates the potential spread of ASF virus through the movement of liquid-cooled boar semen from Monitored Premises within, into, and outside Control Areas. Conducted through a public-private partnership, the assessment examines how standard production practices, enhanced biosecurity measures, and targeted mitigations can reduce risk. Once finalized, it will support permitting decisions to enable the safe, timely movement of semen during an outbreak, helping maintain continuity in swine production while minimizing the likelihood of disease transmission.

Evaluate the Diagnostic Performance of Pen-side Tests for ASF Detection

Project #: 20-078 | **Principal Investigator:** Hiep Vu | **Institution:** University of Nebraska-Lincoln | **Posted:** 7/1/2022 | **Keywords:** ASFV, ASF, pen-side test, lateral flow, PCR, early detection

African swine fever (ASF) is a devastating viral disease of domestic pigs with mortality rate that can approach 100%. ASF control mainly relies on strict biosecurity that involves movement restriction, quarantine, and compulsive depopulation of affected herds. Rapid and reliable detection of ASFV infected pigs is critical for the control of ASFV. One desirable property of a diagnostic tests is the capacity to detect viral infection, especially during the incubation time, when the infected animals have not displayed any clinical signs. In this study, we evaluated performance of three pen-side tests for ASFV detection: one PCR test for detection of viral genomic DNA and two lateral flow tests for detection of viral antigens.

Evaluation of the Diagnostic Performance of an ASFV Serum/Oral Fluid Antibody ELISAs Under Field Conditions in Vietnam

Project #: 20-081 | **Investigators:** Luis G. Giménez-Lirola, Neeraja Venkateswaran | **Institution:** Innoceleris LLC. and Tetracore Inc. | **Posted:** 2/24/2023 | **Keywords:** Bayesian latent class analysis, ELISA, PCR, African swine fever, diagnostic test, evauation, Vietnam

In the absence of effective African swine fever virus (ASFV) vaccines, infection prevention and control through diagnostic testing and quarantine is critical. Early detection and differential diagnosis of ASFV infections increase the chances for successful control of this devastating disease. However, the interpretation of the ASF diagnostic results can be complicated due to the complex epidemiology of the disease, and its unspecific and highly variable clinical presentation, i.e., same strain producing a wide range of clinical forms. The objective of this proposal was to evaluate the performance of ASFV serum/oral fluid indirect ELISA (iELISA) (collaborative work between Innoceleris LLC. and Tetracore Inc.) for surveillance and monitoring of ASFV outbreaks in commercial farms in Vietnam.

The Domestic Swine Disease Surveillance: Improvement Sustainability and Providing Monthly Updates Until May of 2021

Project #: 20-103 | **Principal Investigator:** Giovani Trevisan | **Institution:** Iowa State University | **Posted:** 10/8/2021 | **Keywords:** data analysis, surveillance, preparedness, animal health treats, diagnostic data

In 2017 SHIC funded the Domestic Swine Disease Surveillance project, currently housed under the Swine Disease Reporting System (SDRS) initiative. The purpose of this proposal was to keep the Domestic Swine Disease Surveillance program ongoing and further develop a capability to improve sustainability over time. The specific aims included a) keep updated the aggregated database with diagnostic data from the participating laboratories, and provide monthly PDF reports to SHIC as well as keep updated the online interactive dashboards; b) enhance the sustainability of the project by migrating the report-building mechanism to an automated R Markdown technology; c) improve data exchange capability between the Data warehouse project, the Domestic Swine Disease Surveillance program, and other SDRS programs by migrating the data visualization platform to Tableau.

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Investigation of the Risks of Organic Soy Importation and Potential Means of Risk Reduction

Project #: 20-155 | **Principal Investigator:** Chad Paulk | **Institution:** Kansas State University | **Posted:** 11/2/2021 | **Keywords:** soy imports, transboundary shipping, foreign animal disease, organic soybeans, soybean meal

Soy-based products pose a risk to US swine herds due to their potential to harbor and transmit viruses. This project evaluated soy imports overall and from foreign animal disease (FAD)-positive countries to identify high-volume products and trends. Using USITC DataWeb and R, 21 HTS codes were analyzed for import quantities from 2015–2020. In 2019–2020, 78 countries exported soy products to the US, led by Canada, India, and Argentina. Soy oilcake was the top import in 2020, followed by organic soybeans and soy oil. Of these countries, 46 reported FAD cases. Monitoring import sources, shipping methods, and product use could help manage FAD introduction risk.

FAQ

Developing the Swine Health Monitoring Project (SHMP) to Build Capacity and Enable the Swine Health Information Center

Project #: 20-172 | **Principal Investigator:** Cesar A Corzo | **Institution:** University of Minnesota | **Posted:** 2/11/2022 | **Keywords:** monitoring, emerging, PRRS, PEDV, trends

This project advanced four key objectives. First, pathogen trends (PRRSv, PEDv, PDCoV, Senecavirus) were monitored; PRRSv incidence was among the lowest in 11 years, though a new variant altered seasonal patterns, and 40% of outbreaks were linked to manure pumping. Second, PRRSv evolution was tracked, supporting outbreak investigations and monitoring the emerging L1C144 variant. Third, transport data analysis improved traceability and highlighted system connectivity, with some vehicles contacting one-third of farms, emphasizing biosecurity needs. Finally, participation expanded across sow, boar, and growing pig populations, adding 42 boar studs and increasing data integration to strengthen surveillance and disease control efforts.

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A Near-Real Time Global Surveillance System for Swine Diseases

Project #: 20-174 | **Principal Investigator:** Maria Sol Perez Aguirreburualde | **Institution:** University of Minnesota | **Posted:** 12/21/2022 | **Keywords:** swine diseases, global surveillance, hazards, preparedness, awareness

Since 2018, the global spread of African swine fever across Asia, Europe, and the Americas has heightened industry concern, echoing the 2013 PED outbreak that caused major losses. These events underscored the need for near real-time situational awareness to coordinate responses between industry and government. To address this, a public-private-academic partnership developed a system to identify and monitor emerging disease risks. The US swine industry remains vulnerable to foreign pathogens and variants. Monthly hazard reports are shared with veterinarians and government partners to enhance awareness, preparedness, and response. This system supports early detection and strengthens prevention and mitigation strategies against disease introduction.

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Porcine Parvovirus 2 Research Results

Project #: 20-175 | **Principal Investigator:** Dr. Ben Hause and Chun-Ming Lin | **Institution:** South Dakota State University | **Posted:** 6/17/2021 | **Keywords:** porcine parvovirus, porcine respiratory disease complex, tissue microarray, metagenomic sequencing, in situ hybridization

Discovered in 2001, porcine parvovirus 2 (PPV2) is widespread in swine, though its clinical significance remains unclear. This study investigated its role in respiratory disease after high levels were found in a pig with pneumonia. PPV2 was detected in 39% of lungs submitted for diagnostics, with viral load increasing with pig age. It was primarily found in alveolar macrophages in cases of interstitial pneumonia, and viral load correlated with macrophage presence. While co-infections with other respiratory viruses were common, no clear association was observed. Notably, one-third of PPV2-positive lungs had no other pathogens, suggesting PPV2 may contribute directly to respiratory disease.

Understanding the Role of Feed Manufacturing and Delivery Within a Series of Porcine Deltacoronavirus Investigations

Project #: 20-178 | **Principal Investigator:** Cassandra Jones | **Institution:** Kansas State University | **Posted:** 1/7/2022 | **Keywords:** swine, epidemiology, feed safety, porcine delta coronavirus

Two feed mills and three breed-to-wean facilities were investigated after being diagnosed with porcine deltacoronavirus (PDCoV) with initial suspicion that feed manufacture and delivery processes were involved in disease transmission. Both feed mills were audited and environmental samples collected in areas that were deemed high risk for virus contamination. All breed-to-wean facilities had PDCoV detected as would be expected, while the only positive samples for enteric coronaviruses associated with feed mills were feed delivery trucks. These results indicate that feed delivery surfaces can help spread virus during an ongoing disease outbreak and must be considered when determining the outbreak origin.

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Evaluating Methods of Extraction for Pathogen Detection in Feed Ingredients and Environmental Samples from Feed Mills

Project #: 21-065 | **Principal Investigator:** Diego G. Diel | **Institution:** Cornell University | **Posted:** 10/5/2021 | **Keywords:** feed, biosecurity, nucleic acid extraction, PRRSV, SVA, PEDV

Feed biosecurity is critical, as viruses such as PEDV, Senecavirus A, and FMDV can be transmitted through contaminated feed. Effective testing depends on reliable sampling and nucleic acid extraction methods. This study compared three commercial extraction kits (CORE, IndiMag, MVP II) using feed samples spiked with PRRSV, SVA, and PEDV. Results showed the CORE kit outperformed others, producing lower Ct values and higher sensitivity, particularly for PRRSV and SVA, compared to MVP II and IndiMag. These findings highlight the importance of method selection for pathogen detection in feed. However, effective sampling strategies for large volumes of feed remain a key challenge for future research.

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Further Characterization of *Streptococcus Equi Subsp. Zooepidemicus* Isolates From Indiana with Increased Sow Mortality

Project #: 21-074 | **Principal Investigator:** Ganwu Li | **Institution:** Iowa State University | **Posted:** 4/30/2022 | **Keywords:** *Streptococcus equi subspecies zooepidemicus (S. zooepidemicus)*, whole genome sequencing analysis, genomic island, virulence gene, pahtogenicity, epidemiology

High mortality events linked to *Streptococcus equi* subspecies *zooepidemicus* were first reported in US swine in 2019. In early 2021, a severe outbreak in Indiana caused 66 sow deaths within six weeks. Whole genome sequencing showed Indiana isolates were genetically distinct from earlier Ohio and Tennessee strains but closely related to a strain from a horse in Iowa, suggesting multiple virulent strains exist. Comparative genomic analysis identified unique genomic islands (GI-3 and GI-13) in the Indiana isolates as potential diagnostic biomarkers. Differences in key virulence genes were also observed, highlighting the value of genomic tools to improve detection and response to future outbreaks.

View Full Report: As published in peer-reviewed journal October 2023

Evaluation of Technologies, Protocols, Strategies and Ideas for the Biocontainment of Infectious Aerosols in Response to Emerging Disease Outbreaks

Project #: 21-109 | **Principal Investigator:** Montserrat Torremorell | **Institution:** University of Minnesota | **Posted:** 12/1/2022 | **Keywords:** biosecurity, biocontainment, swine, technologies, airborne

Airborne pathogens are among the most difficult to control in agriculture, particularly in swine facilities where ventilation systems can spread infectious particles. A review of mitigation technologies found that fibrous air filtration is the only widely implemented method on farms. Other technologies, such as electrostatic precipitators and ultraviolet-C systems, are effective in industrial and medical settings but remain underused in livestock production despite their potential. Emerging technologies are still in early development and not yet scalable for agricultural use. Farm-level practices like windbreaks, fan coverings, and herd management strategies may help reduce spread, but their effectiveness in limiting airborne pathogen emissions requires further evaluation.

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Assessment of Temperature and Time to Inactivate PRRSV and PEDV on Contaminated Surfaces Commonly Found at Entry Room in Swine Farms

Project #: 21-113 | **Principal Investigator:** Gustavo Silva, DVM, MS, PhD | **Institution:** Iowa State University | **Posted:** 9/15/2022 | **Keywords:** PRRSV, PEDV, biosecurity, temperature, time

Decontamination of fomites coming into sow farms using foggers at supply entry rooms is commonly used to mitigate associated risks. Although this practice has been established, recent research has begun to question the effect of this method to inactivate pathogens, especially in complex situations where pathogens may be shielded by organic material or blind spots (Kettelkamp et al., 2019; Leuck et al., 2020). Objective: The primary objective of this study is to evaluate the efficacy of temperature and time for inactivating porcine reproductive and respiratory syndrome virus (PRRSV) and porcine epidemic diarrhea virus (PEDV) on experimentally contaminated surfaces commonly found at supply entry rooms in swine farms.

Virus Isolation and Epidemiological Study of a Novel Porcine Morbillivirus as a Putative Cause of Fetal Death and Encephalitis

Project #: 21-114 | **Principal Investigator:** Ganwu Li | **Institution:** Iowa State University | **Posted:** 5/25/2022 | **Keywords:** porcine mobillivirus, virus isolation, real-time RT-PCR, virus isolation, epidemiology

Paramyxoviruses infecting swine include several known viruses, though none belong to the genus *Morbillivirus*. In 2020, diagnostic investigation of porcine fetuses from Mexico identified a novel *Morbillivirus*, named Porcine Morbillivirus (PoMV), after common pathogens were ruled out. Given that related viruses are highly contagious and cause severe disease, assessing PoMV risk is critical. Testing of 450 US swine samples found no evidence of PoMV presence. Efforts to isolate the virus in multiple cell lines were unsuccessful, limiting further study. Ongoing research is needed to determine PoMV prevalence, pathogenicity, and potential impact on swine health and production.

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Improving the Efficacy of Extended Storage for Reducing the Risk of Viral-Contaminated Feed through a Better Understanding of the Effective Ambient Temperature

Project #: 21-115 | **Principal Investigator:** Scott Dee | **Institution:** Pipestone Research | **Posted:** /30/2022 | **Keywords:** swine, feed, soybean meal, extended storage, viral diseases, temperature

Viruses of veterinary concern—such as African swine fever, foot-and-mouth disease, pseudorabies, and classical swine fever—can persist in plant-based feed ingredients imported into North America. To reduce risk, high-risk materials like oilseed meals are stored under controlled conditions before use. This study shows that storing feed for 30 days at 23.9°C significantly reduces viral infectivity in ingredients such as soybean meal. Unlike earlier guidance based on mathematical models, these findings come from controlled studies using live pathogens under realistic conditions. This provides scientifically grounded recommendations for farmers, feed operators, veterinarians, regulators, and industry leaders to better manage feed safety and strengthen Responsible Imports protocols.

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The Spillover Risk of Pathogenic Bacteria from Wild Mammals into Pigs

Project #: 21-116 | **Principal Investigator:** John M. Drake | **Institution:** University of Georgia | **Posted:** 9/15/2022 | **Keywords:** bacterial associations, BRT machine learning, spillover risk, subject matter experts, Sus scrofa domesticus, survey

A collaboration between SHIC and the University of Georgia's CEID assessed the risk of bacterial spillover from wild North American mammals into US swine. An initial data-driven scan identified 102 bacterial species across 127 wildlife hosts with potential to infect pigs, assigning scores for spillover likelihood and classifying them as known or novel. A second phase used expert surveys to rank high-risk threats. Five industry experts identified 16 bacteria of greatest concern, including four not yet known to infect swine: *Anaplasma bovis, Clostridium botulinum, Klebsiella pneumoniae*, and *Yersinia pestis*. Additionally, seven species showed high antimicrobial resistance risk, and five posed significant human outbreak potential.

Investigating Different Methods for Decontaminating Feed Manufacturing Facilities

Project #: 21-133 | **Principal Investigator:** Chad Paulk | **Institution:** Kansas State University | **Posted:** 12/19/2023 | **Keywords:** chlorine dioxide, feed mill decontamination, flushing, formaldehyde, riral contamination, Paulk

This project evaluated flushing, thermal processing, and decontamination methods for feed mills contaminated with PEDV, PRRSV, and SVV1. Formaldehyde flushes were most effective at reducing viral loads, though RNA remained detectable. Bioassays showed PEDV and SVV1 were non-infectious post-treatment, while PRRSV remained infectious even when PCR-negative, indicating detection limits and need for further study. Thermal processing reduced RNA levels but did not fully inactivate PRRSV, suggesting higher temperatures may be necessary. Complete facility decontamination—combining cleaning, chemical disinfection, and sustained heat—was the only method eliminating detectable RNA for all viruses. Overall, mitigation strategies reduced viral presence, but their impact on infectivity, especially for PRRSV, requires further investigation.

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Comprehensive Identification and Interpretation of PCV3 Diagnostic Features Applied Toward a Case Definition

Project #: 21-139 | **Principal Investigator:** Pablo Pineyro | **Co-investigator:** Marcelo Almeida | **Institution:** Iowa State University | **Posted:** 8/28/2023

Porcine circovirus type 3, first identified in 2016, is now detected globally in pigs of all ages and linked to conditions such as reproductive failure, dermatitis, inflammation, and respiratory or enteric disease. However, its causal role in many cases remains unclear, as it is also found in healthy animals. Diagnosis typically relies on PCR, sometimes supported by in situ hybridization. This study highlights the need for clearer case definitions by correlating PCR cycle threshold values with disease. Findings show that Ct values below 30 are associated with lesions of multisystemic inflammation, confirmed by histopathology and hybridization, improving diagnostic accuracy and supporting better disease investigation and control.

Expand the Domestic Swine Disease Surveillance Laboratory Networking and Pilot Monitoring of Negative Results for Early Detection of Emerging or Re-emerging Animal Health Threats

Project #: 22-002 | **Principal Investigators:** Giovani Trevisan & Daniel Linhares | **Institution:** Iowa State University | **Posted:** 7/9/2024 | **Keywords:** data analysis, surveillance, preparedness, animal health threats, diagnostic

This US retrospective study assessed PCR-negative results for endemic enteric coronaviruses as an early warning system for emerging swine diseases with similar clinical signs. Data from six diagnostic labs were analyzed, focusing on TGEV-negative submissions prior to PEDV emergence (2013) and TGEV/PEDV-negative data before PDCoV (2014). Time-series modeling (SARIMA) and anomaly detection methods (CUSUM, EWMA, Farrington) identified unusual increases in negative results. These methods generated alerts four to 17 weeks before PEDV and PDCoV emergence with low false alarm rates. No alerts appeared in 2023 data. Findings demonstrate that negative-based monitoring can complement existing surveillance for early detection of emerging swine pathogens.

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Development of DNA Aptamer-nanopore Sensors for Direct Detection of Infectious Swine Viruses

Project #: 22-003 | **Principal Investigator:** Yi Lu | **Institution:** University of Texas at Austin | **Posted:** 2/14/25 | **Keywords:** aptamers, PRRSV, PEDV, sensors, detection

Swine viral pathogens such as PRRSV and PEDV cause major economic losses, highlighting the need for rapid, on-site diagnostics. Current methods often require sample preparation, specialized equipment, and trained personnel, or cannot distinguish infectious from noninfectious virus. This study presents a novel detection approach using DNA aptamers to directly identify intact, infectious viruses without sample pretreatment. The aptamers selectively bind infectious PRRSV and PEDV, distinguishing them from inactivated virus. Integrated into a nanopore system, this binding generates measurable electrochemical signals, enabling detection and quantification with a handheld device. This technology offers a rapid, field-ready tool to improve outbreak response and management in the swine industry.

The role of vehicle movement in swine disease dissemination: Novel method accounting for pathogen stability and vehicle cleaning effectiveness uncertainties

Project #: 22-059 | **Principal Investigator:** Gustavo Machado | **Institution:** North Carolina State University | **Posted:** 1/1/25 | **Keywords:** Truck, transport, disease modeling, contact trace, indirect contact, truck cleaning, and disinfection

Jason A. Galvis[1] and Gustavo Machado[1]

[1]Department of Population Health and Pathobiology, College of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA.

Disease transmission via farm-to-farm transportation vehicles is still to be fully appreciated as a significant route of disease dissemination; however, it has slowly sounded the alarm for swine and systems. While transmission by vehicle movements has been associated with outbreaks such as foot and mouth disease (FMD) and African swine fever (ASF), it is still unknown how these movements represent a risk for disease transmission. This is due to the absence of information about pathogen viability on vehicle surfaces and the efficacy of cleaning and disinfection to eliminate such pathogens.

Actinobacillus Pleuropneumoniae Serotype 15 Outbreak: 1 – Determination of Sow Farm Status; 2 – Post-Outbreak Dynamics and Persistence; Environmental Stability

Project #: 22-065 | **Principal Investigators:** Marcelo Almeida, Alyona Michael | **Institution:** Iowa State University | **Posted:** 2/5/2024 | **Keywords:** App, surveillance, oral fluids, nasal swabs, tonsil scrapings, survivability

Following a 2021–22 outbreak of Actinobacillus pleuropneumoniae (App) serotype 15 in central Iowa, three investigations examined its unusual spread. Serology in 19 sow farms found most negative, suggesting lateral introduction into finishing sites. Post-outbreak sampling showed tonsil scrapings had the highest PCR detection, nasal swabs were limited to early detection, and oral fluids identified positive pens but missed some infected pigs; environmental samples were sporadically positive. Survival studies found colder temperatures favored persistence, while warmer conditions reduced it. The bacteria survived best in nutrient-rich media and on porous surfaces like concrete. These findings improve understanding of App ecology and inform diagnostics, surveillance, and biosecurity strategies.

Revisiting the Role of Swine (domestic and feral) in the Transmission of the Japanese Encephalitis Virus

Project #: 22-070 | **Principal Investigator:** Dr. Natalia Cernicchiaro | **Institution:** Kansas State University | **Posted:** 7/14/2023 | **Keywords:** swine, Japanese encephalitis, rapid systemic review, transmission

The United States is considered vulnerable to the introduction of Japanese encephalitis virus due to multiple risk factors: competent mosquito vectors (e.g., *Culex and Aedes*), susceptible avian hosts, extensive global travel and trade, and large swine populations that can amplify the virus. Environmental and climatic conditions in parts of the US also resemble regions where JEV is endemic, yet no active national surveillance program is in place. The virus has expanded geographically in recent decades, including the emergence of a new genotype in Australia. This ongoing risk highlights the need for improved understanding of JEV biology, transmission dynamics, and environmental conditions that support its introduction and establishment.

Development of a Single, Rapid Workflow for Simultaneous Detection of >50 Swine Viruses from Field Samples

Project #: 22-071 | **Principal Investigator:** Dr. Monteserrat Torremorell | **Institution:** University of Minnesota | **Posted:** 9/12/2023 | **Keywords:** whole-genome, long-read sequence, viruses, target enrichment

Viral co-infections are common in swine farms, worsening disease outcomes, reducing productivity, and promoting the emergence of new variants due to high mutation rates. Despite their impact, they remain understudied because of limitations in sequencing technologies. This study introduces “TELSVirus” (Target-Enriched Long-read Sequencing of Virus), a workflow enabling real-time detection and genomic characterization of multiple viruses from a single sample within ~24 hours. Applied to porcine oral fluids, it identified diverse co-circulating viruses, including bocavirus, sapelovirus, astrovirus, PRRSV, influenza A, and rotavirus—often in the same sample. TELSVirus demonstrated sensitivity comparable to qPCR while providing richer genomic data, supporting improved surveillance and understanding of viral dynamics in swine populations.

Reassessing the Risk of Japanese Encephalitis Introduction to and Transmission in the United States

Project #: 22-072 | **Principal Investigator:** Dr. Natalia Cernicchiaro | **Institution:** Kansas State University | **Posted:** 3/22/2024 | **Keywords:** Japanese encephalitis, JE, JEV, risk assessment, swine

Japanese encephalitis virus, which causes encephalitis in humans and reproductive and neurological disease in pigs, has recently expanded into new regions, including Australia. This study aims to strengthen awareness and preparedness for a potential US incursion, which could affect public health, animal health, and the food supply. The researchers updated a 2018 qualitative risk assessment using new data, including recent outbreaks, revised assumptions, and regional risk factors. The analysis evaluates how JEV could be introduced, transmitted, established, and spread within the US. The findings emphasize the importance of improved surveillance, risk modeling, and preparedness strategies to manage and mitigate the threat effectively.

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Developing the Morrison Swine Health and Monitoring Project (MSHMP) to Build Capacity and Enable the Swine Health Information Center

Project #: 22-094 | **Principal Investigator:** Dr. Cesar A Corzo | I**nstitution:** University of Minnesota | **Posted:** 3/20/2024 | **Keywords:** Morrison Swine Health Monitoring Project, MSHMP, disease monitoring, PRRS, PEDV, PDCoV, Senecavirus

This project monitored key swine pathogens (PRRSV, PEDV, PDCoV, Senecavirus), which followed expected patterns. A correlation between PRRS positivity in breeding and growing pigs was observed, though conclusions are limited by lack of spatial and viral data. Mortality management methods showed no clear advantage. PEDV-infected herds during epidemic phases took longer to stabilize (~9 weeks) than endemic cases. An emerging PRRS strain (L1C-124) spread but was less impactful than others. Industry participation expanded, adding systems representing 1,274 sow farms and over 12 million pig spaces. A public MSHMP website launched in 2023 enhances data sharing, global access, and collaboration across the swine industry.

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Ongoing Management and Administration of the Rapid Response Program for Epidemiological Investigations

Project #: 23-044 | **Principal Investigator:** Dr. Derald Holtkamp | **Institution:** Iowa State University | **Posted:** 8/20/2024 | **Keywords:** Standardized Outbreak Investigation Program, emerging disease, transboundary disease, Rapid Response Rrogram, epidemiology

To protect the US swine industry from costly emerging and transboundary diseases, rapid detection and response are critical. Following the 2013 introduction of PEDV, the Swine Health Information Center funded Iowa State University to launch the Rapid Response to Emerging Disease Program (RRP) in 2016. The program established a nationwide Rapid Response Team (RRT) of veterinarians, epidemiologists, and state and federal animal health officials. These trained experts are prepared to deploy within 24 hours to investigate outbreaks. Standardized methods, tools, and reporting systems were developed to ensure consistent, thorough epidemiological investigations, helping producers and officials quickly identify, control, and limit disease spread.

Development and Evaluation of an Electrostatic Precipitator (ESP) Prototype to Mitigate Airborne Spread of Pathogens Under Farm Conditions

Project #: 23-009 | **Principal Investigator:** Montserrat Torremorell | **Institution:** University of Minnesota | **Posted:** 10/15/25 | **Keywords:** Biosecurity, aerosols, electrostatic precipitator, air filtration, transmission, biocontainment

Airborne diseases in food animals threaten sustainability and food security. This study evaluated a commercial electrostatic precipitator (ESP) as an alternative to air filtration in swine facilities. The ESP achieved particle removal efficiencies comparable to or slightly exceeding a MERV-16 filter, exceeding 99% for particles >1 µm, with temperature affecting performance for smaller particles. It also removed over 99% of airborne PRRSV. An economic analysis showed a higher net present value over 15 years, adding about $0.25 per weaned pig compared to filtration. While highly effective, broader adoption will require improved scalability, farm-specific design, and reduced installation and maintenance costs.

Ensuring Site and Transportation Biosecurity Using Bioluminescence

Project #: 23-018 | **Principal Investigator:** Dustin Boler, Bailey Harsh | **Institution:** Carthage Innovative Swine Solutions, University of Illinois | **Posted:** 11/14/2023 | **Keywords:** Truck wash biosecurity, ATP bioluminescence, disease monitoring, surveillance

This study evaluated two adenosine triphosphate (ATP) instruments as rapid tools to assess cleanliness in livestock trailers. ATP bioluminescence, which detects cellular energy from residual organic material, was compared to aerobic plate counts to measure microbial contamination. Results showed that ATP readings (relative light units, RLU) correlated with bacterial levels, indicating that higher RLU values reflect lower cleanliness. Unlike visual inspection, which may miss microscopic contaminants and occurs after drying costs are incurred, ATP testing offers a quick, objective measure. The study also identified high-risk contamination areas and determined optimal sampling locations, supporting ATP monitoring as a practical alternative for improving biosecurity and reducing disease transmission risk.

Evaluation of Deployable Fan Coverings for Biocontainment of Airborne Swine Pathogens

Project #: SHIC 23-019 | **Principal Investigators:** Erin Kettelkamp, DVM | **Institution:** Swine Vet Center | **Posted:** 6/14/2024 | **Keywords:** aerosol, biocontainment, biosecurity, fan covering, PRRS, swine

The primary objective of this study was to evaluate the effectiveness of various rapidly deployable exhaust fan cover materials in reducing airborne particles that can carry swine respiratory pathogens. These pathogens include viruses such as PRRSv (Porcine Reproductive and Respiratory Syndrome virus), PEDv (Porcine Epidemic Diarrhea virus), and IAV (Influenza A virus). By identifying effective and rapidly deployable fan coverings, we aim to enhance biosecurity measures and reduce the spread of these diseases within and between swine farms.

Mitigating Between-farm Disease Transmission Through Simulating Vehicle Rerouting and Enhanced Cleaning and Disinfection Protocols

Project #: 23-028 | **Principal Investigator:** Gustavo Machado | **Institution:** North Carolina State University | **Posted:** 1/10/25 | **Keywords:** Trucks, deliveries, transportation, prevention strategies, and biosecurity

Substantial evidence indicates that vehicle movement is closely linked to the spread of diseases among animal production sites. To mitigate these transmission events, vehicles undergo thorough cleaning and disinfection (C&D) procedures. However, C&D effectiveness remains an open-ended question, while the frequency of C&D between farm visits is unknown. Consequently, relying solely on vehicle C&D is insufficient to control the spread of diseases, and supplementary strategies are necessary to prevent disease transmission events via 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.

Wide-industry Assessment of Bioexclusion Practices in Wean-to-harvest Sites, and Development and Validation of a Rapid risk Assessment Bioexclusion Tool

Project #: 23-029 | **Principal Investigator:** Gustavo Silva | **Institution:** Iowa State University | **Posted:** 3/11/2025 | **Keywords:** Biosecurity, wean-to-harvest, PRRSV, PEDV, swine

The main objectives of this proposal were: 1) to assess the current bioexclusion practices used at wean-to-harvest sites across the U.S., 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.

Assessment of Manure Pumping Effects on Disease Onset in Wean-to-Finish Pig Sites

Project #: 23-031 | **Principal Investigators:** Daniel C. L. Linhares; Gustavo de Sousa e Silva | **Institution:** Iowa State University College of Veterinary Medicine | **Posted:** 7/1/2024 | **Keywords:** Manure; Manure pumping; PRRS; PEDV; Wean-to-finish; Bioexclusion; Biocontainment

Due to its nutritional and fertilizing value for soil, pig manure is spread in fields surrounding pig sites for the following grain crop season. However, manure agitation and spreading pose risks to animal health due to the gases and pathogens that may recirculate within the site and to surrounding sites. Therefore, the goal of this project was to estimate the impact of manure pumping practices on PRRSV and PEDV health outcomes in wean-to-finish (W2F) pig populations. A retrospective and prospective studies were conducted separately.

Evaluating the Effects of Alternative Livestock Trailer Cleaning Methodologies on the Relative Risks of Introducing Diseases (PEDV) to Farm Sites When Loading-out Hogs to Terminal Points of Concentration

Project #: 23-036 | **Principal Investigator:** Rodger Main, DVM, PhD | **Institution:** Iowa State University | **Posted:** 1/10/25 | **Keywords:** PRRSV, PEDV, Biosecurity, Temperature, Time

Since its introduction in 2013, PEDV remains an important disease to the US swine industry, necessitating robust biosecurity measures. This study aimed to evaluate various cleaning protocols—Positive Control (no cleaning), Dry Clean – Scrape and Bake (TADD), Volume Hose Wash and Disinfect, Power Wash and Disinfect, and Negative Control—to determine their efficacy in mitigating PEDV spread from a contaminated trailer to the farm site area after simulating foot traffic between these two areas.

Creating A Truck Automated Sanitation Classification (TASC) Platform Using Multiple Data Recording Approaches Currently Used in the Swine Industry – A Pilot and Scalable Study

Project #: 23-037 | **Principal Investigators:** Daniel Linhares & Edison Magalhães | **Institution:** Iowa State University | **Posted:** 6/11/2024 | **Keywords:** market pigs; trailer sanitation; automated; data integration; compliance verification

The pilot project aimed to address the challenge of documenting truck washes between visits to slaughterhouses and return to swine barns, a critical aspect of market haul sanitation in the swine industry. The primary goal was to assess three different methods for automatically recording truck wash events and market pig deliveries at packing plants, thus, enabling producers to verify trailer cleanliness compliance. Furthermore, automated reports were produced to inform the decision-makers on the status of the trailers, and identify the non-compliance events (i.e., trailers not washed between loads to the packing plant).

Establish and Validate RT-rtPCR for Detecting Japanese Encephalitis Virus in Porcine Samples

Project #: 23-045 | **Principal Investigator:** Dr. Rahul K. Nelli | **Institution:** Iowa State University | **Posted:** 3/20/2024 | **Keywords:** Japanese encephalitis virus, JEV, RT rt-PCR, JEV detection

Japanese encephalitis virus threatens both swine health and public health and has recently expanded beyond endemic regions, including outbreaks in Australia. Early detection is critical to prevent spread in the United States. This project developed a reverse transcription real-time PCR assay capable of rapidly detecting JEV, including all five genotypes (G1–G5). Compared to existing methods, the new assay demonstrated higher specificity, sensitivity, and a low detection limit, enabling the identification of small viral quantities. Ongoing validation with clinical samples, including collaboration with Australia, supports its reliability. This tool offers an effective approach for surveillance, early detection, and prevention of JEV outbreaks.

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Comparison of a Rail-Mounted Automated Power Washer to a Commercial Manual Power Washing Crew in Terms of Cleanliness, Manpower, and Water Usage Efficiency

Project #: 23-046 | **Principal Investigator:** Francisco Cabezon | **Institution:** Pipestone Research | **Posted:** 5/16/2024 | **Keywords:** Power-washing, robotics, cleanliness, water usage, labor

A 2,400-head wean-to-finish barn with two rooms of 1,200-head capacity, each containing 44 pens, was used in the study. A group of nursery pigs were placed in the barn and raised until harvest. The barn was then cleaned, with one room washed using traditional manual power washer methods by a contract service, and the other room cleaned using a railed robotic power washer prototype, followed up with a manual power wash to remove any additional manure. The trial consisted of two washing events (August 2023 and February 2024) to compare the efficacy and efficiency of an automated power washer to a manned power-washing crew, based on cleaning time, manpower time, water usage, and cleanliness rates.

Development of an Effective and Practical Biosecurity Entrance

Project #: 23-049 | **Principal Investigator:** Teng Lim | **Institution:** University of Missouri | **Posted:** 10/14/25 | **Keywords:** Pathogen Reduction, Danish entry system, Shower in-out, Electrolyzed water, Biosecurity Protocol

This study evaluated biosecurity interventions—air showers (AS), disinfectant spraying (DS), fogging (DF), and their combinations—on reducing bacterial and viral contamination on clothing, skin, and hair. Tests included Staphylococcus aureus, E. coli, canine distemper virus, and feline calicivirus. Single methods were largely ineffective, but combining approaches with the Danish Entry System (DES) or hair nets (HN) significantly improved results. Bacterial reductions reached 3–4 logs with DES or HN, while full showering remained the most effective, especially for hair. A modified DES using hand sanitizer eliminated bacteria on hands. For viruses, only DES- or HN-based combinations achieved meaningful reductions, supporting multi-step protocols as practical alternatives when full showering is not feasible.

Determining the Economical and Epidemiological Benefit of Cleaning and Disinfecting Market Haul Trailers within the US Swine Industry

Project #: 23-051 | **Principal Investigators:** James F. Lowe | **Institution:** Lowe Consulting Ltd. | **Posted:** 12/16/24 | **Keywords:** Swine biosecurity, Trailer decontamination, Disease transmission, Epidemiological modeling, Cost-benefit analysis

The primary goal of this study was to determine the most effective and cost-efficient way to clean market haul trailers that transport pigs between wean-to-finish farms and slaughter facilities. We aimed to understand how different levels of trailer washing impact the spread of Porcine Epidemic Diarrhea virus (PEDv) and to find the best practices that balance disease control and economic feasibility.

Self-vaccinating Pigs to Save Labor, Improve Efficiency and Enhance Biosecurity: Mycoplasma hyopneumoniae, Influenza A, Erysipelothrix rhusiopathiae, Lawsonia intracellularis

Project #: 23-052 | **Principal Investigator:** John J McGlone | **Institution:** Texas Tech University | **Posted:** 2/19/25 | **Keywords:** Pigs, Vaccination, Environmental Enrichment, Erysipelas, Ileitis

Environmental enrichment (EE) devices are increasingly required, and multi-purpose designs may improve adoption. This study developed an EE device that allows pigs to self-administer liquids by leveraging natural rooting and play behaviors. A pilot showed pigs preferred the device when treated with maternal pheromones. The system was tested for self-delivery of vaccines against four common diseases. Results showed effective immune responses for Erysipelas and Ileitis, with strong antibody production. However, Influenza and Mycoplasma hyopneumoniae vaccines did not generate adequate responses. EE-based self-vaccination offers a promising approach to reduce labor, eliminate needles, and enable pen-level delivery of vaccines and other health products.

Glaesserella australis: Identification and detection of this potential swine pathogen in clinical samples

Project #: 23-053 | **Principal Investigator:** Nubia Resende de Macedo | **Institution:** Iowa State University | **Posted:** 12/12/24 | **Keywords:** Glaesserella australis, Diagnostics, Swine, Novel, Pathogen

Glaesserella australis, a recently identified Gram-negative bacterium first isolated in Australia (2018) and later in Canada (2023), may have been historically misdiagnosed due to clinical similarities with *Actinobacillus pleuropneumoniae*. To improve detection, the ISU Veterinary Diagnostic Laboratory incorporated a reference strain into sequencing workflows and expanded its MALDI-TOF database for real-time screening. Additional diagnostic tools, including RT-PCR and a developing in situ hybridization assay, support more accurate identification in clinical samples. Despite ongoing screening since 2024, no US cases have been detected. These advances enhance surveillance capacity and will improve understanding of the pathogen's prevalence and disease impact.

An Exploratory Study to Assess Whether Tongue Tip Fluids Could be a Tool in Growing Pigs

Project #: 23-063 | **Principal Investigator:** Cesar A. Corzo | **Institution:** University of Minnesota | **Posted:** 2/19/25 | **Keywords:** Post-mortem, tongue tip, growing pigs, alternative specimens

Post-weaning health monitoring in US swine production relies heavily on oral fluids, as blood collection is labor-intensive and requires skilled personnel. This study evaluated tongue tip fluids (TTF), an easy-to-collect post-mortem sample, as a practical alternative. Researchers assessed the sensitivity and specificity of TTF alongside intracardiac blood, oral/nasal swabs, rectal swabs, and lymph nodes for detecting PRRSV in growing pigs. The study also examined detection of PCV2, PCV3, PPV1, PPV2, *Lawsonia intracellularis*, and influenza A virus across sample types. Results support TTF as a promising, efficient tool for disease surveillance, offering practical benefits for improving post-weaning health monitoring and understanding disease dynamics.

Optimizing Tongue-tip Sampling Protocols for Enhanced PRRS Viral Isolation

Project #: 23-067 SHIC | **Principal Investigator:** Onyekachukwu Henry Osemeke | **Institution:** Iowa State University | **Posted:** 9/27/2024 | **Keywords:** PRRSV, perinatal, mortalities, tongue, virus isolation, swine

This study aimed to assess different sample collection protocols and cell lines for successfully isolating live porcine reproductive and respiratory syndrome virus (PRRSV) from perinatal piglet mortalities (stillborn piglets and piglets that died within 24 hours of birth) using tongue tissue fluids (TF).

Optimizing PRRSV Surveillance: A Study on the Sensitivity of Tongue Tip Testing Protocols in Sow Herds

Project #: 23-068 | **Principal Investigator:** Igor Paploski and Cesar Corzo | **Institution:** University of Minnesota | **Posted:** 4/11/25 | **Keywords:** epidemiology, tongue tips, disease testing, surveillance, PRRSV, swine, infectious diseases

Porcine reproductive and respiratory syndrome virus (PRRSV) causes major economic losses in the US, with frequent outbreaks in breeding herds. Tongue tips from dead piglets offer a practical, welfare-friendly sample for monitoring PRRSV during herd stabilization, but optimal processing methods are needed. This study evaluated different protocols across seven farms. Results showed tongue tip fluids were more sensitive than tissue homogenates, and freezing samples improved detection (lower Ct values) compared to refrigeration. Pooling reduced accuracy but remained useful depending on objectives. Ct values increased with delays in submission, emphasizing timely handling. These findings highlight how processing, storage, and testing decisions affect PRRSV detection using tongue tip samples.

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The Use of Tongue Tip Fluids to Monitor Viral Pathogens in the Nursery and Grow-finish Phases of Swine Production

Project #: 23-070 | **Principal Investigator:** Gustavo De Sousa E Silva | **Institution:** Iowa State University | **Posted:** 1/10/25 | **Keywords:** PRRSV, perinatal, mortalities, tongue, virus isolation, swine

This study aimed to: 1) Compare the detection of the Porcine reproductive and respiratory syndrome virus (PRRSV) and Influenza A virus (IAV) using reverse transcription-quantitative polymerase chain reaction (RT-qPCR) in weekly oral fluids (OF) and TF from wean-to-market pigs, 2) Assess the likelihood of successful PRRSV ORF-5 sequencing from these two sample types (OF vs. TF), 3) Assess the effect of pooling TF on the RT-qPCR detection of PRRSV.

Assessment of Caretaker Motivation and Resources in the Wean-to-Market Phase of Production

Project #: 23-071 | **Principal Investigator:** Dr. Michael Chetta | **Institution:** Talent Metrics Consulting | **Posted:** 5/16/2024 | **Keywords:** safety, biosecurity, biocontainment, wean-to-market, caretaker, mitigation, prevention, preparedness, compliance

The Swine Health Information Center has identified that caretaker motivation related to compliance with biosecurity behaviors is a priority that needs to be better understood. An exploratory study was conducted to establish a baseline for worker motivation and identify possible issues within the industry that could be impacting compliance with biosecurity. This research and measurement of motivation are the first of their kind in the industry and set the groundwork for better understanding the primary factors influencing worker motivation and compliance.

Assessment of tongue tip fluids from stillborn piglets as a risk-based sample

Project #: 23-076 | **Principal Investigators:** Isadora Machado, DVM MSc., and Daniel Linhares, DVM MBA PhD. | **Institution:** Iowa State University | **Posted:** 12/13/24 | **Keywords:** PRRSV, tongue fluids, risk-based, monitoring, targeted sampling, swine

Objectives: The primary objective of this study was to evaluate tongue fluids (TF) as a risk-based sampling approach in commercial breeding herds. TF PRRSV reverse transcription-qualitative polymerase chain reaction (RT-qPCR) results from stillborn piglets were evaluated as an indicator of PRRSV RNA detection in liveborn littermates. Secondly, we evaluated the presence of stillborns and litter size as indicators of PRRSV detection in live piglets.

Reproduction of Clinical Respiratory Disease and Respiratory Epitheliotropic Viral Infection Lesions with Porcine Astrovirus 4

Project #: 23-077 | **Principal Investigator:** Michael C. Rahe | **Institution:** North Carolina State University | **Posted:** 6/23/25 | **Keywords:** PoAstV4, tracheitis, bronchitis, CDCD pigs, machine learning, immunohistochemistry, in situ hybridization

Porcine astrovirus 4 (PoAstV4) has been detected in piglets with respiratory disease, but its role was unclear. This study experimentally infected caesarean-derived, colostrum-deprived piglets to assess causation. Infected pigs (n=17) shed virus in nasal secretions by 2 days post-challenge, with clearance by 14 days. Tracheitis and bronchitis were observed at 5 and 8 days, with viral presence confirmed in affected tissues. Infected piglets developed a measurable immune response, including anti-PoAstV4 antibodies and immune cell infiltration in respiratory tissues. These findings demonstrate that PoAstV4 can cause microscopic respiratory lesions consistent with an epitheliotropic viral infection, similar to influenza A virus.

Developing the Morrison Swine Health Monitoring Project (MSHMP) to Build Capacity and Enable the Swine Health Information Center

Project #: 23-078 | **Principal Investigator:** Cesar A. Corzo | **Institution:** University of Minnesota | **Posted:** 3/13/2025 | **Keywords:** Monitoring, Swine Health, PRRS, PEDv, Senecavirus, SVA, PRRSv 1H.18, PEDv Stability

During 2023–2024, major swine pathogens (PRRSv, PEDv, PDCoV, Senecavirus, CNS viruses) followed historical trends. Senecavirus cumulative incidence remained low (<2.5%, typically <0.5%). Time to eliminate PEDV improved from 24 weeks (epidemic) to 13 weeks (endemic), influenced by immunity, herd size, and season. Continued curation of the PRRSv ORF5 database supported collaborations, a new classification system, and identification of a lower-transmissibility variant of concern. Tools to detect herds with prolonged time-to-stability are in beta testing. Participation expanded with new production systems, while the website surpassed 15,000 views globally. The team published nine peer-reviewed manuscripts, highlighting the dataset's value and broad industry relevance.

Postmortem Sampling in Piglet Populations: Unveiling Specimens Accuracy for Porcine Reproductive and Respiratory Syndrome Detection

Project #: 23-078 | **Principal Investigator:** Mariana Kikuti, Cesar A. Corzo | **Institution:** University of Minnesota | **Posted:** 9/27/2024 | **Keywords:** postmortem sampling; PRRSV detection; specimen sensitivity; disease monitoring; diagnostic accuracy

Specimens from dead piglets offer a welfare-friendly, cost-effective surveillance method. This study evaluated postmortem samples for PRRSV detection on three farrow-to-wean farms at eight and 20 weeks post-outbreak. Samples included nasal, oral, and rectal swabs, tongue-tip fluids (TTF), superficial inguinal lymph nodes (SIL), and intracardiac blood, tested by RT-PCR. Using intracardiac serum as the gold standard, oral swabs and SIL performed best, with sensitivities of 94.6–100%, specificities of 83.9–85.1%, and negative predictive values of 97.3–100%. TTF showed high sensitivity (92.2%) but low specificity (53.9%). PRRSV was detected across all specimens. Oral and nasal swabs were reliable for monitoring, while TTF was better suited for assessing environmental contamination.

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Ensuring Farrowing Room Cleanliness and Biosecurity Using ATP Bioluminescence

Project #: 24-001 | **Principal Investigator:** Dustin Boler | **Institution:** Carthage Innovative Swine Solutions | **Posted:** 7/9/2024 | **Keywords:** ATP bioluminescence, disease monitoring, sow farm biosecurity, surveillance

This study evaluated three adenosine triphosphate (ATP) instruments to assess cleanliness of farrowing crates after washing. Visual inspection, typically performed before disinfection and sow entry, may not reliably detect contamination or reduce disease risk. Objectives included identifying the most contaminated crate areas, assessing correlation between microbial counts and ATP readings (relative light units), and determining the number of sampling sites needed. Results showed the entryway floor and sow feeder had the highest contamination, confirmed by ATP bioluminescence and coliform plate counts. ATP monitoring proved useful for routine assessment but should be paired with periodic microbial validation to ensure effective cleaning and disinfection protocols.

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Investigating Waterless Decontamination and Application Potential in Transportation Biosecurity

Project #: 24-003 | **Principal Investigator:** Erin Kettelkamp | **Institution:** Swine Vet Center | **Posted:** 8/14/25 | **Keywords:** Biosecurity, Decontamination, Disinfection, PEDV, Swine, Trailer

The overarching aim of this study was to evaluate the effectiveness of a waterless trailer decontamination method using modified vaporous hydrogen peroxide (mVHP) in combination with an industrial vacuum system on PEDV detection and inactivation. To do so, the effect of mVHP on detectable PEDV RNA levels using a waterless swine trailer decontamination system and varying disinfectant holding times was evaluated. In addition, the antiviral efficacy of mVHP against PEDV was assessed using a bioassay.

Development of a Targeted Next-generation Sequencing Panel for Common and Emerging Swine Pathogens

Project #: 24-007 | **Principal Investigators:** Rebecca P. Wilkes | **Institution:** Purdue University | **Posted:** 2/16/2026 | **Keywords:** Swine respiratory disease; targeted NGS; Ion Torrent; multiplex diagnostics; pathogen surveillance

Respiratory disease remains a costly and complex challenge in the US swine industry, often involving multiple pathogens that complicate diagnosis and control. While PCR is sensitive, it is limited in multiplexing capacity and lacks genetic detail for surveillance. This study developed and validated a targeted next-generation sequencing (tNGS) respiratory panel to detect multiple viral and bacterial pathogens in a single test. Evaluation of 70 clinical samples showed high agreement with PCR, strong specificity, and robust sensitivity. The panel identified mixed infections and detected pathogens potentially missed by PCR, while providing strain-level data. tNGS offers a valuable complementary tool to improve diagnostics, outbreak investigations, vaccine strategies, and overall swine health monitoring.

Establishing Oral Fluid Sampling Guidelines for Group-housed Sows

Project #: 24-008 | **Principal Investigator:** Jeffrey Zimmerman | **Institution:** Iowa State University | **Posted:** 11/11/25 | **Keywords:** Oral fluids, Surveillance, Sampling, Sows, Group-housing

This study characterized sow behaviors during oral fluid sampling to guide protocols for group-housed sows. Conducted on a commercial farm, where behavior was recorded in 12 pens over four days using video during 90-minute sampling periods. Results showed oral fluids can be effectively collected using cotton ropes, but unlike growing pigs, sampling should last 60–90 minutes due to limited rope access. Placing two ropes per pen improved participation and reduced competition; samples can be pooled to reduce costs. The study also confirmed that oral fluids capture both pig-derived and environmental pathogens, explaining the detection of agents not shed orally. These findings support practical, efficient oral fluid sampling in gestating sows.

Exploratory Study to Evaluate the Presence of PCV4 in Different Sample Matrices and Confirmation of its Role in Histological Changes by Direct Detection

Project #: 24-015 | **Principal Investigators:** Pablo Piñeyro | **Institution:** Iowa State University | **Posted:** 7/9/2024 | **Keywords:** PCV4, In situ hybridization, Lymphoid tissue, Coinfection, PCV2, PCV3

Since its identification in 2019, porcine circovirus 4 (PCV4) has been reported in Asia and Europe, with unclear links to disease. This study analyzed 512 US diagnostic samples (lung, feces, spleen, serum, lymphoid tissue, fetus) collected June–September 2023. PCV4 was detected in 8.6% of samples (mean CT value of 33), with the highest rate in lymphoid tissue (18.7%). Two ORF2 sequences showed 96.36–98.98% identity to reference strains. RNAscope confirmed viral replication in lymph node B cells and macrophages, with intestinal lesions observed. Detection was most common in nursery to finishing pigs with respiratory and enteric signs. Frequent coinfections highlight PCV4's potential role within complex disease processes.

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Generating a Disease Index Based on Confirmed Tissue Diagnosis Data to Assess the Relative Burden of Endemic Swine Pathogens in the U.S.

Project #: 24-016 | **Principal Investigators:** Giovani Trevisan & Daniel Linhares | **Institution:** Iowa State University | **Posted:** 9/10/25 | **Keywords:** Diagnosis, surveillance, endemic diseases, animal health threats, diagnostic data

The Swine Health Information Center funded the development of a data-driven disease index to monitor US swine pathogens using ISU-VDL diagnostic data. Built from 59,950 cases (2020–2024), the index integrates disease frequency, co-infection rates, geographic spread, and abnormal activity signals into a weekly updated score displayed in a Power BI dashboard. PRRSV and Streptococcus suis ranked highest, while emerging activity in 2024 included sapovirus and astrovirus, with declining PCV2 trends. The system enables real-time tracking and year-to-year comparisons to support decision-making. Validation using distance models and bootstrap resampling confirmed consistency, highlighting its potential for integration into SDRS and broader livestock disease surveillance.

Developing and Implementing a Capability for Real-time Monitoring of *Escherichia Coli* Genotyping and Virotypes detected in Porcine Samples Tested by PCR.

Project #: 24-017 | **Principal Investigators:** Giovani Trevisan and Daniel Linhares | **Institution:** Iowa State University | **Posted:** 10/2/25 | **Keywords:** Endemic bacteria, colibacillosis, diagnostic data, E. coli, surveillance, monitoring, SDRS

Escherichia coli (E. coli) is a key endemic bacterium in swine, becoming pathogenic when specific virulence factors are present. A SHIC-funded project integrated PCR genotyping data from SDRS-participating laboratories to create a centralized, real-time reporting platform. Analysis of 29,682 samples (2008–2024) showed shifting trends, including increased dominance of F18 fimbriae and rising hybrid ETEC/STEC pathotypes. Results can be filtered by pathogenic potential, age group, and location to support decision-making. Notably, 30.8% of samples were negative, underscoring the diagnostic value. This user-friendly system enables veterinarians and producers to monitor trends, assess risk, and improve herd health, with ongoing updates expanding its surveillance capabilities.

Implementing a Real-Time Surveillance System Utilizing Diagnostic, Movement, and Site Location to Early Detect Emerging/Re-emerging Diseases Across Different Regional Levels

Project #: 24-029 | **Principal Investigator:** Gustavo Silva | **Institution:** Iowa State University | **Posted:** 9/18/25 | **Keywords:** PRRSV, spatial epidemiology, farm stratification, disease surveillance, Bayesian modeling, epidemiological modeling

This project developed a real-time, spatial disease surveillance system for swine pathogens using diagnostic, movement, and location data from 3,084 sites across 18 US states. The system provides weekly, site-specific infection risk forecasts and detects regional disease emergence. Farm type was the primary driver of PRRSV risk (81%), followed by movement networks (16%) and proximity (3%). Forecast accuracy exceeded 83% at the county and site levels. Analysis identified 319 breeding herd outbreaks, with 109 linked to spillover events. The system also enables site-level alerts and targeted investigations. This scalable platform supports early detection, risk assessment, and data-driven interventions to improve swine health, biosecurity, and industry preparedness.

Atypical Interstitial Pneumonia-like Disease in Swine: Etiologic Investigation of an Emergent Syndrome

Project #: 24-043 | **Principal Investigator:** Marcelo Almeida | **Institution:** Iowa State University | **Posted:** 12/16/25 | **Keywords:** Porcine Interstitial Pneumonia, Atypical Interstitial Pneumonia (AIP), Diffuse Alveolar Damage (DAD), PRRSV, IAV, PCV2

Diffuse alveolar damage (DAD), a severe lung lesion pattern, has recently increased in porcine cases at the Iowa State University Veterinary Diagnostic Laboratory. This study evaluated 42 cases using histology, PCR, immunohistochemistry, and next-generation sequencing. PRRSV (71.4%), IAV (35.7%), and PCV2 (16.7%) were frequently detected, often in combination, though none were directly associated with DAD lesions. Sequencing identified contemporary viral strains and 17 additional viruses, including parvoviruses in 45% of cases, but none consistently linked to DAD. The cause of DAD remains unclear; however, controlling PRRSV, IAV, and PCV2 through vaccination and management remains the most practical strategy to reduce risk in affected herds.

Building Diagnostic Capability for Japanese Encephalitis Virus in the United States

Project #: 24-061 | **Principal Investigators:** Katharine N. Bossart | **Institution:** Integrated Research Associates, LLC | **Posted:** 3/10/2026 | **Keywords:** Japanese encephalitis virus, diagnostic prototypes, serology, recent exposure, on-site testing

Japanese encephalitis virus (JEV), a mosquito-borne pathogen affecting swine and humans, poses a significant incursion risk to the United States. Diagnostic capacity is limited by the lack of approved tests and biosafety restrictions. This project developed serologic assays using nonhazardous recombinant virus-like particles, enabling safer and broader testing. Antigens produced under cGMP conditions performed as well as or better than traditional assays. Two prototype kits—ELISA and a field-based dot assay—were created and are undergoing validation. An additional objective evaluated a recombinant NS1 antigen to differentiate infected from vaccinated animals; while initial results were limited, alternative platforms show promise. These tools enhance preparedness, supporting surveillance, biosecurity, and outbreak response.

An underappreciated respiratory pathogen or shifting tropism of porcine rotaviruses

Project #: 24-082 | **Principal Investigators:** Vlasova, Anastasia | **Institution:** Ohio State University | **Posted:** 12/15/25 | **Keywords:** porcine rotavirus; respiratory illness; diarrhea; suckling piglets; weaned piglets; field study

Rotaviruses A and C are major causes of diarrhea in piglets, with emerging evidence of respiratory involvement. This study evaluated nasal and fecal shedding in suckling and weaned piglets across three health statuses and six Ohio farms. Samples were tested by RT-PCR, and tissues from deceased piglets were examined for viral distribution. Rotaviruses were detected on all farms, with prevalence ranging from 67–100% for RVA and 7–56% for RVC; overall, 88% and 29% of piglets were positive, respectively. Highest viral loads occurred in diarrheic weaned pigs, but increased RVA levels were also observed in suckling piglets with respiratory signs, supporting a potential respiratory role.

Final Report

Assessment of Caretaker Motivation and Resources in the Wean-to-market Phase of Production

Project #: 24-093 | **Principal Investigator:** Dr. Michael Chetta | **Institution:** Talent Metrics Consulting | **Posted:** 10/15/25 | **Keywords:** safety, biosecurity, biocontainment, wean-to-market, caretaker, mitigation, prevention, preparedness, compliance, motivation, recognition

The Swine Health Information Center has emphasized that caretaker motivation is critical to improving farm biosecurity. Prior research showed caretakers are generally internally motivated by personal values rather than external rewards. This study further examined drivers of behavior, including resources, supervisor feedback, incentives, and job demands. Caretakers identified mistakes, inattention, and lack of accountability as common causes of protocol breaches, noting minimal recognition for correct practices and more emphasis on punishment. These findings highlight limited external motivation. Understanding these factors supports the development of interventions that enhance resources, recognition, and supervision, ultimately improving compliance, strengthening biosecurity practices, and protecting animal health across swine operations.

Domestic Swine Disease Surveillance Monthly Report Updates Until September 2025

Project #: 24-098 | **Principal Investigators:** Giovani Trevisan & Daniel Linhares | **Institution:** Iowa State University | **Posted:** 11/20/25 | **Keywords:** data analysis, surveillance, preparedness, animal health threats, diagnostic data

Since 2017, SHIC has supported the Swine Disease Reporting System (SDRS), which continues to expand its surveillance capacity. This project maintained PCR databases, delivered monthly PDF and audio reports, updated dashboards, and improved tissue diagnosis data systems. From October 2024–2025, reports reached 631 subscribers across 236 organizations in 21 countries, with digital content exceeding 67,000 views. Enhancements included a new PRRSV ORF5 classification system, a PEDV “facility” category, and an API-based data retrieval system for real-time access. SDRS remains the only public US swine diagnostic data source, supporting decision-making, industry programs, and international collaborations to strengthen global disease monitoring.

Final Report

Epidemiology of JEV in Australian Intensive Piggeries

Project #: 25-053 | **Principal Investigator:** Dr Brendan Cowled | **Institution:** Ausvet Pty Ltd | **Posted:** 6/30/25 | **Keywords:** Australia, Japanese encephalitis virus, Epidemiology, Outbreak, US Preparedness, US Response

Japanese encephalitis virus (JEV), a mosquito-borne pathogen not present in the US, caused major reproductive losses during Australia’s 2021–2022 outbreak. This study used veterinarian interviews and data analysis to identify drivers of spread and inform US preparedness. Clinical impacts varied widely, including mummified fetuses, weak piglets, infertility, and reduced litter size. Increased rainfall, wetlands, and mosquito populations—likely amplified by waterbird movement—were key drivers. Control focused on farm-level mosquito management, as landscape control was not feasible; mechanically ventilated systems offered added protection. Risk modeling highlighted environmental factors for targeted surveillance. Findings provide actionable guidance for preparedness, outbreak response, and long-term control strategies.