SHIC
Swine Health Information Center
Made possible by pork checkoff

Newsletter
FEBRUARY 2025

OUR LATEST INFORMATION ON PROTECTION OF US SWINE HERD HEALTH

SHIC Update on Recent Detection of FMDV Serotype O in Germany

This update was first published on January 14, 2025. For a subsequent update, please review this month's Global Swine Disease Monitoring Report.

SHIC actively monitors global swine diseases as part of its mission to enhance swine health through the identification and mitigation of emerging disease threats. On January 10, 2025, Germany confirmed its first outbreak of foot-and-mouth disease virus (FMDV) since 1988. The outbreak was detected in a herd of water buffalo in the Märkisch-Oderland district of Brandenburg, near Berlin. As part of the SHIC Global Swine Disease Monitoring Reports, the team at the Center for Animal Health and Food Safety (CAHFS) has prepared this summary of the current FMDV situation in Germany.

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

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

January 19. Veal calf imports from Brandenburg were also banned. However, export to countries within the European Union's single market is still possible for products that originate outside the restricted zones, under the principle of regionalization.

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

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

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

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

2022
Egypt: South American strains A/EURO-SA, and O/EURO-SA, were isolated from a batch of Egyptian samples tested by the World Reference Laboratory (WRLFMD).
Libya: FMD virus O/EA-3, a strain from East Africa was detected.
Iraq: FMD virus SAT2/XIV, closely related to viruses from Ethiopia was detected. It was observed to cause more severe clinical disease.
Jordan: FMD virus SAT2/XIV, closely related to viruses from Ethiopia was reported in the country.
Türkiye: FMD virus SAT2/XIV, was reported for the first time.

2023
Qatar: FMDV SAT1/I topotype, a virus with close sequence identity to a virus from Kenya was reported for the first time.
Algeria: Virus of the SAT2 topotype (SAT2/V) detected for the first time. Viruses from this lineage were last found in Ghana (1991), Togo (1990) and Ivory Coast (1990).

2024
Libya: A new incursion of FMDV O/EA-3 which is endemic to East Africa
Türkiye: Re-emergence of a virus strain originally from Iran, FMDV A/ASIA/Iran-05FAR-11

2025
Germany: Recurrence of FMD after 37 years. The National Reference Laboratory at the FLI confirmed the virus Serotype as type O, although the virus strain, origin, and route of entry into Germany are yet to be determined.

References

- Germany confirms first case of foot-and-mouth disease in nearly 40 years
- Germany Reports Foot-and-mouth Disease In Water Buffalo
- Foot-and-mouth disease detected in Brandenburg
- FMD outbreak in Brandenburg: serotype O detected
- FMD Germany: pig industry holds its breath
- FMD Reference Laboratory reports
- Germany Races To Contain Foot-and-mouth Outbreak Amid Export Fears https://www.barrons.com/news/germany-races-to-contain-foot-and-mouth-outbreak-amid-export-fears-17ea20e0
- German agri minister meets sector stakeholders on foot-and-mouth
- https://www.agriland.ie/farming-news/german-agri-minister-meets-sector-stakeholders-on-foot-and-mouth/
- Foot and mouth outbreak halts German pork exports to GB https://nationalpigassociation.co.uk/foot-and-mouth-outbreak-halts-german-pork-exports-to-gb/

2024 Progress Report Reveals Record Year for SHIC

The Swine Health Information Center, launched in July 2015 with Pork Checkoff funding, maintains a mission to protect and enhance the health of the US swine herd. The 2024 Progress Report provides pork producers, swine veterinarians, and industry stakeholders with a review of SHIC's activities and accomplishments to carry out its mission over the past year. SHIC's scope of work focuses on five strategic pillars encompassing projects that cover domestic and global emerging disease monitoring, targeted swine disease research, swine health data analysis and coordinated communications. The Center's progress can be found in the recently released 2024 Progress Report, including details on the 32 research projects SHIC funded to achieve their objectives on behalf of US pork producers, for a record total of $3,990,689 contracted. "SHIC received the greatest number of proposals and awarded the highest dollar amount for research projects in a single year in 2024," said SHIC Executive Director Dr. Megan Niederwerder. "Matching funds and external grants allowed SHIC to leverage Pork Checkoff investment and at the same time, expand both research breadth as well as funding capacity to increase return on investment."

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

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

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

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

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

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

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

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

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

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

Following PEDV introduction in the US, a high number of cases were reported through the MSHMP network during the first two years (gray bars in Figure 1), declining in the third year, and stabilizing thereafter with slight fluctuations. An exception was noted in 2021 when the incidence of PEDV was higher compared to all remaining years during the endemic period. Sequencing surveillance was also more intense during the epidemic phase (blue line in Figure 1), decreasing afterward with a consistent trend. During the endemic period, approximately one sequence was generated for every 10 infected sow farms in MSHMP (red line in Figure 1).

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

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

Find the MSHMP report here.

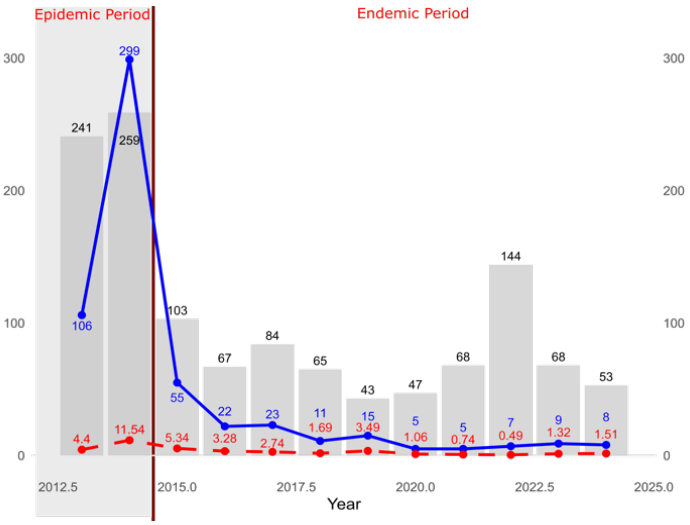

Figure 1. Bars represent the number of cases per year reported to the MSHMP. The solid blue line represents the number of spike protein sequences available. The dashed red line represents the number of sequences per 10 reported outbreaks. The brown line marks the boundary between the endemic and non-endemic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

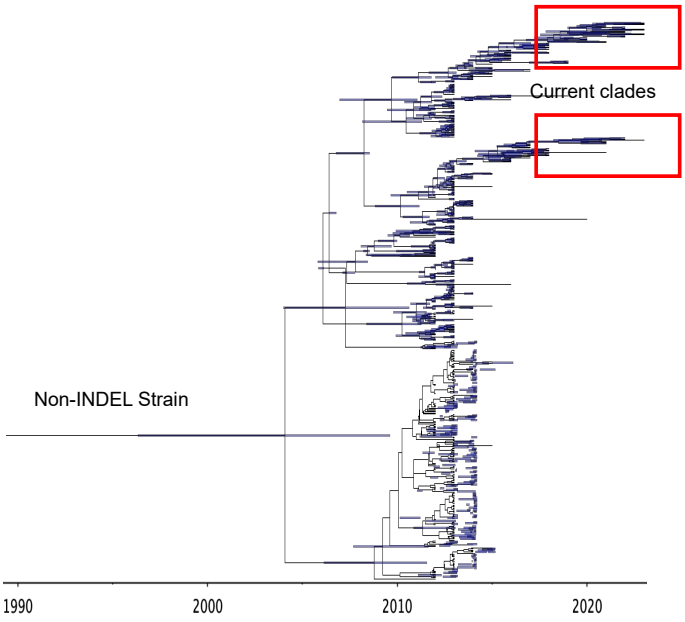

Figure 2. Time-scaled tree of PEDV spike protein for non-indel strains.

Figures and content: Joao Paulo Herrera da Silva, Nakarin Pamornchainavakul, Mariana Kikuti, Xiaomei Yue, Cesar A. Corzo and Kimberly VanderWaal. (2024). Long-term evolutionary dynamics of Porcine Epidemic Diarrhea Virus (PEDV) in the U.S. a decade after introduction. https://mshmp.umn.edu/sites/mnshmp.umn.edu/files/2025-01/SHMP%202024l25.26%20%5BEvolutionary%20Dynamics%20of%20PEDV%5D.pdf

SHIC Wean-to-Harvest Biosecurity: Alternative Cleaning Methods to Reduce PEDV in Livestock Trailers (Final Report)

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

Find the study industry summary here.

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

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

gross fecal matter, then power washed at 1500 psi, followed by disinfectant; and 5) negative control, where trailers were inoculated with PEDV-negative feces and received no cleaning.

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

Washing treatments, particularly flush-out volume hose and power wash and disinfect, demonstrated significant efficacy in reducing viral load on both the trailer and farm-site surfaces. For farm-site surface contamination, these methods achieved over 99% reduction in viral genomic copies compared to the positive control. This marked reduction is crucial in preventing infection of susceptible pigs and highlights the importance of effective washing protocols. The power wash and disinfect method emerged as highly effective, significantly reducing PEDV levels on trailer surfaces with most samples showing negative PCR results (three of five). The volume hose wash and disinfect method also demonstrated substantial efficacy in inactivating the virus as tested through swine bioassay, though some residual fecal material was observed.

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

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

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

Foundation for Food & Agriculture Research

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

Swine Health Information Center

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. As a conduit of information and research, SHIC encourages sharing of its publications and research. Forward, reprint, and quote SHIC material freely. For more information, visit http://www.swinehealth.org or contact

Dr. Megan Niederwerder at mniederwerder@swinehealth.org or Dr. Lisa Becton at lbecton@swinehealth.org.

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

A study funded by the Swine Health Information Center Wean-to-Harvest Biosecurity Research Program, in partnership with the Foundation for Food & Agriculture Research and Pork Checkoff, aimed to reduce the risk of disease transmission between farms through vehicle contacts. Led by Dr. Gustavo Machado of North Carolina State University, the study evaluated reduction of risk through rerouting vehicles while considering cleaning and disinfection events and effectiveness. Findings demonstrate that a vehicle rerouting system holds potential as a strategic tool for preventing and controlling the spread of diseases among farms through vehicle movements.

Find the study industry summary **here**.

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

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

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

Implementing the rerouting system led to a substantial decrease in the median number of at-risk contacts between farms (Figure 1). For vehicles transporting feed, at-risk contacts were reduced by 42% when C&D effectiveness was 0% and reduced by 89% when C&D effectiveness was 50%. For vehicles transporting pigs to market, at-risk contacts were reduced by 25% when C&D effectiveness was 0% and reduced by 45% when C&D effectiveness was 50%. Vehicles transporting pigs between farms only showed a remarkable reduction after C&D effectiveness was above 50%, with 33% fewer at-risk contacts. Finally, when C&D effectiveness was increased to 100%, at-risk contacts dropped below 5% for vehicles transporting feed and pigs to market, and below 37% for vehicles transporting pigs to farms.

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

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

This study demonstrates that combining vehicle rerouting movements with stringent C&D practices effectively reduces contact between disease-positive and disease-negative farms. Further, rerouting reduces at-risk contacts between farms from different network communities, thereby reducing the probability of disease dissemination. Ultimately, the rerouting system could be integrated into regular vehicle shipment schedule operations as an additional tool for preventing and controlling the spread of livestock diseases among farms via the indirect contact network of vehicle movements.

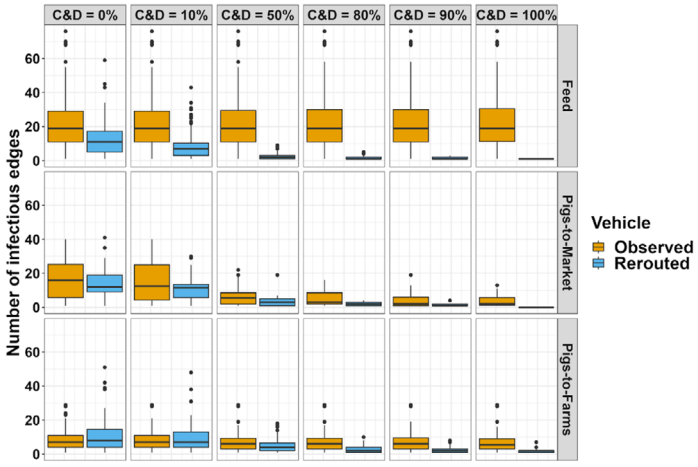

Figure 1. Infectious edges within the vehicle contact network. Box plots displaying the number of connections, named infectious edges or at-risk contact, from PRRSV-positive and PEDV-positive farms to disease-free farms within the vehicle contact network for one week.

Foundation for Food & Agriculture Research

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

Swine Health Information Center

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. As a conduit of information and research, SHIC encourages sharing of its publications and research. Forward, reprint, and quote SHIC material freely. For more information, visit http://www.swinehealth.org or contact Dr. Megan Niederwerder at mniederwerder@swinehealth.org or Dr. Lisa Becton at lbecton@swinehealth.org.

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

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

Find the study industry summary here.

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

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

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

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

Across all three groups, there were 60 study weeks with sample submissions. Oral fluids were obtained in all 60 weeks whereas tongue tip fluids were collected in 43 of those weeks. IAV was detected in 34.9% of oral fluids and 30.2% of tongue tip fluids, while PRRSV was found in 67.4% of oral fluids and 53.5% of tongue tip fluids. Tongue tip fluids showed a significantly lower mean cycle threshold for PRRSV (mean Ct = 28.7) compared to oral fluids (mean Ct = 33.2). There was fair agreement between the PCR outcomes of tongue tip fluids and oral fluids (Cohen's kappa values of 0.26 for PRRSV and 0.24 for IAV).

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

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

SHIC/AASV Webinar February 18: Practical Approaches for Transportation Biosecurity

Click here to register.

The Swine Health Information Center and American Association of Swine Veterinarians invite you to participate in a new webinar, **Practical Approaches for Transportation Biosecurity**, to be held on **Tuesday, February 18, 2025**. The webinar will begin at 11:00 am and conclude at 12:30 pm CT.

Webinar presenters will provide producers and their veterinarians practical and applicable information focusing on transport biosecurity strategies for swine disease prevention and control. As part of SHIC's mission to protect and enhance the health of the US swine herd, the organization has funded research on novel approaches to transport biosecurity and supports the broad sharing of information for producers to implement on-farm.

Presenters:

Dr. Edison Maghales, Iowa State University – Evaluating alternative livestock trailer cleaning methodologies to manage the risk of PEDV introduction

Dr. Ben Blair, University of Illinois Urbana-Champaign – Cost effective trailer cleaning & disinfection based on PEDV prevalence and system connectivity

Dr. Gustavo Machado, North Carolina State University – Rerouting vehicles as an alternative strategy for transport biosecurity

Dr. Pete Thomas, Iowa Select Farms – Implementation of transportation biosecurity for PEDV control

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

SWINE DISEASE MONITORING REPORTS

DOMESTIC

This month's Domestic Swine Disease Monitoring Report brings information about the increased case positivity of PRRSV in all age categories. Lineages 1C.5, 1C.2, and 1A were predominantly detected in January 2025. The report contains a Bonus page about the PRRSV L1C.2 scenario, showing the record high detection trends of this lineage in 2024. Based on historical data and as expected for this time of the year, the report brings information about an increase in PEDV and PDCoV detection, mainly in wean-to-finish sites. *Mycoplasma hyopneumoniae* and Influenza A case positivity decreased in January, mainly in the wean-to-market category. PCV2 case positivity remains high in the wean-to-market category with low PCR Ct values in tissue cases. In the podcast, Dr. Paul Yeske, Swine Vet Center, discussed the clinical implications of PRRSV L1C.2, the next steps for the PEDV elimination plan, and *M. hyopneumoniae* elimination strategies.

VIEW REPORT

GLOBAL

This month, the Global Swine Disease Monitoring Report shares information on efforts to prevent African swine fever in France. The French National Swine Health Association will train 600 auditors and conduct 3,000 biosecurity audits, prioritizing small-scale pig and wild boar farms. Taiwan was recognized as an FMD-free country in 2020 and has self-reported as free of ASF so fresh pork exports to Singapore have resumed for the first time in 15 years. In Sri Lanka, authorities are weighing complete depopulation to control the ASF outbreak there. The total pig population in the country is estimated at 170,000 head. The Department of Agriculture in the Philippines has distributed over 32,000 doses of ASF vaccines. Those vaccines are being administered in 11 municipalities across five provinces. Brazil has secured an agreement with Singapore to ensure continued pork exports even in the event of an ASF outbreak.

VIEW REPORT

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. As a conduit of information and research, SHIC encourages sharing of its publications and research. Forward, reprint, and quote SHIC material freely. For more information, visit http://www.swinehealth.org or contact Dr. Megan Niederwerder at mniederwerder@swinehealth.org or Dr. Lisa Becton at lbecton@swinehealth.org.