





Swine Disease Reporting System Report # 48 (February 1, 2022)

What is the Swine Disease Reporting System (SDRS)? SDRS includes multiple projects that aggregate data from participating veterinary diagnostic laboratories (VDLs) in the United States of America (USA), and reports the major findings to the swine industry. Our goal is to share information on endemic and emerging diseases affecting the swine population in the USA, assisting veterinarians and producers in making informed decisions on disease prevention, detection, and management.

After aggregating information from participating VDLs and summarizing the data, we ask the input of our advisory group, which consists of veterinarians and producers across the USA swine industry. The intent is to provide an interpretation of the observed data, and summarize the implications to the industry. Major findings are also discussed in monthly podcasts. All SDRS reports and podcasts are available at www.fieldepi.org/SDRS. The SDRS projects are:

Swine Health Information Center (SHIC)-funded Domestic Swine Disease Surveillance Program: collaborative project among multiple VDLs, with the goal to aggregate swine diagnostic data and report in an intuitive format (web dashboards and monthly PDF report), describing dynamics of pathogen detection by PCR-based assays over time, specimen, age group, and geographical area. Data is from the Iowa State University VDL, South Dakota State University ADRDL, University of Minnesota VDL, and Kansas State University VDL.

Collaborators:

Swine Disease Reporting System office: Principal investigator: Daniel Linhares, Project coordinator: Giovani Trevisan, Communications: Edison Magalhães.

Iowa State University: Gustavo Silva, Marcelo Almeida, Bret Crim, Kent Schwartz, Eric Burrough, Phillip Gauger, Pablo Pineyro, Christopher Siepker, Alyona Michael, Panchan Sitthicharoenchai, Rodger Main.

University of Minnesota: Mary Thurn, Paulo Lages, Cesar Corzo, Jerry Torrison.

Kansas State University: Rob McGaughey, Franco Matias-Ferreyra, Jamie Retallick.

South Dakota State University: Jon Greseth, Darren Kersey, Travis Clement, Angela Pillatzki, Jane Christopher-Hennings.

Ohio Animal Disease and Diagnostic Lab.: Melanie Prarat, William Hennessy, Yan Zhang, Dennis Summers.

The Ohio State University: Andreia Arruda.

Disease Diagnosis System: A pilot program with the ISU-VDL consisting of reporting disease detection (not just pathogen detection by PCR), based on diagnostic codes assigned by veterinary diagnosticians.

FLUture: Aggregates influenza A virus (IAV) diagnostic data from the ISU-VDL and reports results, metadata, and sequences.

PRRS virus RFLP and Lineage report: Benchmarks patterns of PRRSV RFLP pattern and Lineages detected at the ISU-VDL, UMN-VDL, KSU-VDL, and OH-ADDL over time, USA state, specimen, and age group.

Audio and video reports: Key findings from SDRS projects are summarized monthly in a conversation between investigators, and available in the form of an 'audio report', and "video report" through SwineCast, YouTube, LinkedIn, and the SDRS webpage.

Advisory Group: Reviews and discusses the data, providing their comments and perspectives on a monthly: Mark Schwartz, Paul Sundberg, Paul Yeske, Tara Donovan, Deborah Murray, Scott Dee, Melissa Hensch, Brigitte Mason, Peter Schneider, Sam Copeland, Luc Dufresne, and Daniel Boykin.

In addition to this report, interactive dashboards with aggregated test results are available at www.fieldepi.org/SDRS.

Note: This report contains data up to January 31, 2022.



Figure 1. Top: *left*: Results of PRRSV RT-PCR cases over time. *Right*: Proportion of accession ID cases tested for PRRSV by age group per year and season. Middle: *Left* expected percentage of positive results for PRRSV RNA by RT-qPCR, with 95% confidence interval band for predicted results based on weekly data observed in the previous 3 years. *Right*: percentage of PRRSV PCR-positive results, by age category over time. Wean to market corresponds to nursery and grow-finish. Adult/Sow correspond to Adult, boar stud, breeding herd, replacement, and suckling piglets. Unknown corresponds to not informed site type or farm category. Bottom *left* the 25 most frequently detected RFLP patterns during 2022; *right* Epidemiological curve of detection for PRRSV Lineage 1C variant strains.

SDRS Advisory Group highlights:

• Overall, 29.94% of 6,549 cases tested PRRSV-positive in January, similar to 31.17% of 7,386 in December;

• Positivity in adult/sow category in January was 28.29% (892 of 3,153), similar to 27.51% (961 of 3,493) in December;

• Positivity in wean-to-market category in January was 40.24% (752 of 1,869), a moderate decrease from 42.9% (934 of 2,177) in December:

• PRRSV detection is within the expected for this time of the year. However, there is a trend towards increased submissions and increased positivity compared to previous years;

• The advisory group has highlighted that various factors are potentially associated with the increase in PRRSV detection. Pointed factors include more activity with an increased number of lateral breaks and intensive monitoring in finishing sites, newly emerging PRRSV strains, like the L1C variant, those are more severe and persistent, more sensitive diagnostic sample sizes capable of detecting PRRSV at lower prevalence level when compared with the standard 30 or 60 monthly serum samples, increased consolidation in the market with more interconnected usage of contract carriers for transport, feed mills, truck wash, finishing site labor, 2022 winter months are coming right after aa year with increased activity during spring, more PRRSV modified live vaccines in the market needing differentiation. More severe PRRSV is also associated with pneumonia and systemic issues such as encephalitis.



SDRS Advisory Group highlights:

• Overall, 12.98% of 3,352 cases tested PEDV-positive in January, a moderate increase from 9.96% of 3,382 in December;

- The overall PRRSV detection was above the forecasted levels for the week of January 23, 2022;
- Positivity in adult/sow category in January was 11.61% (125 of 1,077), a moderate increase from 9.28% (94 of 1,013) in December;
 Positivity in wean-to-market category in January was 17.82% (240 of 1,347), a moderate increase from 14.1% (195 of 1,383) in

December;
Positivity in wean-to-market category in January was 17.82% (240 of 1,347), a moderate increase from 14.1% (195 of 1,383) in December;

• Overall, 3.23% of 3,223 cases tested PDCoV-positive in January, similar to 2.43% of 3,209 in December;

• Positivity in adult/sow category in January was 1.55% (16 of 1,035), similar to 1.78% (17 of 955) in December;

• Positivity in wean-to-market category in January was 5.67% (73 of 1,287), a moderate increase from 2.9% (38 of 1,311) in December;

- There was 0 positive case for TGEV RNA in January, 2021 over a total of 3,166 cases tested;

• The advisory group has suggested that we should be cautious with the decrease in detection of enteric coronavirus observed during 2021. Even though lots have been done to improve farm biosecurity, truck wash, the understanding role of pathogen transmission in feed and feed ingredients quarantine, some outbreaks in different regions have been observed over time. The advisory group suggests keeping vigilant with enteric coronavirus agents and, whenever possible, interacting with neighbors to awareness and early contain the spread of eventual outbreaks.



95 % predicted confidence interval — Predicted % of positive — Observed % positive

Figure 3. Left top: results of M. hyopneumoniae (MHP) PCR cases over time. Right top: percentage of MHP PCR-positive results, by category over time. Bottom: expected percentage of positive results for MHP by PCR and 95% confidence interval for 2022 predicted value, based on weekly data observed in the previous 3 years.

SDRS Advisory Group highlights:

• Overall, 15.54% of 650 cases tested *M. hyopneumoniae*-positive in January, similar to 16.1% of 708 in December;

• Positivity in adult/sow category in January was 15.79% (15 of 95), a moderate increase from 13.48% (12 of 89) in December;

• Positivity in wean-to-market category in January was 15.32% (51 of 333), a moderate decrease from 18.18% (72 of 396) in December;

• The advisory group highlighted that more production systems are moving toward *M. hyopneumoniae* elimination and this may change the pattern of *M. hyopneumoniae* detection due to the need to better monitoring and surveillance programs. Several sow farms have depopulated due to PRRSV outbreaks, and quite a few are targetting *M. hyopneumoniae* negative status, which may also influence the levels of detection. There is reporting of new startups are targetting negative status. Also, a better understanding of finishing sites lateral transmission is still needed.



Topic 4 – Confirmed tissue cases etiologic/disease diagnosis at the ISU-VDL.



Figure 4. ISU-VDL most frequent overall confirmed tissue disease diagnosis. The presented system is described in the title of the chart. Colors represent one agent. Line intersections present diagnosis of 2 or more agents within a submission. Only the most frequent etiology/disease are presented. Less frequent etiology/disease are grouped as other. Non-confirmed diagnoses are not presented.

This work is made possible due to the commitment and teamwork from the ISU-VDL diagnosticians who assign standardized diagnostic codes to each case submitted for histopathology: Drs. Almeida, Burrough, Derscheid, Gauger, Harm, Magstadt, Mainenti, Michael, Piñeyro, Rahe, Schumacher, Siepker, Sitthicharoenchai, and previous VDL diagnosticians who have contributed to this process.

Note: Disease diagnosis takes 1 to 2 weeks to be performed. The graphs and analysis contain data from Dec. 1, 2021 to Jan. 22, 2022.

SDRS Advisory Group highlights:

• PRRSV (549) leads cases with confirmed etiology/disease, followed by *S. suis* (357), and Influenza A (227). PRRSV (504 of 1577) leads the number of confirmed respiratory diagnoses, *Rotavirus* (156 of 512) leads the number of confirmed digestive diagnoses, and *S. suis* (46 of 72) leads the number of confirmed neurological diagnosis;

• During the week of January 17, there was a significant increase (signal) in tissue diagnosis of urogenital agents;

• During December 1, 2021 to January 22, there was a significant increase (signal), with an uptick in diagnosis of: A. pleuropneumoniae, Clostridiosis, and PED;

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Note: The SDRS is a collaborative project among multiple VDLs in the US swine industry. The VDL collaborators and industry partners are all invited to submit content to share on this bonus page related to disease prevention, control, and management. Stay tuned for more content in future editions.

Frequency of PRRSV strains detections during 2021

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PRRSV is one of the most important pathogens to the US swine industry. The newly emerging PRRSV L1C variant strain has received much attention and caused considerable problems to the US swine industry during 2020/2021. SDRS has stood out in providing epidemiological data for PRRSV strains detections according to PRRSV strain classification into restriction length polymorphism-RFLP and Lineages over time and geographic regioni.e. states. A PRRSV genotyping dashboard presenting strains classified according to RFLP and Lineages has been made available online at the SDRS project webpage https://www.fieldepi.org/domestic-swine-disease-monitoring-program.

The PRRSV L1C variant strain has been majorly detected in Iowa and Minnesota. Meanwhile, other contemporary PRRSV strains have been frequently detected in other states. After excluding strains classified as vaccine-like by having 99% or greater similarity with commercially available PRRS modified life vaccines, the SDRS bonus page summarizes the PRRSV strains more frequently detected by state. Only states where the participant VDL's are located or having a hog inventory larger than 2 million hogs. PRRSV ORF5 sequencing metadata is from ISU-VDL, UMN-VDL, KSU-VDL, and OH-ADDL.

	Most frequent	Second	Third
Overall	L1A RFLP 1-7-4	L1Cvariant RFLP 1-4-4	L1H RFLP 1-8-4
Illinois	L1A RFLP 1-7-4	L1H RFLP 1-8-4	L1A RFLP 1-3-4
Indiana	L1A RFLP 1-7-4	L1H RFLP 1-4-4	L1A RFLP 1-4-4
Iowa	L1Cvariant RFLP 1-4-4	L1H RFLP 1-8-4	L1A RFLP 1-7-4
Kanssas	L1H RFLP 1-8-4	L1H RFLP 1-4-4	L1E RFLP 1-3-2
Minnesota	L1Cvariant RFLP 1-4-4	L1A RFLP 1-7-4	L1A RFLP 1-4-4
Missouri	L1A RFLP 1-8-4	L1A RFLP 1-8-3	L1H RFLP 1-8-4
Nebraska	L1H RFLP 1-8-4	L1A RFLP 1-4-4	L1A RFLP 1-7-4
North Carolina	L1A RFLP 1-7-4	L1A RFLP 1-4-4	L1A RFLP 1-4-3
Ohio	L1A RFLP 1-7-4	L1A RFLP 1-4-4	L1H RFLP 1-8-4
Oklahoma	L1A RFLP 1-8-4	L8 RFLP 1-4-2	L1C RFLP 1-2-4
South Dakota	L1C RFLP 1-3-2	L1A RFLP 1-7-4	L1Cvariant RFLP 1-4-4

Table 1: Most frequently detected PRRSV strains classified accroding to linage and RFLP by state

PRRSV strains classified as Lineage 1A RFLP 1-7-4 were the more frequently detected wild-type strain, followed by the L1C variant RFLP 1-4-4 and L1H RFLP 1-8-4 strain. Large diversity exists across states what has also been reflected in the detection of different PRRSV strains across different regions.