

# Swine Disease Reporting System Report # 72 (February 06, 2024)

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, and reports the major findings to the swine industry. Our goal is to share information on activity of 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 for the input of our advisory group, which consists of veterinarians and producers across the US 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 it 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, Kansas State VDL, Ohio Animal Disease and Diagnostic Laboratory (ADDL), and Purdue ADDL.

### **Collaborators:**

Swine Disease Reporting System office: Principal investigators: Daniel Linhares & Giovani Trevisan; Project coordinator: Guilherme Cezar, Communications: Edison Magalhães, Data analyst: Srijita Chandra.

*Iowa State University*: Gustavo Silva, Marcelo Almeida, Bret Crim, Kinath Rupasinghe, Eric Burrough, Phillip Gauger, Christopher Siepker, Marta Mainenti, Michael Zeller, Rodger Main.

University of Minnesota: Mary Thurn, Paulo Lages, Cesar Corzo, Albert Rovira.

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

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

Ohio Animal Disease and Diag. Lab.: Melanie Prarat, Ashley Johnson, Dennis Summers.

Purdue University: Craig Bowen, Kenitra Hendrix, Joseph Boyle.

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. PRRSView and FLUture: Aggregates PRRSV and influenza A virus 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 over time by specimen, age group, and US State.

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 Spotify, Apple Podcast, Google podcast, SwineCast, YouTube, LinkedIn, and the SDRS webpage.

Advisory Group: Providing their comments and perspectives monthly: Mark Schwartz, Megan Niederwerder, Paul Yeske, Deborah Murray, Brigitte Mason, Peter Schneider, Sam Copeland, Luc Dufresne, Daniel Boykin, Corrine Fruge, William Hollis, Rebecca Robbins, Thomas Petznick, Kurt Kuecker, and Laura Glowzenski.

In addition to this report, interactive dashboards and educational material are available at www.fieldepi.org/SDRS.

Note: This report contains data up to January 31, 2024.



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 2024; Right: Epidemiological curve of detection for PRRSV Lineage 1C variant (L1C.5) strain.

#### SDRS Advisory Group highlights:

• Overall, 23.76% of 6,486 cases tested PRRSV-positive in January, a moderate decrease from 27.22% of 6,878 in December;

• Positivity in the adult/sow category in January was 20.39% (629 of 3,085), similar to 21.67% (681 of 3,143) in December;

• Positivity in the wean-to-market category in January was 39.1% (701 of 1,793), a moderate decrease from 43.63% (898 of 2,058) in December;

• PRRSV had a decrease in positivity in both wean-to-market and adult/sow farms in January, which is unusual for this month, according to our historical database. However, this is the fourth consecutive month (since November of 2023) of low average Ct value in the PRRSV submissions (average varies between 25-26).;

• The predominant PRRSV wildtype ORF5 sequences detected since November 2023 are the Lineages L1C.5 (variant) (558), Lineage 1A 1-7-4 (215), L1H 1-8-4 (123), L1C.2 1-2-4 (122), and L1C.5 (variant) 1-4-3 (77);

• Different regional PRRSV wild-type ORF5 sequences were detected in 2023. Within states, the major wild-type dominant strain and percentual of state detections were: a) Lineage 1A: NC 83%, IN 55%, OH 53%, IL 34%; b) Lineage 1C.5 9 (L1C variant) MO 75%, SD 67%, MN 64%, NE 45%, IA 43%; c) Lineage 1H: KS 76%, OK 51%;

• The advisory group highlighted to interpret with caution the decreased activity of PRRSV observed in January; it will be great if the decrease in positivity continues for the upcoming months, but this is not what is realistically expected. The advisory pointed out that the decrease in positivity might be due to more pigs being placed as known to be positive, and some production systems do not sample these animals downstream for PRRSV testing once they know their PRRS status.



#### SDRS Advisory Group highlights:

• Overall, 11.43% of 3,630 cases tested PEDV-positive in January, a moderate increase from 9.04% of 3,439 in December;

• Positivity in the adult/sow category in January was 14.15% (185 of 1,307), a moderate increase from 11.1% (137 of 1,234) in December;

• Positivity in the wean-to-market category in January was 14.05% (193 of 1,374), a moderate increase from 10.27% (135 of 1,314) in December;

• Overall, 4.72% of 3,541 cases tested PDCoV-positive in January, similar to 3.3% of 3,366 in December;

• Positivity in the adult/sow category in January was 1.35% (17 of 1,257), similar to 1.52% (18 of 1,187) in December;

• Positivity in the wean-to-market category in January was 9.47% (128 of 1,351), a moderate increase from 4.98% (65 of 1,304) in December;

• There was 0 positive case for TGEV RNA-PCR in December, 2024 over a total of 3,239 cases tested. It has been 33 months (with a total of 114,239 cases tested) since the last TGEV PCR-positive result;

• Since 2020, a pattern of increased detection above expected and alternating between PEDV and PDCoV has been occurring. PEDV had increased detection in 2020 and 2022 and PDCoV in 2021 and 2023;

• The advisory group highlighted that this pattern might occur due to herd immunity waning. Once the site is positive, a common practice is to expose the whole herd in an effort to generate immunity, stabilize the herd, and eliminate PEDV. Once the herd is stabilized, naïve gilts enter the system, which might increase the number of susceptible animals. Also, the advisory reinforces the importance of biosecurity in this period of increased PEDV and PDCoV positivity in January;



## Topic 3 – Detection of M. hyopneumoniae DNA by PCR.





**Figure 3. Top:** Left MHP; MHP Case results tested by PCR over time. Right MHP PCR-positive results, by category over time. **Bottom:** expected percentage of positive results for MHP by PCR and 95% confidence interval for 2024 predicted value, based on weekly data observed in the previous 5 years.

### SDRS Advisory Group highlights:

- Overall, 8.83% of 691 cases tested *M. hyopneumoniae*-positive cases in January, similar to 10.66% of 816 in December;
  - Positivity in the adult/sow category in January was 9.17% (20 of 218), a moderate decrease from 12.35% (30 of 243) in December;
  - Positivity in the wean-to-market category in January was 12.27% (34 of 277), similar to 12.24% (42 of 343) in December;



Figure 1. Top: Left: Results of PCV2 PCR cases over time; Right: PCV2 PCR-positive results, by category over time. Middle: Left: Average Ct values of PCV2 submissions by specimen; Right: Average Ct values of PCV2 tissue submissions by U.S. region; Central (IA), East Central (IL, IN, MO and WI), Eastern (AL, AR, CT, DE, FL, GA, KY, LA, MA, ME, MD, MI, MS, NC, NH, NJ, NY, OH, PA, RI, SC, TN VA, VT and WA), North Central (MN, ND and SD), Western (AK, AZ, CA, CO, HI, ID, KS, MT, NM, NV, OK, OR, TX, UT, WA and WY). Bottom Left: Results of PCV3 PCR cases over time; Right: PCV3 PCR-positive results, by category over time.

#### SDRS Advisory Group highlights:

• Overall, 37.44% of 812 cases tested PCV2-positive in January, a moderate decrease from 40.93% of 992 in December;

• Positivity in the adult/sow category in January was 34.09% (136 of 399), a substantial decrease from 40.31% (185 of 459) in December;

• Positivity in the wean-to-market category in January was 44.79% (146 of 326), similar to 44.06% (193 of 438) in December;

• In the month of January, the regions with the lowest PCV2 average Ct values was Western (4 submissions; average Ct 17.6), Central (39 submissions; average Ct 23.6), Eastern (31 submissions; average Ct 24.2), East Central (16 submissions; average Ct 25.9), and North Central (35 submissions; average Ct 26.1);

• Overall, 47.36% of 606 cases tested PCV3-positive in January, a moderate increase from 42.98% of 691 in December;

• Positivity in the adult/sow category in January was 63.52% (195 of 307), a moderate increase from 59.86% (173 of 289) in December;

• Positivity in the wean-to-market category in January was 32.57% (71 of 218), similar to 32.82% (106 of 323) in December;



## Topic 5 – Detection of Influenza A Virus (IAV) RNA by RT-PCR.



Figure 3. Top: Left Results of IAV PCR cases over time. Right Percentage of IAV PCR-positive results, by category over time. Bottom: Left expected percentage of positive results for IAV by PCR and 95% confidence interval for 2024 predicted value, based on weekly data observed in the previous 5 years. Right Number of IAV subtyping PCR detection over time; (Partial - only hemagglutinin or neuraminidase region detected; Mixed - 3 or more haemagglutinin and neuroamnidase regions detected. i.e., "H1 H3 N1").

#### SDRS Advisory Group highlights:

• Overall, 30.78% of 2,235 cases tested IAV-positive cases in January, a moderate decrease from 33.32% of 2,515 in December;

• Positivity in the adult/sow category in January was 25.79% (106 of 411), a moderate decrease from 28.44% (128 of 450) in December;

• Positivity in the wean-to-market category in January was 37.99% (397 of 1,045), similar to 37.69% (435 of 1,154) in December.

• Overall, 5.02% of 538 samples had mixed subtype detection in January, similar to 4.08% of 588 in December;





### Topic 6 – 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, Magstadt, Mainenti, Michael, Piñeyro, Siepker, Madson, Thomas 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 December. 1 to Jamuary. 19, 2024.

#### SDRS Advisory Group highlights:

• PRRSV (581) led cases with confirmed etiology, followed by *S. suis* (385), and Influenza A (185). PRRSV (581 of 2575) led the number of confirmed respiratory diagnoses, Rotavirus (129 of 477) lead the number of confirmed digestive diagnoses, and *S. suis* (39 of 75) led the number of confirmed neurological diagnoses.

• Actinobacillus suis entered the top 10 monthly confirmed tissue diagnoses at the ISU-VDL. However, the number of cases is consistent with the historical data for December and January.



**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.

# Weekly monitoring of Influenza A virus (IAV) PCR detection incorporated into the SDRS reports

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The Swine Disease Reporting System (SDRS) aims to monitor endemic and emerging diseases affecting the swine population in the USA and share information with stakeholders, assisting veterinarians and producers in making informed decisions on disease prevention, detection, and management. Influenza A virus has a bi-seasonal detection pattern with higher detection in the Spring (March-May) and Fall (September-November) months. Oral fluid has been the main specimen tested for IAV RNA PCR, and overall, H1N1 has been the primary subtype detected over the years. After a request from our stakeholders, the SDRS brings onboard IAV weekly monitoring charts, including the forecasted predicted value for the year 2024 with a 95% confidence interval. The newly implemented monitoring capability provides the industry with information about IAV detection and its comparison according to the historical expected for a specific period.



Figure 1: Expected percentage of positive results for IAV by PCR and 95% confidence interval for 2024 predicted value, based on weekly PCR data observed in the previous 5 years. Red line: actual value, blue line: predicted value; blue shade: 95% confidence interval;