

Swine Disease Reporting System

Report # 74 (April 02, 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 Linares](#) & [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, Hemant Naikare.

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/Lineage report and BLAST tool: Benchmark PRRSV ORF5 sequences and compare your PRRSV sequence with what have been detected in the U.S.

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 Lauren Glowzenski.

In addition to this report, [interactive dashboards](#) and [educational material](#) are publicly available.

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

Communications and information contained in this report are for general informational and educational purposes only and are not to be construed as recommending or advocating a specific course of action.

Topic 1 – Detection of PRRSV RNA over time by RT-qPCR.

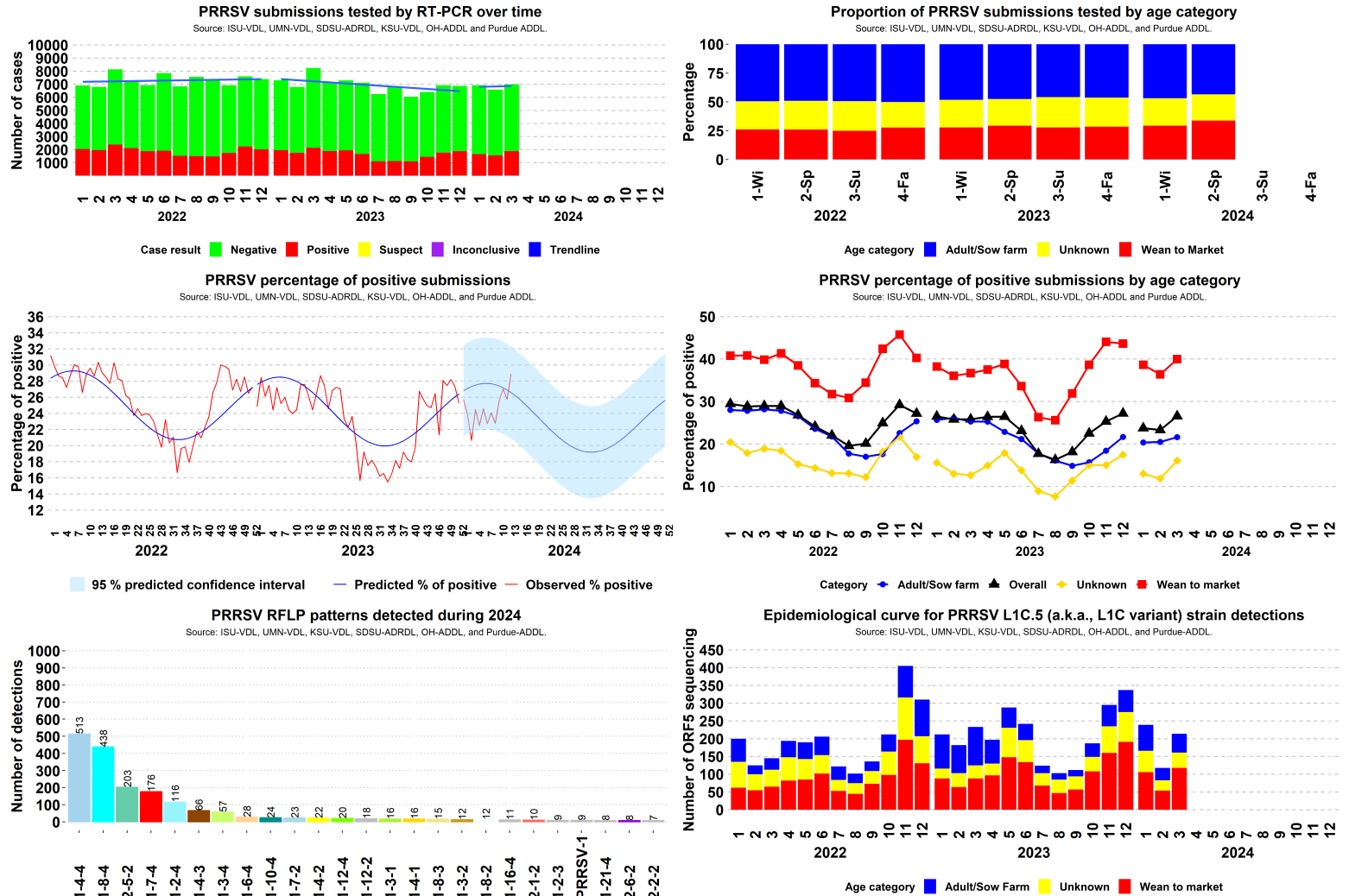


Figure 1. **Top:** *Left:* Results of PRRSV RT-PCR cases over time; *Right:* Proportion of accession ID cases tested for PRRSV by age group per year and season. **Middle:** *Left* Expected percentage of positive results for PRRSV RNA by RT-qPCR, with 95% confidence interval band for predicted results 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, 26.55% of 6,999 cases tested PRRSV-positive in March, a moderate increase from 23.32% of 6,588 in February;
- Positivity in the adult/sow category in March was 21.62% (657 of 3,039), similar to 20.49% (623 of 3,041) in February;
- Positivity in the wean-to-market category in March was 39.97% (944 of 2,362), a moderate increase from 36.39% (730 of 2,006) in February;
- Overall PRRSV-percentage of positive cases was 3 standard deviations above state-specific baselines in SD and IN;
- During March 2024, PRRSV L1C.5 (variant) strains were detected in IA (121), MN (35), MO (27), NE (16), OH (4), SD (3), IL (3), and IN (2).
- The advisory group highlighted that the PRRSV-positivity remains high in the wean-to-market category because some states are still facing PRRSV outbreaks in finishing sites. However, in some states like Indiana, the positivity might be high due to testing strategies, with more testing in finishing sites.

Topic 2 – Enteric coronavirus RNA detection by RT-qPCR

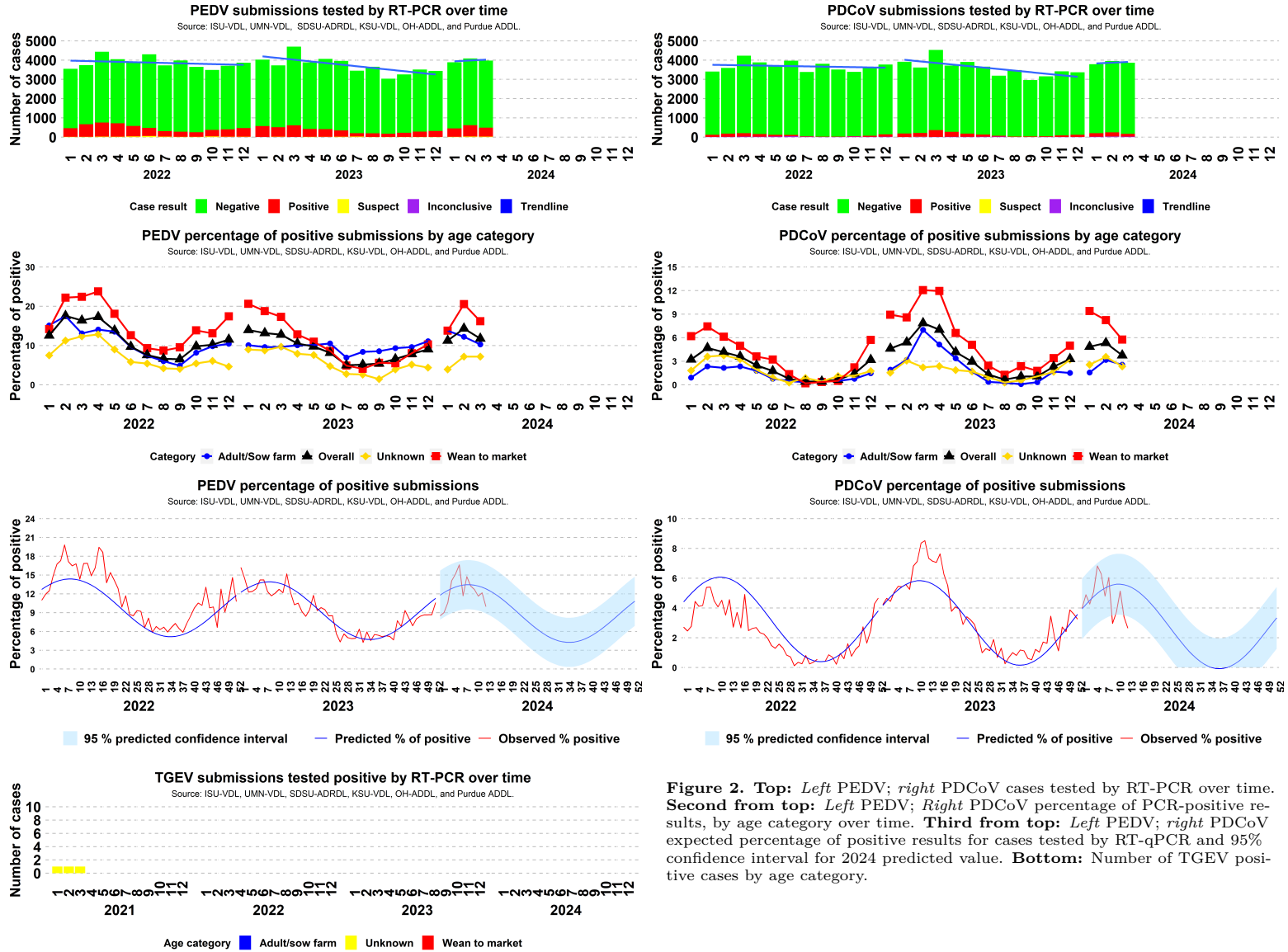


Figure 2. Top: Left PEDV; right PDCoV cases tested by RT-PCR over time. **Second from top:** Left PEDV; Right PDCoV percentage of PCR-positive results, by age category over time. **Third from top:** Left PEDV; right PDCoV expected percentage of positive results for cases tested by RT-qPCR and 95% confidence interval for 2024 predicted value. **Bottom:** Number of TGEV positive cases by age category.

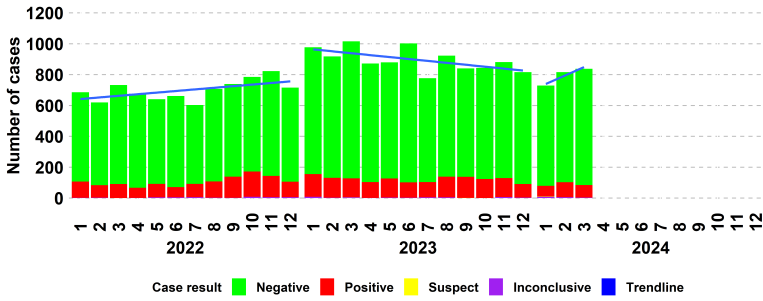
SDRS Advisory Group highlights:

- Overall, 11.77% of 3,975 cases tested PEDV-positive in March, a moderate decrease from 14.34% of 4,087 in February;
- Positivity in the adult/sow category in March was 10.3% (149 of 1,447), similar to 12.25% (177 of 1,445) in February;
- Positivity in the wean-to-market category in March was 16.19% (247 of 1,526), a moderate decrease from 20.56% (337 of 1,639) in February;
- Overall PEDV-percentage of positive cases was 3 standard deviations above state-specific baselines in KS;
- Overall, 3.75% of 3,865 cases tested PDCoV-positive in March, similar to 5.34% of 3,952 in February;
- Positivity in the adult/sow category in March was 2.55% (35 of 1,374), similar to 3.17% (43 of 1,355) in February;
- Positivity in the wean-to-market category in March was 5.76% (87 of 1,511), a moderate decrease from 8.24% (133 of 1,615) in February;
- Overall PDCoV-percentage of positive cases was 3 standard deviations above state-specific baselines in MN and MO;
- There was 0 positive case for TGEV RNA-PCR in March, 2024 over a total of 3,697 cases tested. It has been 36 months (with a total of 125,495 cases tested) since the last TGEV PCR-positive result;

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

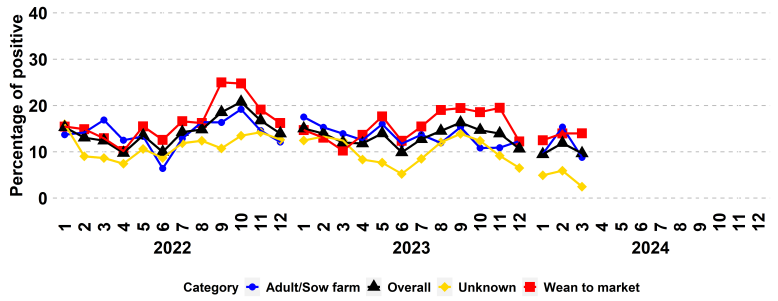
Mycoplasma hyopneumoniae submissions tested by RT-PCR over time

Source: ISU-VDL, UMN-VDL, SDSU-ADRDL, KSU-VDL, OH-ADDL, and Purdue ADDL.



Mycoplasma hyopneumoniae percentage of positive submissions by age category

Source: ISU-VDL, UMN-VDL, SDSU-ADRDL, KSU-VDL, OH-ADDL, and Purdue ADDL.



Mycoplasma hyopneumoniae percentage of positive submissions

Source: ISU-VDL, UMN-VDL, SDSU-ADRDL, KSU-VDL, OH-ADDL, and Purdue ADDL.

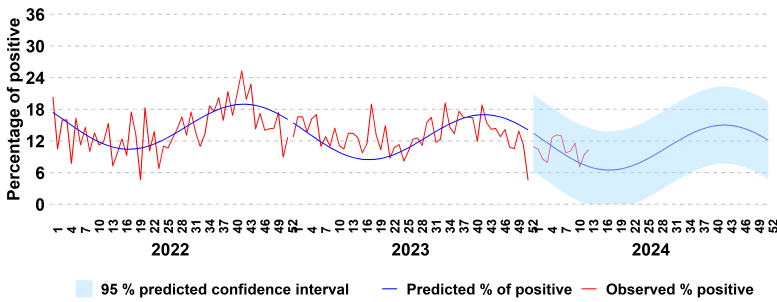


Figure 3. Top: Left MHP; MHP Case results tested by PCR over time. **Right** MHP PCR-positive results, by category over time. **Bottom:** expected percentage of positive results for MHP by PCR and 95% confidence interval for 2024 predicted value, based on weekly data observed in the previous 5 years.

SDRS Advisory Group highlights:

- Overall, 9.67% of 838 cases tested *M. hyopneumoniae*-positive cases in March, a moderate decrease from 11.89% of 816 in February;
 - Positivity in the adult/sow category in March was 8.8% (22 of 250), a substantial decrease from 15.35% (37 of 241) in February;
 - Positivity in the wean-to-market category in March was 13.99% (54 of 386), similar to 13.98% (45 of 322) in February;
- Overall MHP-percentage of positive cases was 3 standard deviations above state-specific baselines in SD;

Topic 4 – Detection of Porcine Circoviruses type 2 and 3 DNA by PCR.

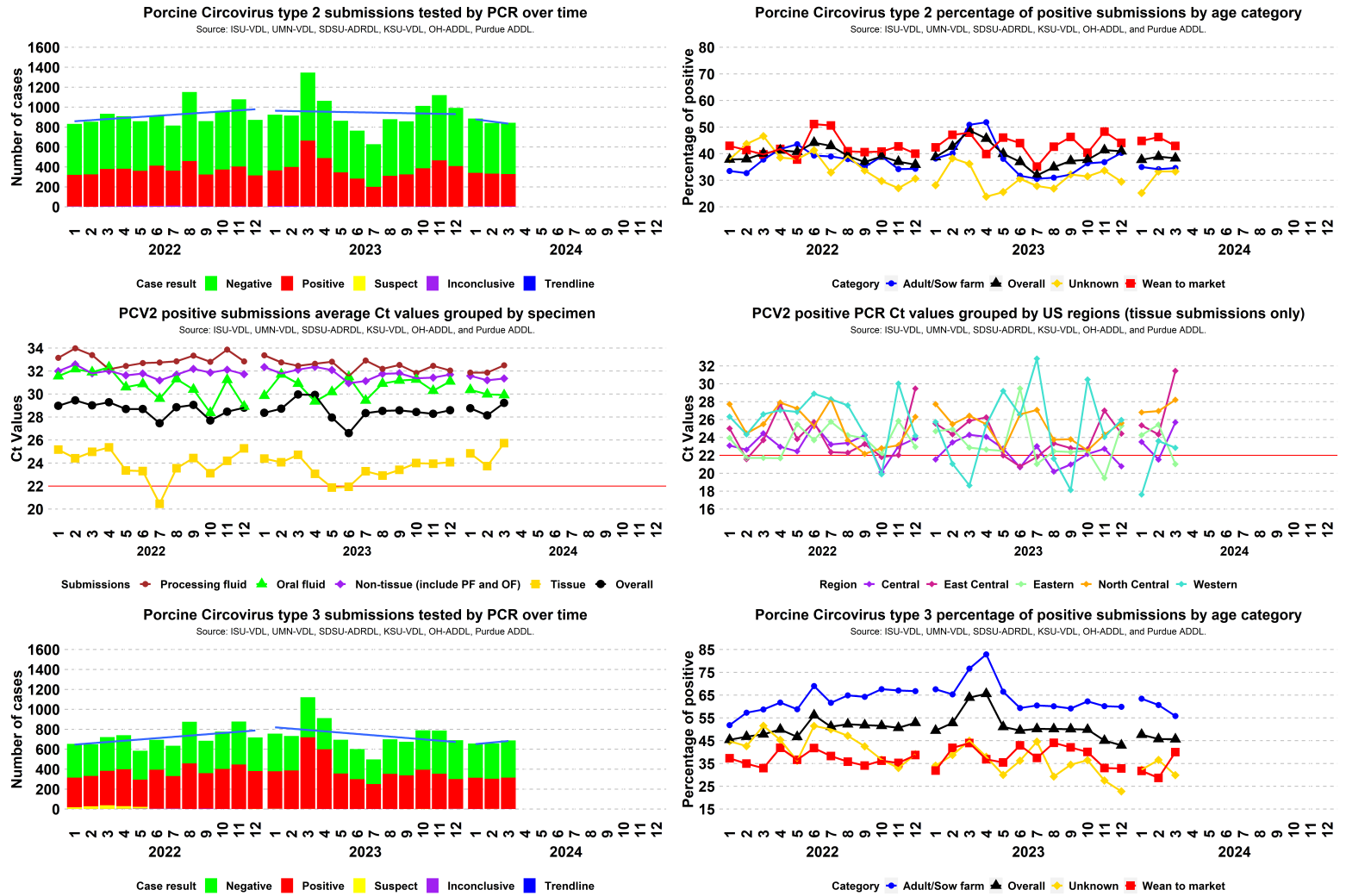


Figure 1. Top: *Left:* Results of PCV2 PCR cases over time; *Right:* PCV2 PCR-positive results, by category over time. **Middle:** *Left:* Average Ct values of PCV2 submissions by specimen; *Right:* Average Ct values of PCV2 tissue submissions by U.S. region; Central (IA), East Central (IL, IN, MO and 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; **Bottom Right:** PCV3 PCR-positive results, by category over time.

SDRS Advisory Group highlights:

- Overall, 38.32% of 843 cases tested PCV2-positive in March, similar to 38.88% of 841 in February;
 - Positivity in the adult/sow category in March was 34.62% (126 of 364), similar to 34.18% (135 of 395) in February;
 - Positivity in the wean-to-market category in March was 42.93% (167 of 389), a moderate decrease from 46.27% (155 of 335) in February;
- In the month of March, the regions with the lowest PCV2 average Ct values in tissue submissions was Eastern (17 submissions; average Ct 21), Western (9 submissions; average Ct 22.8), Central (52 submissions; average Ct 25.7), North Central (19 submissions; average Ct 28.2), and East Central (16 submissions; average Ct 31.4);
- Overall, 45.64% of 688 cases tested PCV3-positive in March, similar to 45.74% of 658 in February;
 - Positivity in the adult/sow category in March was 55.81% (168 of 301), a moderate decrease from 60.67% (199 of 328) in February;
 - Positivity in the wean-to-market category in March was 40% (120 of 300), a marked increase from 28.69% (68 of 237) in February.

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

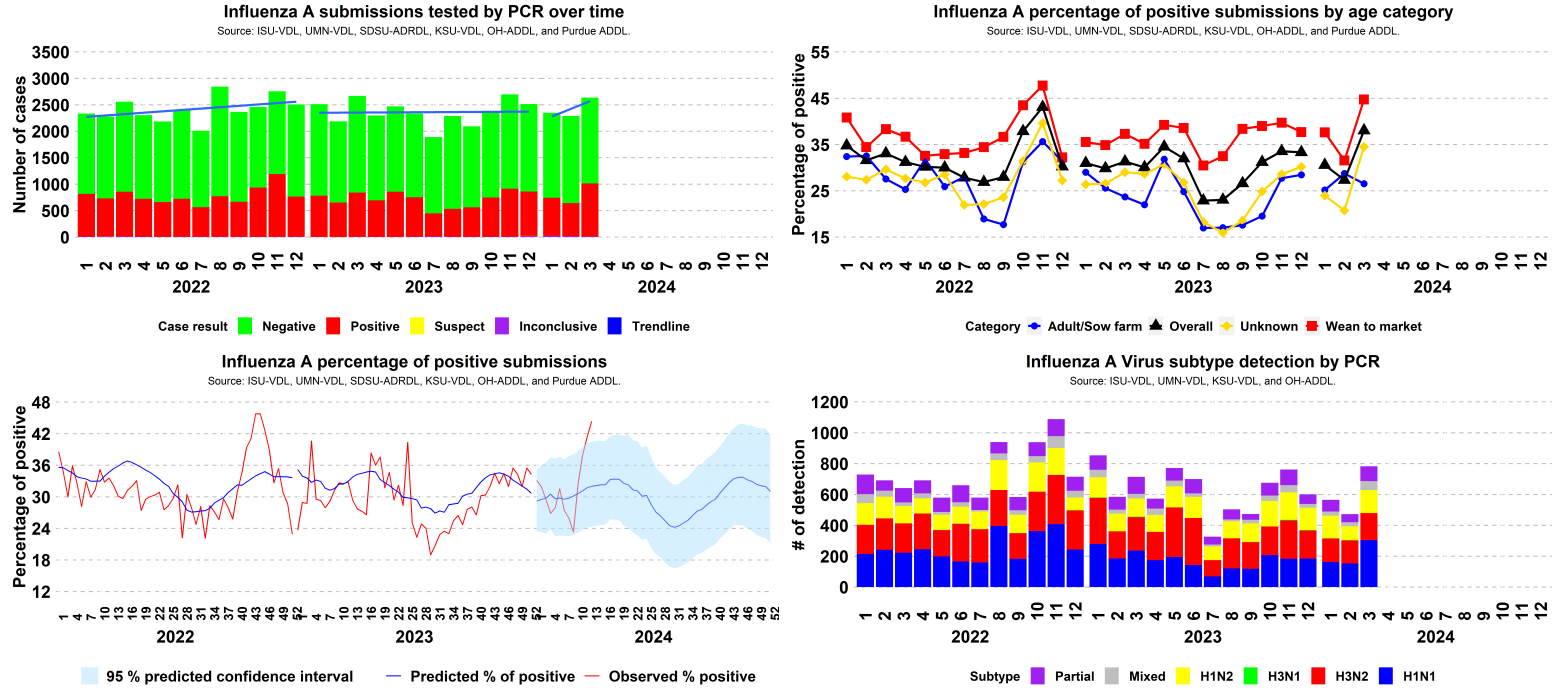


Figure 3. Top: *Left* Results of IAV PCR cases over time. *Right* Percentage of IAV PCR-positive results, by category over time. **Bottom:** *Left* expected percentage of positive results for IAV by PCR and 95% confidence interval for 2024 predicted value, based on weekly data observed in the previous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

SDRS Advisory Group highlights:

- Overall, 38.04% of 2,637 cases tested IAV-positive cases in March, a marked increase from 27.33% of 2,287 in February;
 - Positivity in the adult/sow category in March was 26.52% (135 of 509), a moderate decrease from 28.74% (148 of 515) in February;
 - Positivity in the wean-to-market category in March was 44.72% (585 of 1,308), a marked increase from 31.55% (319 of 1,011) in February.
- Overall IAV-percentage of positive cases was 3 standard deviations above state-specific baselines in IA;
- Overall, 7.54% of 783 samples had mixed subtype detection in March, a moderate increase from 5.5% of 473 in February.
- In March, 51% (296 of 584) of the IAV-positive cases in the wean-to-market category were from lung samples.

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.

Influenza A virus State-Level Monitoring available at the SDRS online dashboard

Jai Tatineni¹, Guilherme Cezar¹, Kinath Rupasinghe¹, Daniel Linhares¹, Giovanni Trevisan¹,
 1 - Swine Disease Reporting System office, Ames, Iowa, USA.

The Swine Disease Reporting System (SDRS) monitors endemic and emerging diseases affecting the swine population in the USA and shares information with stakeholders, assisting veterinarians and producers in making informed decisions on disease prevention, detection, and management. After a request from our stakeholders, the SDRS brings onboard the IAV state-level monitoring dashboard. The algorithms behind the new dashboard use IAV RT-rtPCR testing data from 2013-2023 from participant VDLs to calculate monthly overall state-level changes in the percentage of positive cases using exponential smoothing models (ESMs) to forecast the expected 12-month period in 2024. Then, the actual and predicted values residuals are scanned by an exponential weighted moving average (EWMA) model to monitor and inform potential alterations from the expected baseline. A color coding approach is used on a map for visualization of changes from state-specific baselines as no changes or within expected (green color), standard deviations above state-specific baseline 2-3 (light red), or >3 (dark red) or standard deviations below state-specific baseline 2-3 (light blue), or <3 STD (dark blue). The newly implemented monitoring capability provides the industry with information about IAV detection and its comparison according to the historical expected for each state monitored by the SDRS. The dashboard can be found in the [SDRS website](#).

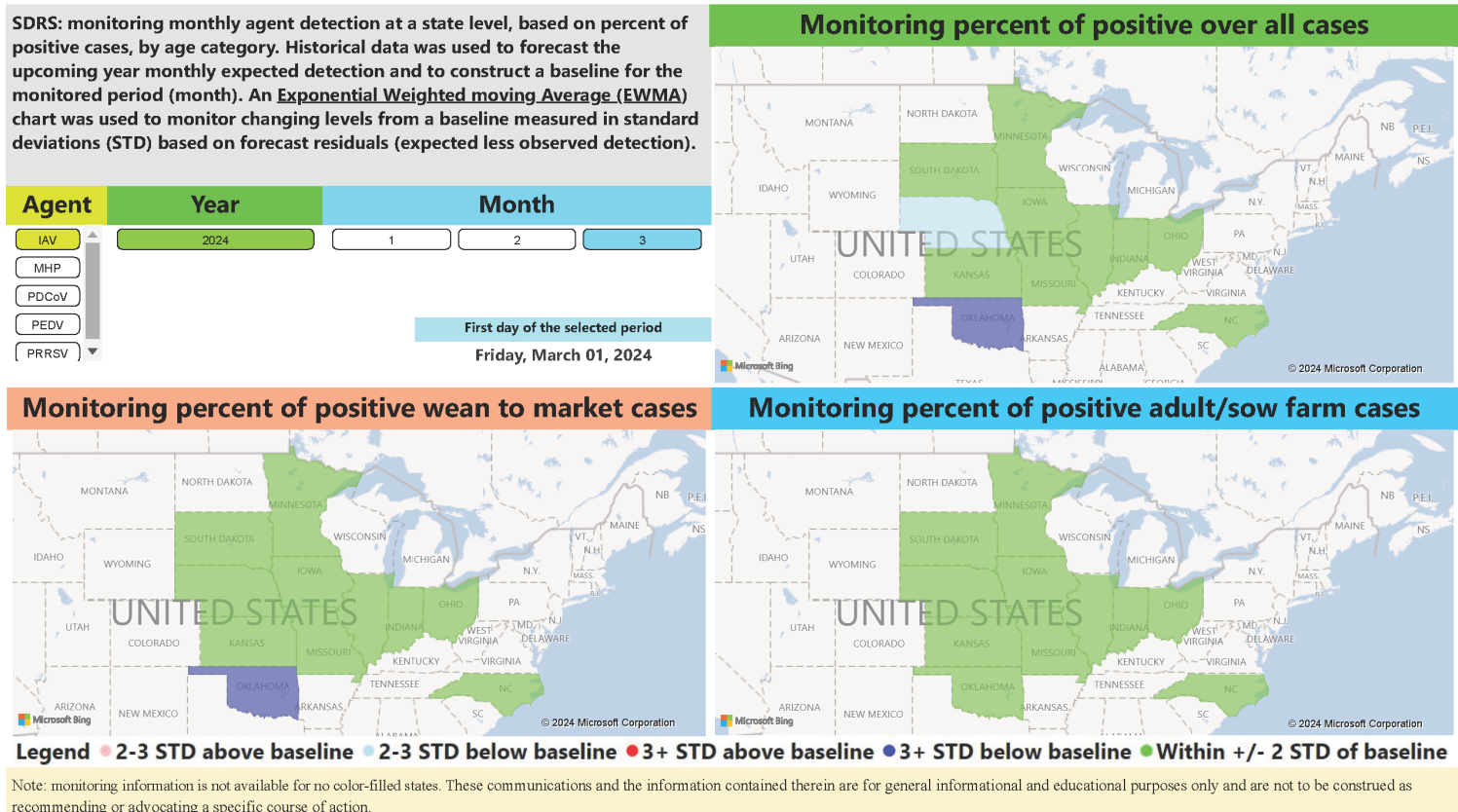


Figure 1: Influenza state level monitoring. Each color-filled represents the changes in standard deviation from the predicted states specific percentage of positive submissions baseline.