

Swine Disease Reporting System

Report # 80 (October 01, 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.

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, 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 ADDL, and Purdue ADDL.

Collaborators:

Swine Disease Reporting System office: Principal investigators: [Daniel Linhares](#) & [Giovani Trevisan](#); Project coordinator: [Guilherme Cezar](#), Extension and Outreach: [Edison Magalhães](#).

Iowa State University: Gustavo Silva, Marcelo Almeida, Bret Crim, Kinath Rupasinghe, Srijita Chandra, Eric Burrough, Phillip Gauger, Joseph Thomas, Darin Madson, Michael Zeller, Rodger Main.

University of Minnesota: Mary Thurn, Paulo Lages, Cesar Corzo, Stephanie Rossow, Matt Sturos, Hemant Naikare.

Kansas State University and *Kansas Dept. of Agr.:* Rob McGaughey, Franco Matias-Ferreyra, Jamie Retallick, Jordan Gebhardt, Sara McReynolds.

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

Ohio Animal Disease and Diag. Lab. and *The Ohio State University:* Melanie Prarat, Dennis Summers, Andréia Arruda.

Purdue University and *Indiana State BOAH:* Craig Bowen, Kenitra Hendrix, Joseph Boyle, James Lyons, Kelli Werling.

Disease Diagnosis System: Consisting of reporting disease diagnosis (not just pathogen detection by PCR), based on diagnostic codes assigned by veterinary diagnosticians from ISU-VDL.

PRRSView and **FLUture:** Aggregates PRRSV and influenza A virus diagnostic data from the ISU-VDL.

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 is available in the [Spotify](#), [Apple Podcast](#), [Google podcast](#), [YouTube](#), [LinkedIn](#), and the [SDRS webpage](#). In addition to this report, [interactive dashboards](#) and [educational material](#) are publicly available.

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 Glowzinski.

Note: This report contains data up to September 30, 2024.

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

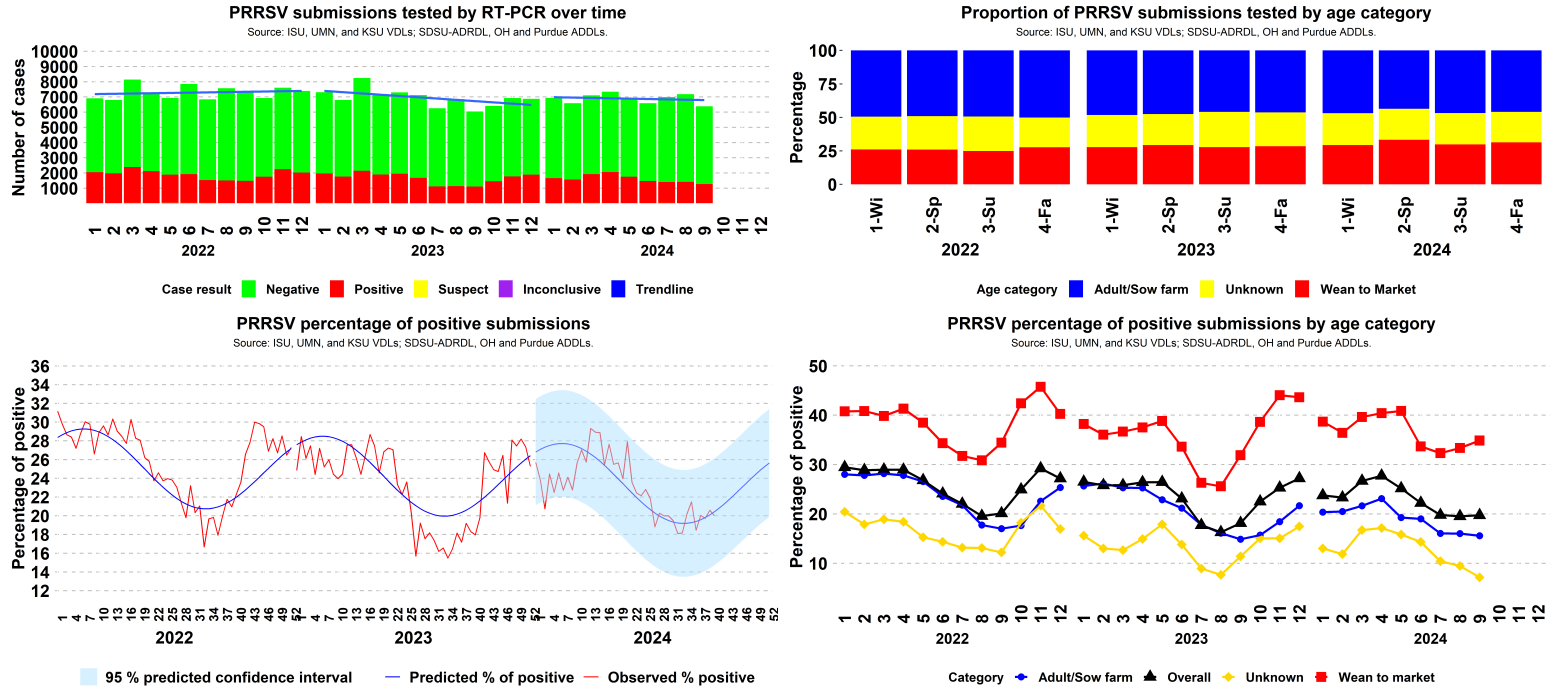
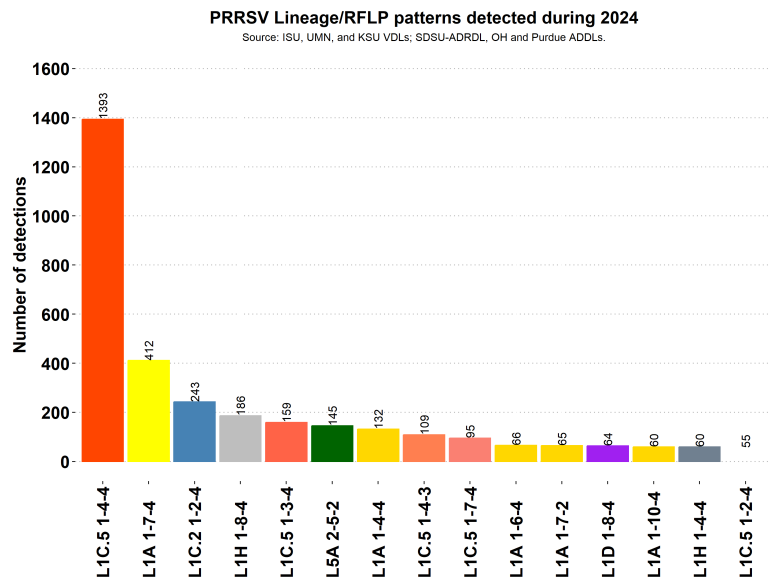
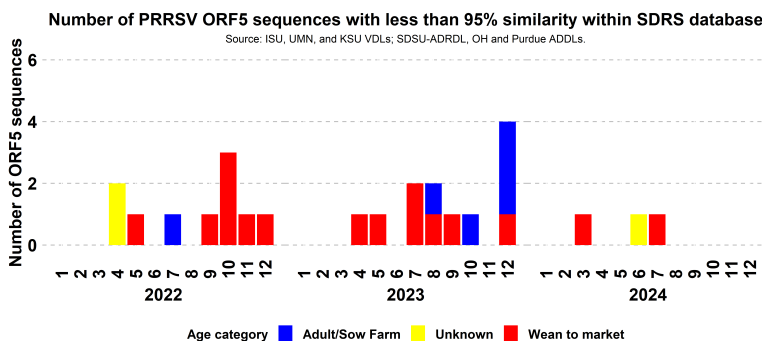
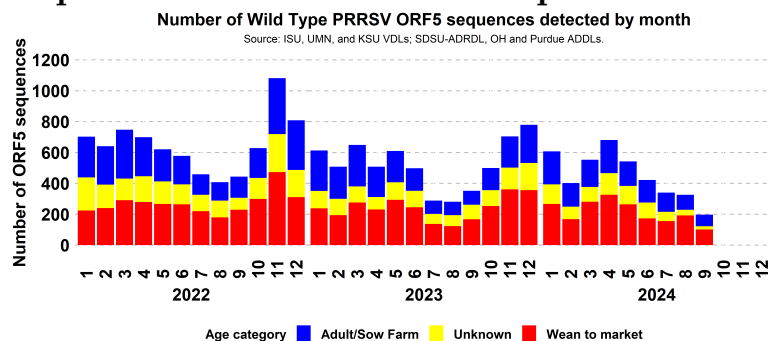


Figure 1. Top: *Left:* Results of PRRSV RT-PCR cases over time; *Right:* Proportion of accession ID cases tested for PRRSV by age group per year and season. **Bottom:** *Left* Expected percentage of positive results for PRRSV RNA by RT-qPCR, with 95% confidence interval band for predicted results based 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.

SDRS Advisory Group highlights:

- Overall, 19.73% of 6,382 cases tested PRRSV-positive in September, similar to 19.54% of 7,181 in August;
 - Positivity in the adult/sow category in September was 15.58% (456 of 2,926), similar to 16.02% (549 of 3,426) in August;
 - Positivity in the wean-to-market category in September was 34.86% (699 of 2,005), similar to 33.35% (696 of 2,087) in August;
- Overall PRRSV-percentage of positive cases was 3 standard deviations above state-specific baselines in IA, OK, and SD;

Topic 2 – PRRSV ORF5 sequences detection over time



Most frequent PRRSV strains detected across U.S. states
Source: ISU, UMN, and KSU VDLs; SDSU-ADRDL, OH and Purdue ADDLs.

Site/State	First Most Frequent	Second Most Frequent	Third Most Frequent
IA	L1C.5 1-4-4	L1A 1-7-4	L1C.2 1-2-4
IL	L1C.2 1-2-4	L1A 1-7-4	L1A 1-3-4
IN	L1A 1-7-4	L1A 1-7-2	L1A 1-4-3
KS	L1H 1-8-4	L1A 1-10-3	L1A 1-7-4
MN	L1C.5 1-4-4	L1A 1-7-4	L1C.5 1-4-3
MO	L1C.5 1-4-4	L1C.5 1-3-4	L1C.5 1-7-4
NC	L1A 1-7-4	L1A 1-4-4	PRRSV-1
NE	L1C.5 1-4-4	L1C.5 1-2-3	L1H 1-8-4
OH	L1A 1-4-4	L1C.5 1-4-3	L1A 1-7-2
OK	L5A 2-2-2	L1H 1-4-4	L1A 1-7-4
SD	L1C.5 1-4-4	L1C.3 1-4-1	L1A 1-7-4

Figure 1. Top: Left: Number of PRRSV ORF5 sequences detected by age category; **Right:** Number of PRRSV ORF5 sequences with less than 95% similarity after BLAST analysis with the sequences in the SDRS database (Sequences with more than 6 ambiguities, sequences with less than 597 nucleotides or higher than 606 nucleotides are not included in this analysis); **Bottom Left:** 15 PRRSV ORF5 sequences most frequent detected by Lineage and RFLP; **Right:** Most frequent detected PRRSV ORF5 sequences by lineage and RFLP at U.S. state level.

SDRS Advisory Group highlights:

- During September 2024, The states with higher number of PRRSV L1C.5 (variant) detections were detected IA, MO, NE, MN, IL, IN (respective number of sequences: 74, 5, 5, 2, 1, 1).
- In September L1C.5 1-4-4 (60) was the PRRSV sequence most detected in the U.S., followed by L1A 1-7-4 (30), and L1C.5 1-3-4 (11);
- Click on the links here to access the [PRRSV genotype dashboard](#) and the [SDRS Blast tool](#) to compare your PRRSV ORF5 sequence with the SDRS database.

Topic 2 – Enteric coronavirus RNA detection by RT-qPCR

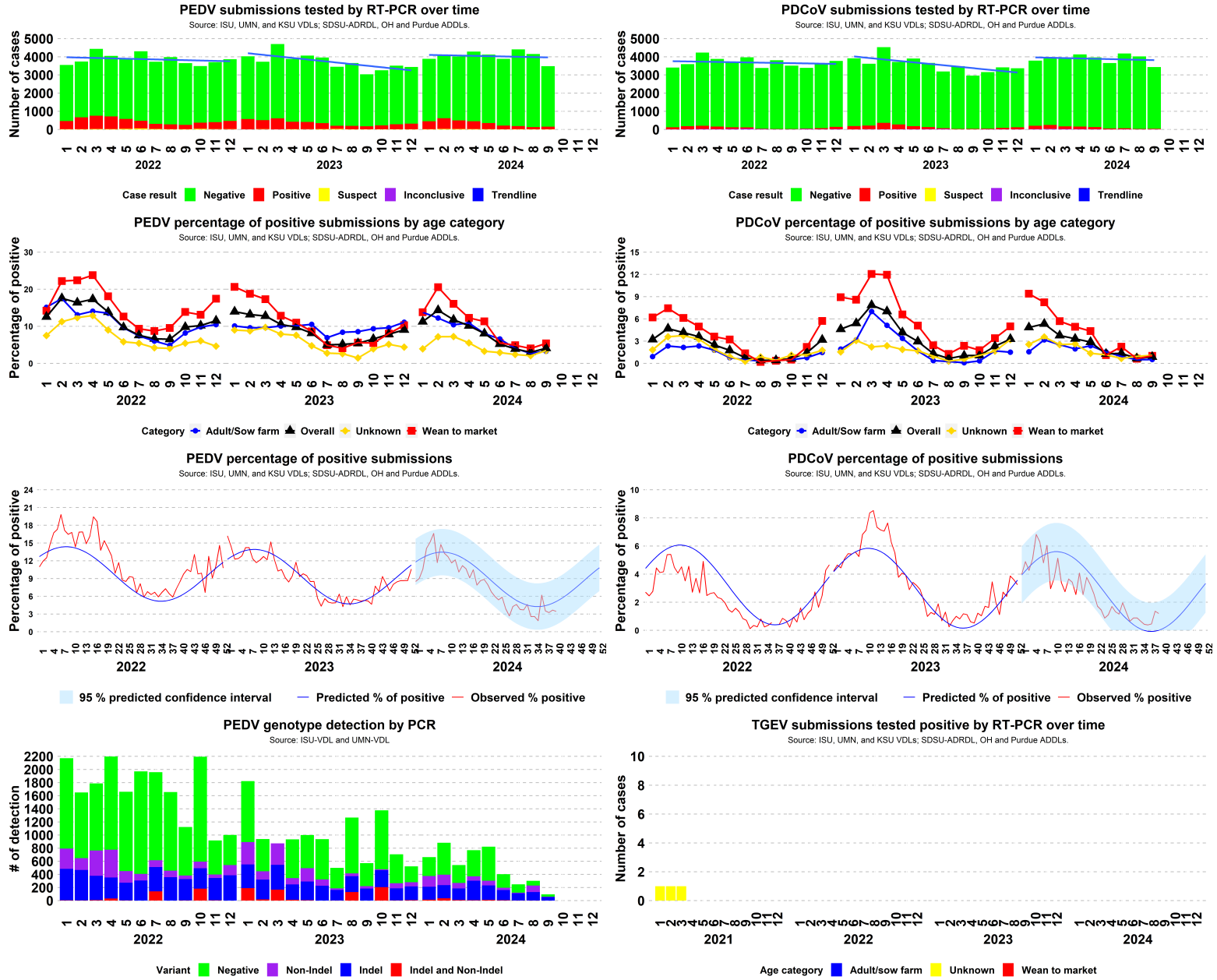


Figure 1. Top: Left PEDV; Right PDCoV cases tested by RT-PCR over time; **Second from top:** Left PEDV; Right PDCoV percentage of positive PCR positive results, by age category over time. **Third from top:** Left PEDV; Right PDCoV expected percentage of positive results for cases tested by RT-PCR and 95% confidence interval for 2024 predicted value. **Bottom Left:** Number of PEDV genotype detection over time; **Right:** Number of TGEV positive cases by age category.

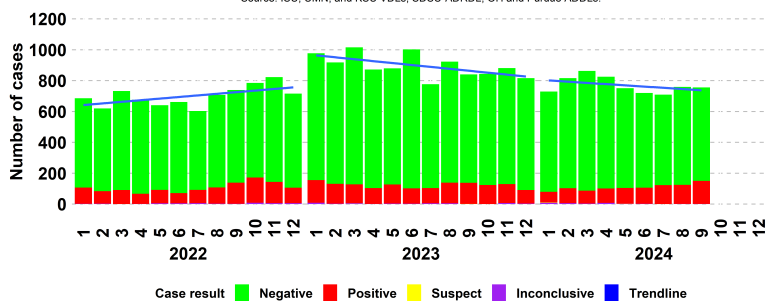
SDRS Advisory Group highlights:

- Overall, 4.1% of 3,485 cases tested PEDV-positive in September, similar to 2.99% of 4,151 in August;
 - Positivity in the adult/sow category in September was 3.27% (39 of 1,192), similar to 2.7% (40 of 1,484) in August;
 - Positivity in the wean-to-market category in September was 5.39% (69 of 1,281), similar to 4.03% (59 of 1,465) in August;
 - Overall PEDV-percentage of positive cases was 3 standard deviations above state-specific baselines in KS;
 - Overall, 0% of 95 samples had mixed PEDV genotype detection in September, similar to 0.66% of 302 in August;
- Overall, 0.87% of 3,436 cases tested PDCoV-positive in September, similar to 0.67% of 4,021 in August;
 - Positivity in the adult/sow category in September was 0.52% (6 of 1,155), similar to 0.49% (7 of 1,422) in August;
 - Positivity in the wean-to-market category in September was 1.02% (13 of 1,277), similar to 0.63% (9 of 1,439) in August;
 - Overall PDCoV-percentage of positive cases was within state-specific baselines in all 11 monitored states;
- There was 0 positive case for TGEV RNA-PCR in September, 2024 over a total of 3,316 cases tested. It has been 42 months (with a total of 148,139 cases tested) since the last TGEV PCR-positive result;

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

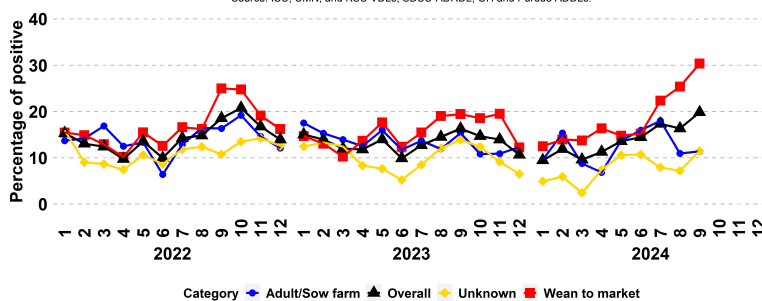
Mycoplasma hyopneumoniae submissions tested by PCR over time

Source: ISU, UMN, and KSU VDLs; SDSU-ADRDL, OH and Purdue ADDLs.



Mycoplasma hyopneumoniae percentage of positive submissions by age category

Source: ISU, UMN, and KSU VDLs; SDSU-ADRDL, OH and Purdue ADDLs.



Mycoplasma hyopneumoniae percentage of positive submissions

Source: ISU, UMN, and KSU VDLs; SDSU-ADRDL, OH and Purdue ADDLs.

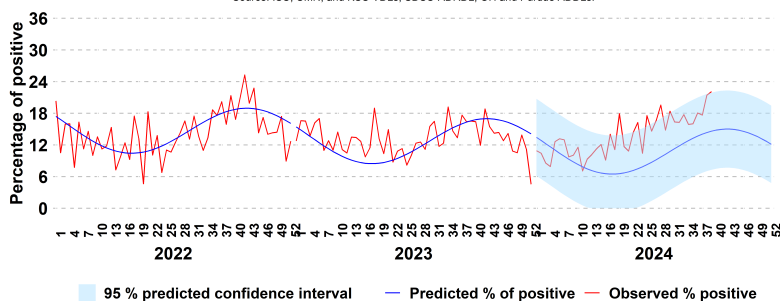


Figure 3. Top: Left MHP; MHP Case results tested by PCR over time. **Right** MHP PCR-positive results, by category over time. **Bottom:** expected percentage of positive results for MHP by PCR and 95% confidence interval for 2024 predicted value, based on weekly data observed in the previous 5 years.

SDRS Advisory Group highlights:

- Overall, 19.84% of 756 cases tested *M. hyopneumoniae*-positive cases in September, a moderate increase from 16.34% of 759 in August;
 - Positivity in the adult/sow category in September was 11.38% (28 of 246), similar to 10.94% (29 of 265) in August;
 - Positivity in the wean-to-market category in September was 30.36% (102 of 336), a moderate increase from 25.38% (83 of 327) in August;
- Overall MHP-percentage of positive cases was 3 standard deviations above state-specific baselines SD, IL, KS and OK;
- *Mycoplasma hyopneumoniae* percentage of positive submissions in the wean-to-market category reached a high level of positive in 2020, which had not been seen before since the efforts for the elimination of this pathogen started. However, the positivity levels in Adult/sow farms remained low.

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

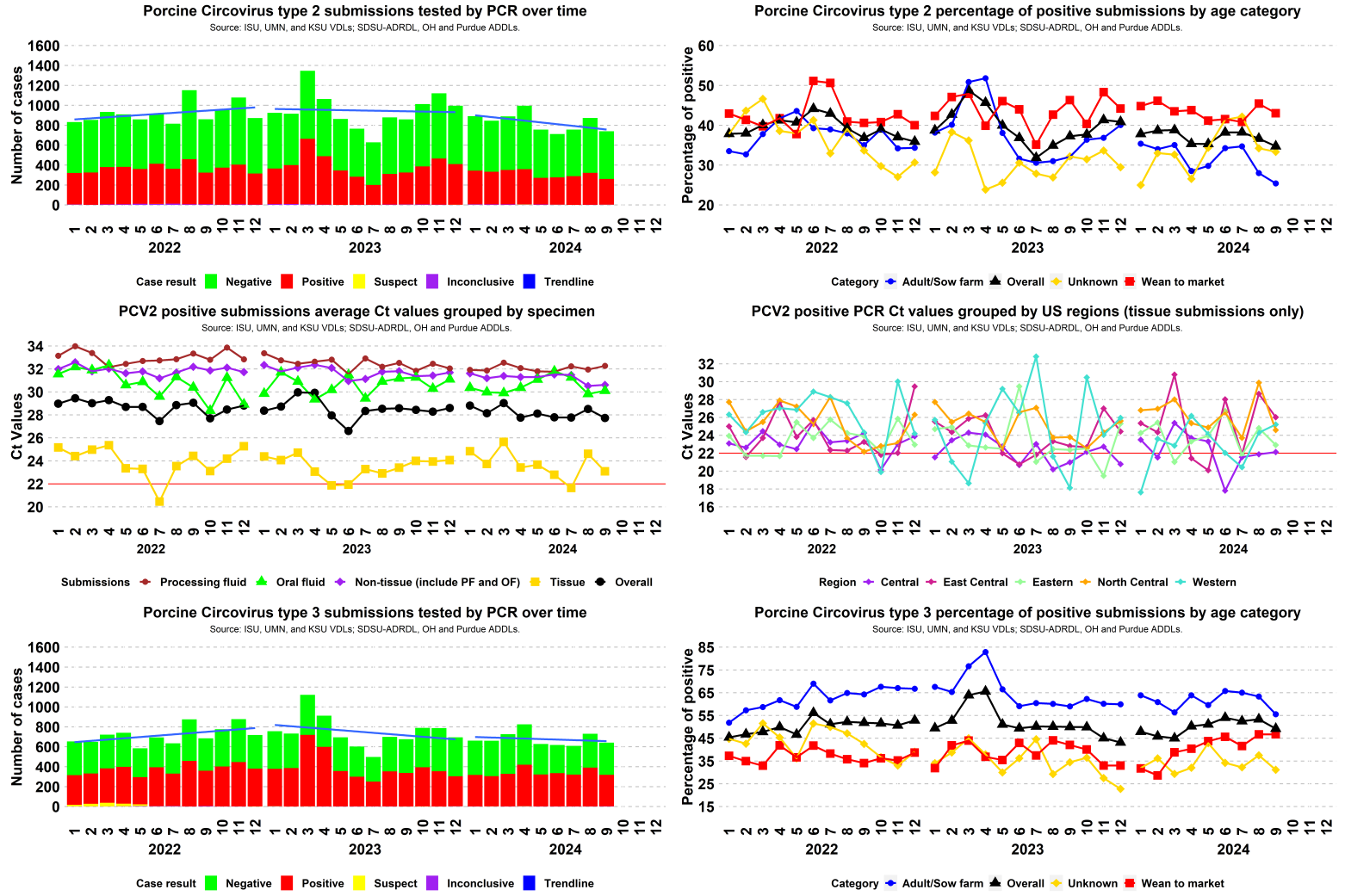


Figure 1. Top: *Left:* Results of PCV2 PCR cases over time; *Right:* PCV2 PCR-positive results, by category over time. **Middle:** *Left:* Average Ct values of PCV2 submissions by specimen; *Right:* Average Ct values of PCV2 tissue submissions by U.S. region; Central (IA), East Central (IL, IN, MO and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

SDRS Advisory Group highlights:

- Overall, 34.73% of 740 cases tested PCV2-positive in September, similar to 36.66% of 873 in August;
- Positivity in the adult/sow category in September was 25.41% (78 of 307), a moderate decrease from 27.99% (103 of 368) in August;
- Positivity in the wean-to-market category in September was 43.02% (154 of 358), a moderate decrease from 45.43% (179 of 394) in August;
- In the month of September, the regions with the lowest PCV2 average Ct values in tissue submissions was Central (43 submissions; average Ct 22.1), Eastern (18 submissions; average Ct 22.9), North Central (16 submissions; average Ct 24.6), Western (8 submissions; average Ct 25.2), and East Central (7 submissions; average Ct 26);
- Overall, 49.22% of 642 cases tested PCV3-positive in September, a moderate decrease from 53.35% of 731 in August;
- Positivity in the adult/sow category in September was 55.56% (160 of 288), a substantial decrease from 63.34% (216 of 341) in August;
- Positivity in the wean-to-market category in September was 46.76% (137 of 293), similar to 46.69% (141 of 302) in August.
- The advisory group highlighted that overall, there have been no clinical cases or significant issues with PCV2. Some regions have conducted testing and modified sanitation and vaccination approaches, but these are consistent with traditional experiences. There was speculation that economic challenges might have led to changes in vaccination protocols, which can explain the increase in positivity in the wean-to-market category in August. Mass vaccination efforts earlier in the year have been effective, and currently, there are no notable issues with PCV2.

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

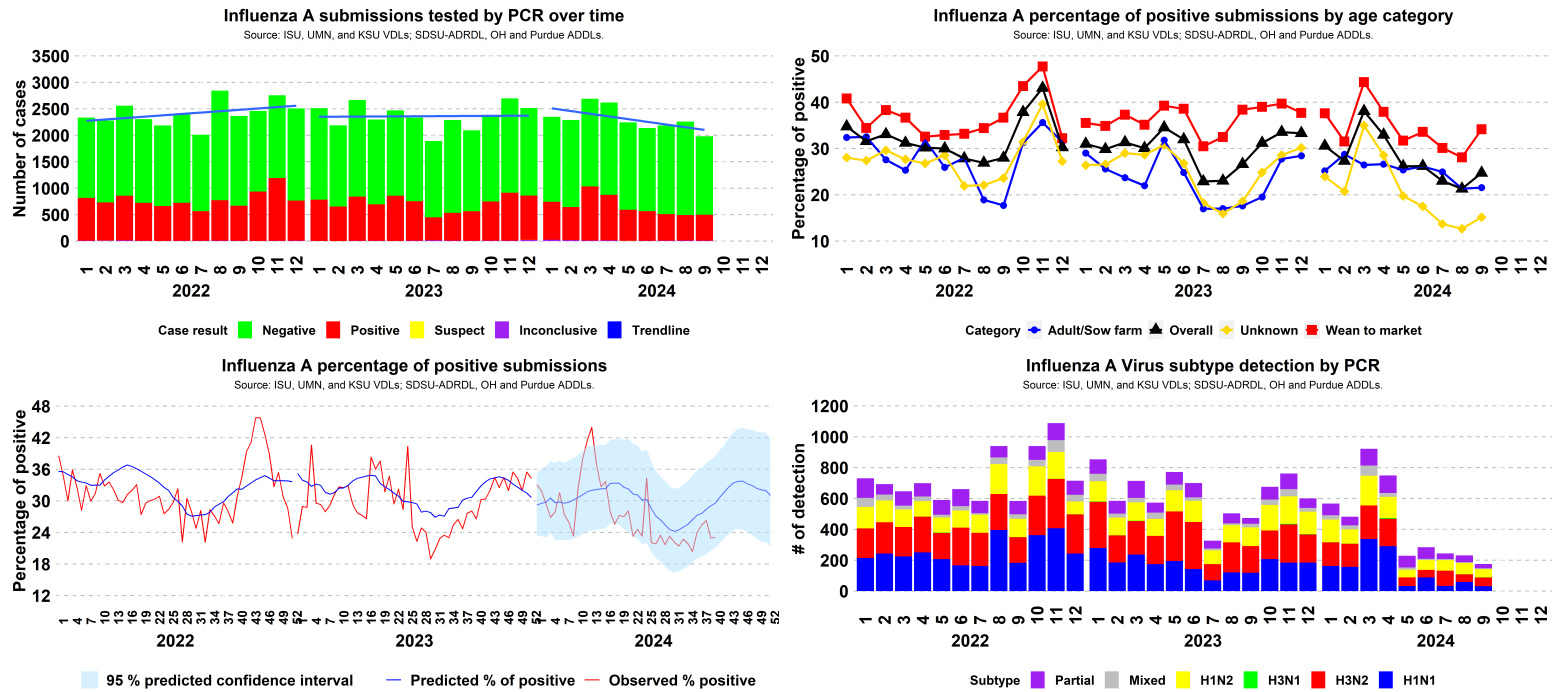


Figure 3. Top: *Left* Results of IAV PCR cases over time. *Right* Percentage of IAV PCR-positive results, by category over time. **Bottom:** *Left* expected percentage of positive results for IAV by PCR and 95% confidence interval for 2024 predicted value, based on weekly data observed in the previous 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, 24.73% of 1,981 cases tested IAV-positive cases in September, a moderate increase from 21.3% of 2,258 in August;
 - Positivity in the adult/sow category in September was 21.57% (88 of 408), similar to 21.34% (108 of 506) in August;
 - Positivity in the wean-to-market category in September was 34.15% (294 of 861), a substantial increase from 28.09% (275 of 979) in August.
- Overall IAV-percentage of positive cases was 3 standard deviations above state-specific baselines in MO;
- Overall, 3.41% of 176 samples had mixed subtype detection in September, similar to 2.16% of 232 in August.
- There is a consensus in the advisory group that most Influenza A cases are due to endemic strains, with no significant new emergence. While some regions have observed an average level of Influenza activity, others have noted a recent increase, particularly in groups nearing marketing. There is also a concern about the potential correlation between Influenza and PRRSV and cooler temperatures in this fall season that can favor respiratory issues.

Topic 6 – Confirmed tissue cases etiologic/disease diagnosis at the ISU-VDL

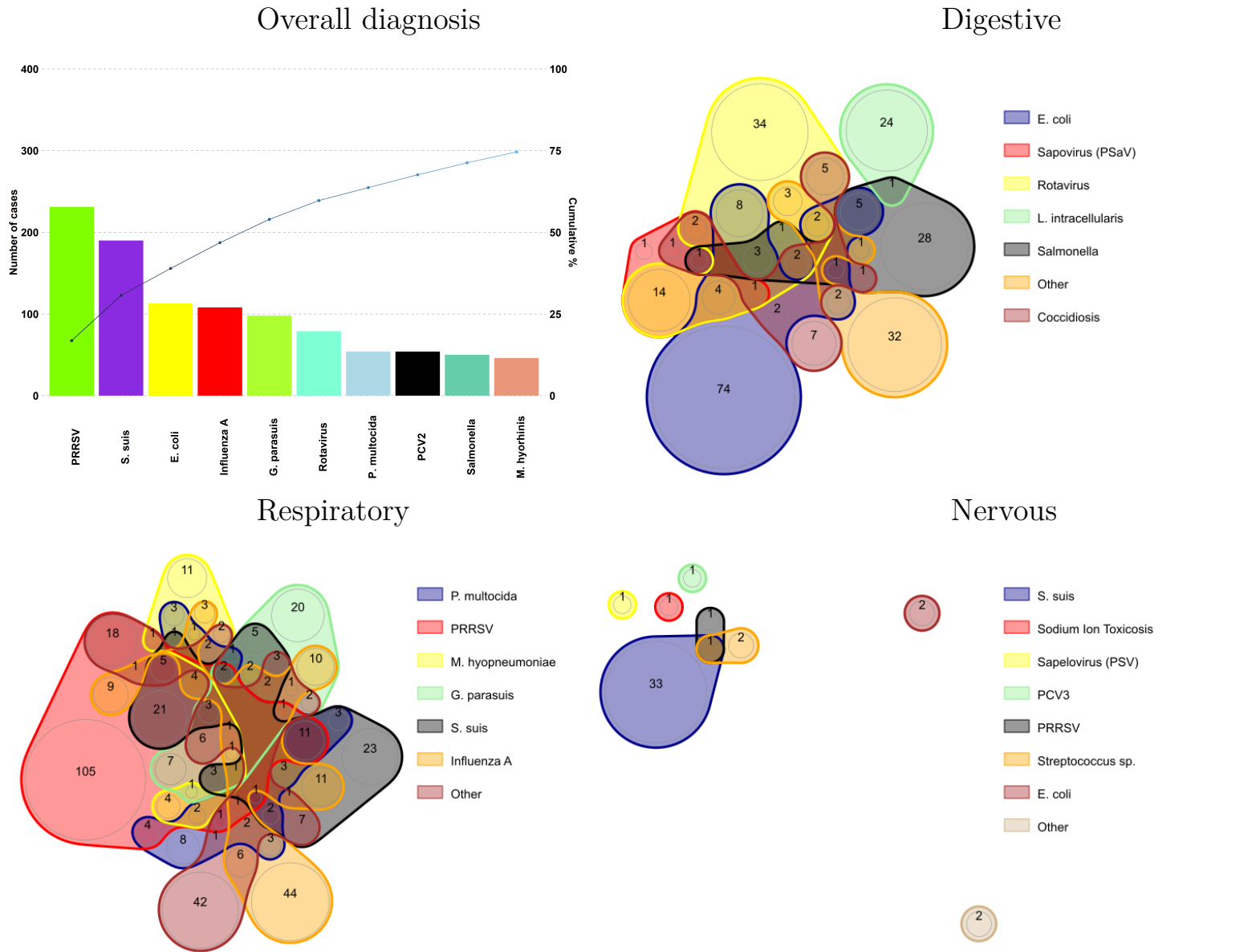


Figure 4. ISU-VDL most frequent overall confirmed tissue disease diagnosis. The presented system is described in the title of the chart. Colors represent one agent; line intersections present diagnosis of 2 or more agents within a submission. Only the most frequent etiology/disease are presented. Less 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 August. 1 to September. 23, 2024.

SDRS Advisory Group highlights:

- PRRSV (231) led cases with confirmed etiology, followed by *S. suis* (190), and *E. coli* (113). PRRSV (214 of 718) led the number of confirmed respiratory diagnoses, *E. coli* (102 of 339) lead the number of confirmed digestive diagnoses, and *S. suis* (34 of 46) led the number of confirmed neurological diagnoses.

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.

What new information you want to see in the SDRS project? Your opinion matters!

Guilherme Cezar¹, Kinath Rupasinghe¹, Daniel Linhares¹, Giovani Trevisan¹

1 - Iowa State University, Ames, IA, USA.

The Swine Disease Reporting System (SDRS) project has been producing reports informing the trends of swine diseases since 2019. The project starts reporting information about one pathogen (PRRSV) from one veterinary diagnostic laboratory. Over the years, more laboratories join the project, ending up with 6 of them nowadays and more pathogens were added. A important part of these additions were the opinion of the stakeholders and the SDRS audience that keeps asking for new implementations.

Therefore, we would like to ask your opinion, which information you want to see in the SDRS project?

Scan the QR code below or [click here](#) and let us know which swine pathogen information you want us to add on the project.

