Swine Disease Reporting System
Report # 62 (April 4, 2023)

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 University VDL, and Ohio Animal Disease and Diagnostic Lab.

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.

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

Ohio Animal Disease and Diag. Lab.: Melanie Prarat, William Hennessy, Ashley Sawyer, 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 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 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: Reviews and discusses the data, providing their comments and perspectives monthly: Mark Schwartz, Paul Sundberg, Paul Yeske, Tara Donovan, Deborah Murray, Brigitte Mason, Peter Schneider, Sam Copeland, Luc Dufresne, Daniel Boykin, Corrine Fruge, William Hollis, Rebecca Robbins, and Thomas Petznick.

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 March 31, 2023.

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

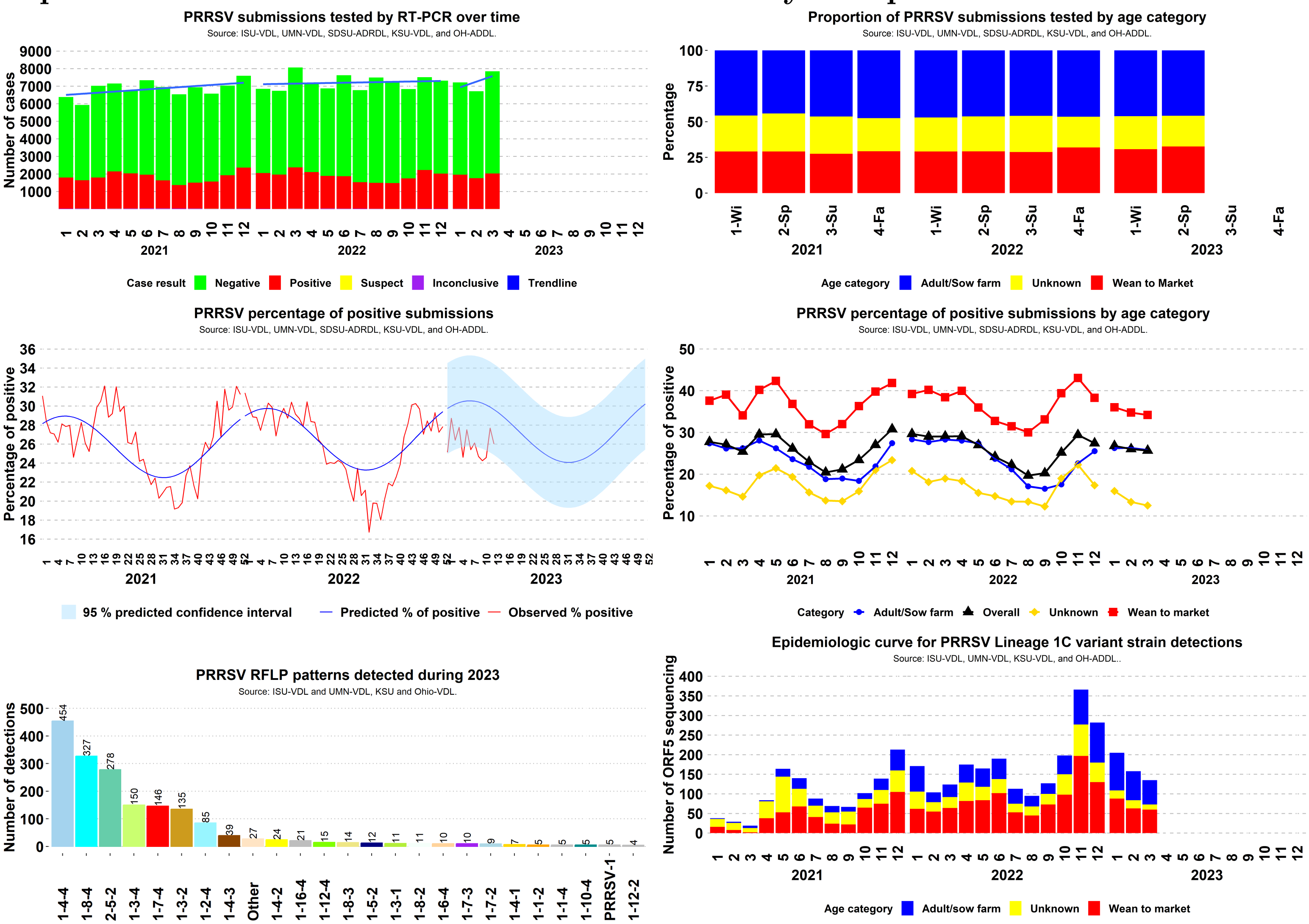
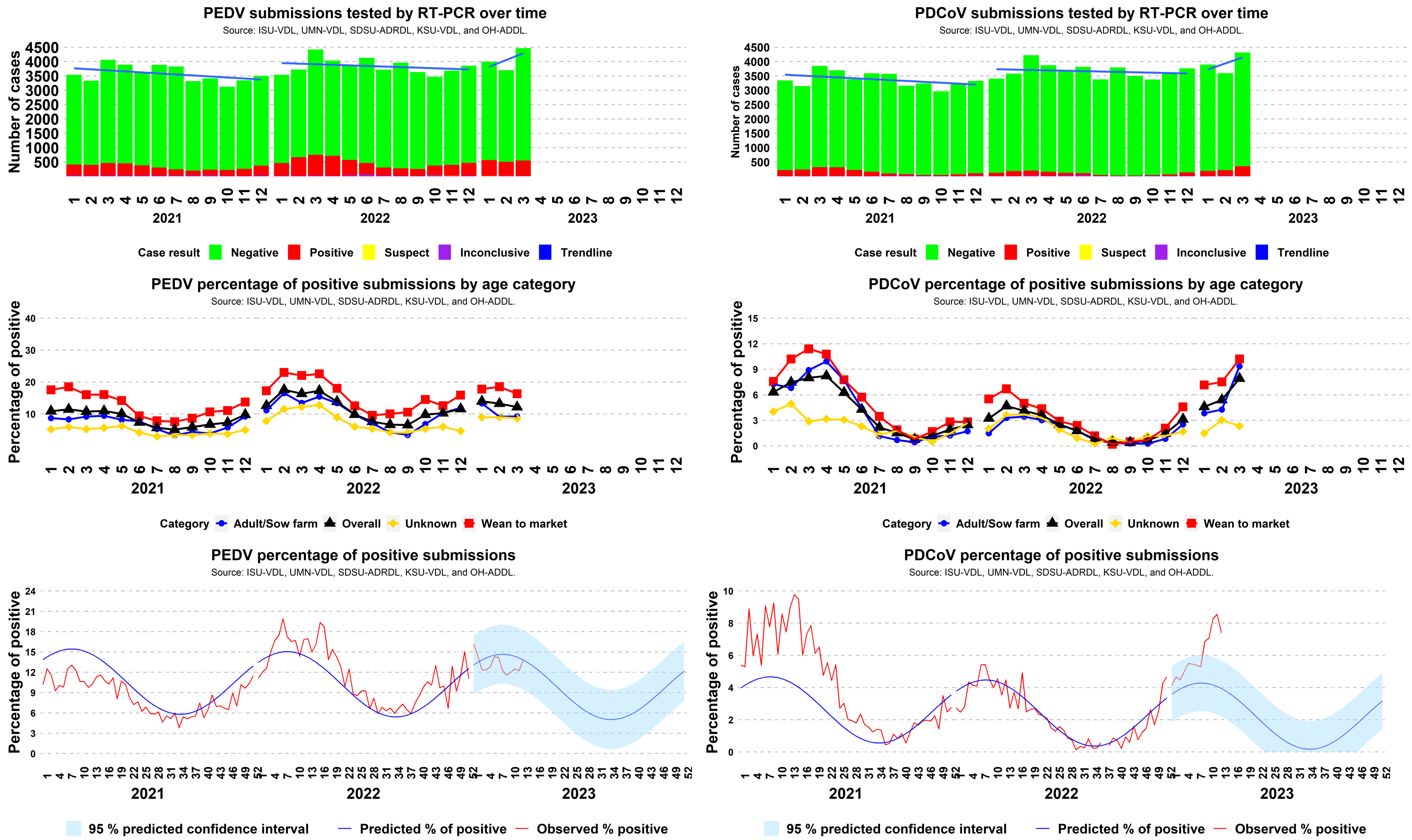


Figure 1. **Top**: *Left*: Results of PRRSV RT-PCR cases over time; *Right*: Proportion of accession ID cases tested for PRRSV by age group per year and season. **Middle**: *Left* Expected percentage of positive results for PRRSV RNA by RT-qPCR, with 95% confidence interval band for predicted results 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 2023; *Right*: Epidemiological curve of detection for PRRSV Lineage 1C variant strain.

SDRS Advisory Group highlights:

- Overall, 25.67% of 7,853 cases tested PRRSV-positive in March, similar to 26.03% of 6,716 in February;
  - Positivity in the adult/sow category in March was 25.81% (928 of 3,596), similar to 26.3% (818 of 3,110) in February;
  - Positivity in the wean-to-market category in March was 34.19% (876 of 2,562), similar to 34.77% (728 of 2,094) in February;
  - Overall PRRSV-percentage of positive cases was 3 standard deviations from state-specific baselines in KS and OH;
- During March 2023, PRRSV L1C variant strains were detected in Missouri (71), Iowa (36), Minnesota (20), Pennsylvania (3), Indiana (2), Oklahoma (2), and Nebraska (1);
- The advisory group highlighted that possible PRRSV L1C variant dissemination sources for east states could potentially have an association with different industry channels as cull sow market moving positive animals and trucks coming back from packing plants. The advisory group reinforced the importance of biocontainment and bioexclusion practices to avoid the dissemination of PRRSV and the importance of testing animals that have been moved to other areas when they are shipped and continuing to test after placement.

Topic 2 – Enteric coronavirus RNA detection by RT-qPCR



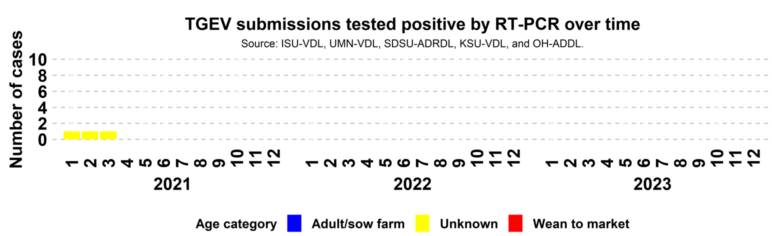
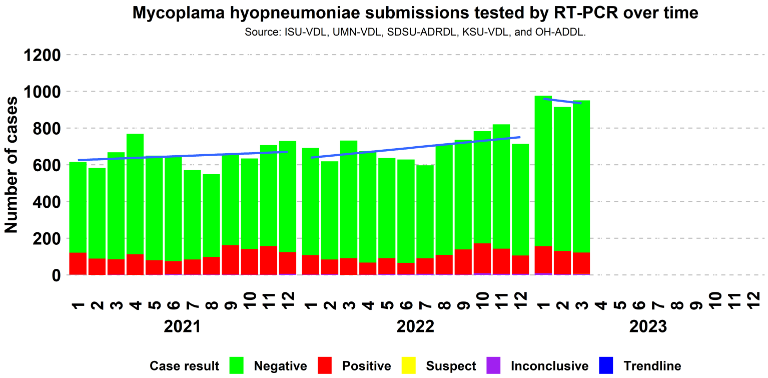


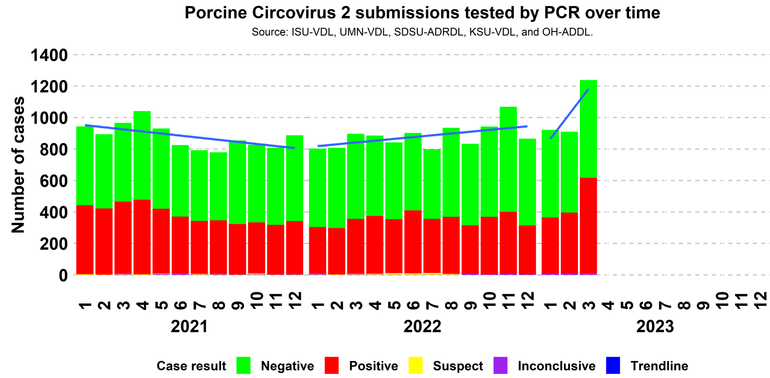
Figure 2. Top: *Left* PEDV; *right* PDCoV cases tested by RT-PCR over time. **Second from top:** *Left* PEDV; *Right* PDCoV percentage of PCR-positive results, by age category over time. **Third from top:** *Left* PEDV; *right* PDCoV expected percentage of positive results for cases tested by RT-qPCR and 95% confidence interval for 2023 predicted value. **Bottom:** Number of TGEV positive cases by age category.

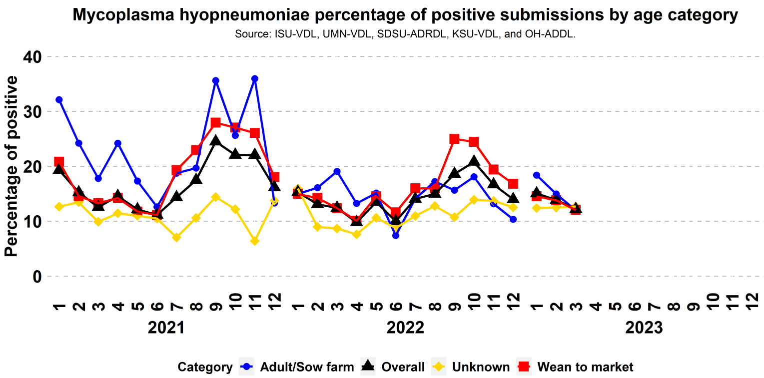
SDRS Advisory Group highlights:

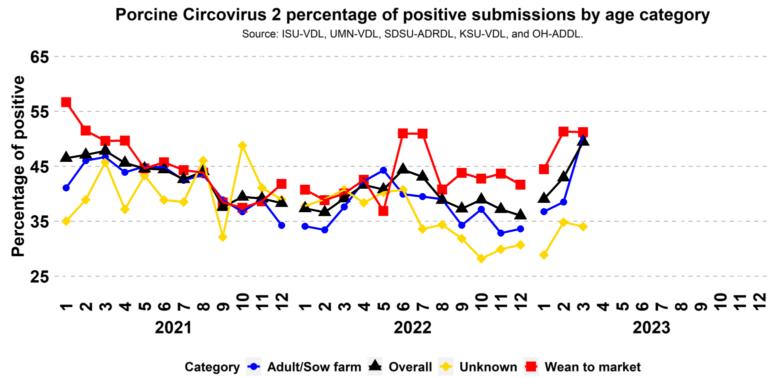
- Overall, 12.16% of 4,467 cases tested PEDV-positive in March, similar to 13.24% of 3,694 in February;
  - Positivity in the adult/sow category in March was 9.27% (128 of 1,381), similar to 9.16% (102 of 1,114) in February;
  - Positivity in the wean-to-market category in March was 16.32% (315 of 1,930), a moderate decrease from 18.53% (301 of 1,624) in February;
  - Overall PEDV-percentage of positive cases was 3 standard deviations from state-specific baselines in SD and NC;
- Overall, 7.92% of 4,318 cases tested PDCoV-positive in March, a moderate increase from 5.4% of 3,595 in February;
  - Positivity in the adult/sow category in March was 9.36% (124 of 1,325), a substantial increase from 4.27% (46 of 1,077) in February;
  - Positivity in the wean-to-market category in March was 10.2% (192 of 1,882), a moderate increase from 7.51% (120 of 1,597) in February;
  - Overall PDCoV-percentage of positive cases was 3 standard deviations from state-specific baselines in SD, MN and KS;
- There was 0 positive case for TGEV RNA-PCR in March, 2023 over a total of 4,219 cases tested. It has been 25 months (with a total of 83,323 cases tested) since the last TGEV PCR-positive result;
- The advisory group highlighted that cold winter temperatures contributed to the increased detection of PDCoV since it favored longer virus persistence in the environment. Additionally, cold weather temperatures make it more difficult to properly wash and disinfect facilities and trucks at that time;
- The SDRS detected a cycle of increased detection of PDCoV occurring every 2 years (2018, 2021, and now 2023). Regarding this finding, the advisory group mentioned that more investigations must be done on the role of feed ingredients, wild animals, and the serological status of herds to understand what might be causing these cycles of PDCoV increased detection.

Topic 3 – Detection of *M. hyopneumoniae* and Porcine Circovirus-2 DNA by PCR.









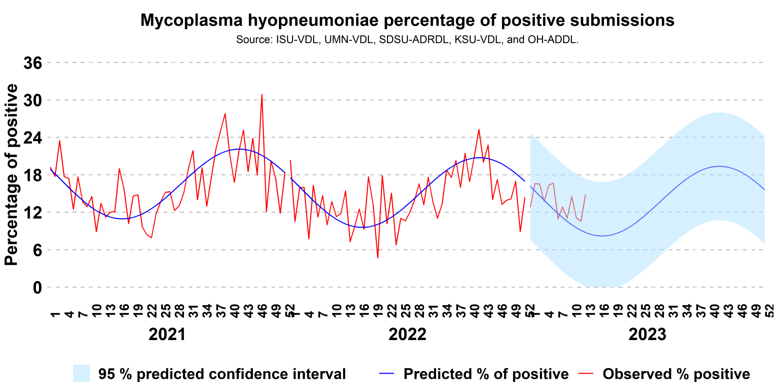
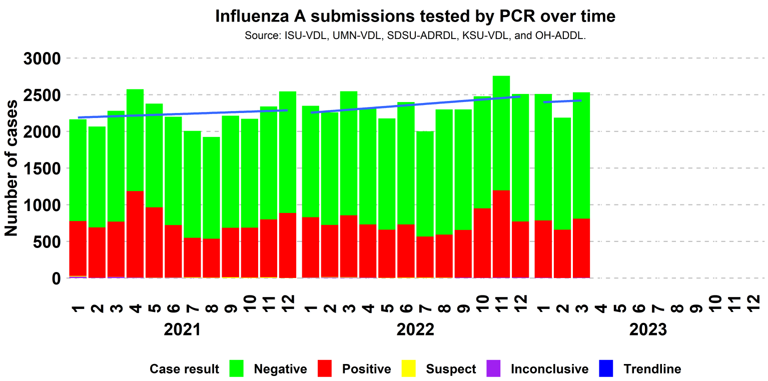


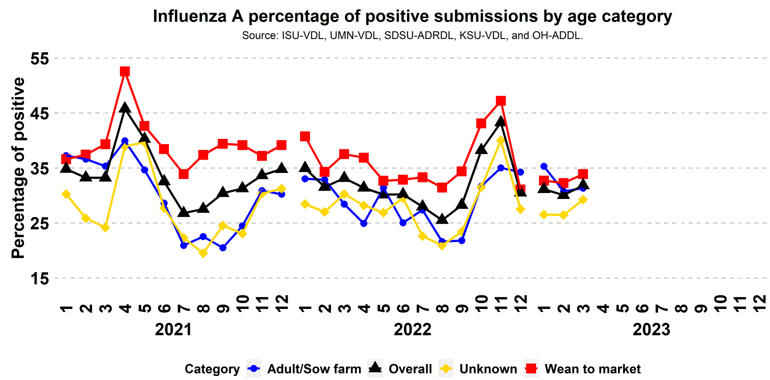
Figure 3. Top: Case results tested by PCR over time. *Left* MHP; *Right* PCV2. **Middle:** percentage of PCR-positive results, by category over time. **Bottom:** expected percentage of positive results for MHP by PCR and 95% confidence interval for 2023 predicted value, based on weekly data observed in the previous 3 years.

SDRS Advisory Group highlights:

- Overall, 12.21% of 950 cases tested *M. hyopneumoniae*-positive cases in March, similar to 13.88% of 915 in February;
  - Positivity in the adult/sow category in March was 11.99% (32 of 267), a moderate decrease from 14.97% (44 of 294) in February;
  - Positivity in the wean-to-market category in March was 12.07% (53 of 439), similar to 13.83% (56 of 405) in February;
  - Overall MHP-percentage of positive was within state-specific baselines in all 11 monitored states;
- Overall, 49.47% of 1,233 cases tested PCV2-positive in March, a substantial increase from 42.95% of 901 in February;
  - Positivity in the adult/sow category in March was 50.52% (392 of 776), a marked increase from 38.53% (183 of 475) in February;
  - Positivity in the wean-to-market category in March was 51.24% (186 of 363), similar to 51.34% (173 of 337) in February;
- The advisory group highlighted that vaccine compliance and effectiveness are important in containing severe health challenges regarding PCV2 in the field, mainly about the application of a full vaccine dose in the animals. Also, it was mentioned the concernsof PCV2 genotype D circulating in the field. Most of the commercially avaliable vaccines in the U.S. do not cover for genotype D, resulting in clinical cases in the field.

Topic 4 – Detection of Swine Influenza A Virus (IAV) RNA by RT-PCR.





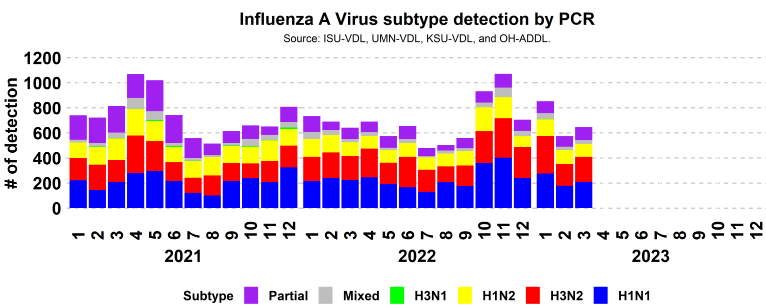


Figure 3. Top: *Left* Results of IAV PCR cases over time. *Right* Percentage of IAV PCR-positive results, by category over time. **Bottom:** Number of IAV subtyping PCR detection over time; (Partial - only hemagglutinin or neuraminidase region detected; Mixed - 3 or more haemagglutinin and neuroamnidase regions detected. i.e., "H1 H3 N1").

SDRS Advisory Group highlights:

- Overall, 31.87% of 2,529 cases tested IAV-positive cases in March, similar to 30.09% of 2,187 in February;
  - Positivity in the adult/sow category in March was 31.34% (157 of 501), similar to 30.79% (145 of 471) in February;
  - Positivity in the wean-to-market category in March was 33.9% (398 of 1,174), similar to 32.27% (325 of 1,007) in February.
- Overall, 4.48% of 647 samples had mixed subtype detection in March, similar to 4.36% of 574 in February;

Topic 5 – Confirmed tissue cases etiologic/disease diagnosis at the ISU-VDL.

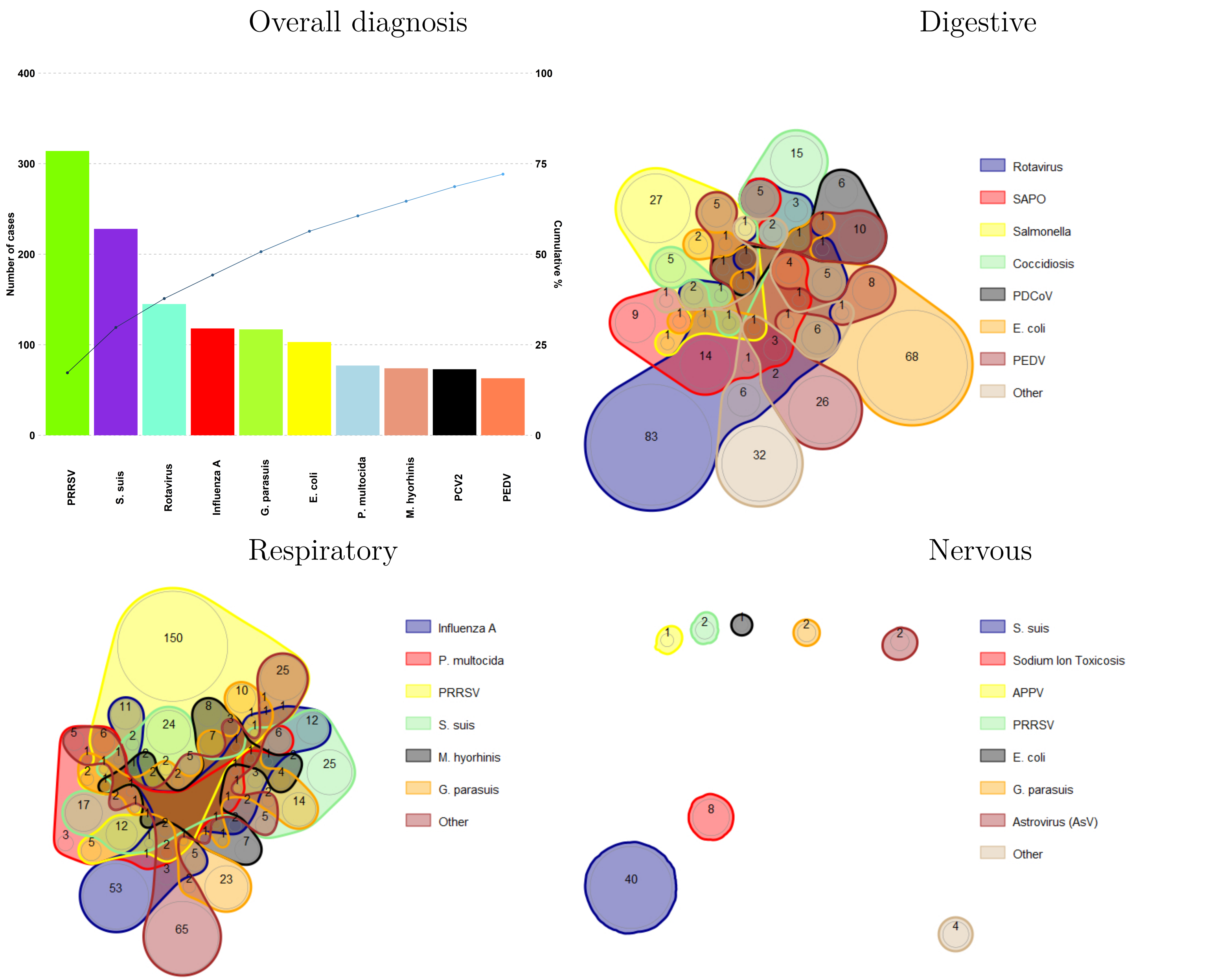


Figure 4. ISU-VDL most frequent overall confirmed tissue disease diagnosis. The presented system is described in the title of the chart. Colors represent one agent; line intersections present diagnosis of 2 or more agents within a submission. Only the most frequent etiology/disease are presented. Less 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 February. 1 to March. 24, 2023.

SDRS Advisory Group highlights:

- PRRSV (314) led cases with confirmed etiology, followed by *S. suis* (228), and Rotavirus (145). PRRSV (295 of 943) led the number of confirmed respiratory diagnoses, Rotavirus (145 of 514) lead the number of confirmed digestive diagnoses, and *S. suis* (40 of 60) led the number of confirmed neurological diagnoses.
- During the week of March 3rd, there were spikes in the number of Integument system confirmed diagnosis;
- PCV2 had an increase in the number of confirmed tissue diagnosis at ISU-VDL becoming the 9th disease most diagnosed in March 2023.

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.*

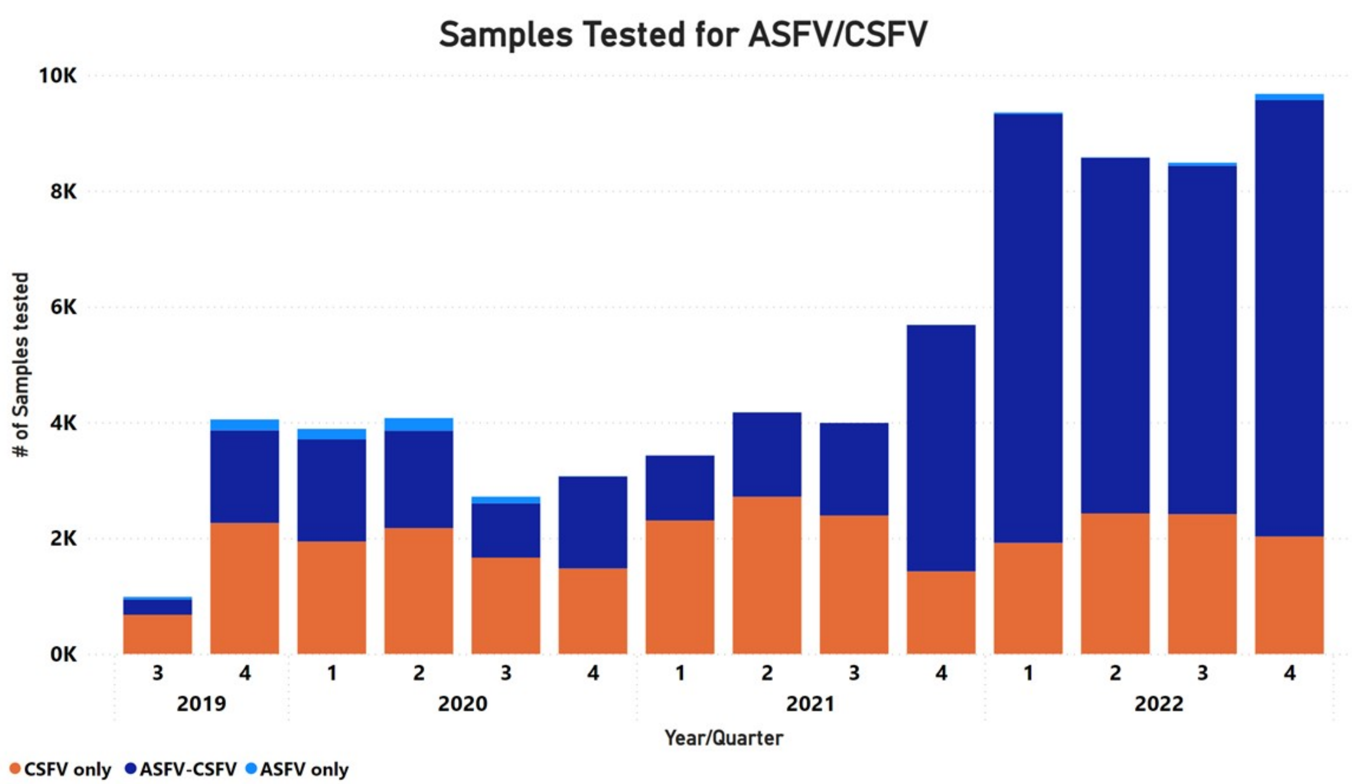
African Swine Fever and Classical Swine Fever surveillance in the United States

U.S Department of Agriculture (USDA)

More information: USDA APHIS|ASF and CSF Executive Summary Dashboard

African swine fever (ASF) and classical swine fever (CSF) are highly contagious viral diseases affecting domestic and feral pigs. No detection of CSF and ASF has been registered in the United States. Outbreaks of one of both diseases in countries like The United States (U.S.) can economically impact the swine industry through swine-based product exporting restrictions and costs with diagnostic tests for disease control and eradication. Specifically, for ASF, no treatments and vaccines are currently available. The increased spread of these viruses among other continents, Europe, Africa, Asia, and Central America countries (the Dominican Republic and Haiti) raises concerns about the potential introduction of these viruses in the U.S. Active surveillance is essential for the early detection of emerging animal health threats, including foreign animal disease introduction events. The U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) developed an integrated active surveillance plan for African swine fever virus (ASFV) and classical swine fever virus (CSFV) targeting higher-risk populations, ill animals, and unusual mortality events. The surveillance system aims to enhance the country's preparedness for emergency response. An impressive number of porcine samples have been tested for ASFV (42,472) and CSFV (69,338) in the US during the last three years (Figure 1). Also, the number of samples collected from feral swine has increased since 2019 (Figure 2), achieving 11,034 samples collected in 2022, demonstrating active monitoring of the U.S. wild boar population for ASF and CSF.

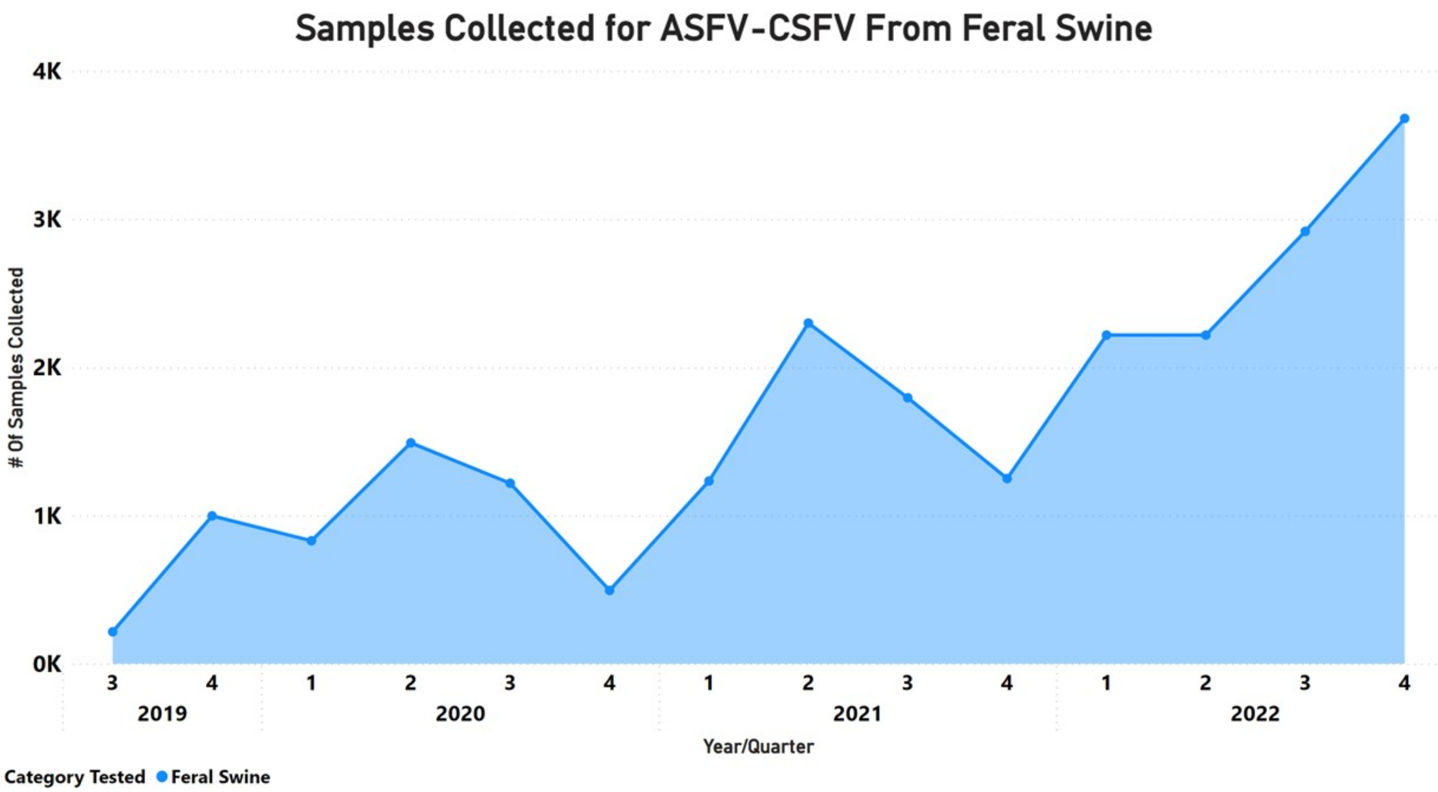
Figure 1. Number of samples tested for ASFV/CSFV simultaneously or separately by quarters of the year.



Legend: Quarter 1 = October 1st – December 31st; Quarter 2 = January 1st-March31st; Quarter 3= April1st – June 30th; and Quarter 4= July 1st – September 30th.

- No detection of ASFV and CSFV has occurred in the surveillance program;
- 49,922 samples (RT-PCR Tissue) dual ASF/CSF have been collected for active surveillance since June 2019;
- 26,129 samples (serology) were collected for active surveillance of CSFV since June 2019 and no ASF or CSF antibodies have been detected.

Figure 2. Number of samples tested from feral swine by quarters of the year.



Legend: Quarter 1 = October 1st – December 31st; Quarter 2 = January 1st-March31st; Quarter 3= April1st – June 30th; and Quarter 4= July 1st – September 30th..

- 18,082 samples from feral swine were collected for CSFV only (serology). 4,759 samples from feral swine were collected for both ASFV and CSFV (RT-PCR tissues);
- Currently, combined ASFV and CSFV testing is only performed in samples collected from Puerto Rico and U.S Virgin Islands.

Report summarized by Guilherme Arruda Cezar using publicly available information from the U.S Department of Agriculture (USDA). Available at: USDA APHIS|ASF and CSF Executive Summary Dashboard.