



Swine Disease Reporting System Report 26 (April 7, 2020)

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 to make 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 interpretation of the data observed, 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 formats (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:

Iowa State University: Giovani Trevisan*, Edison Magalhães, Leticia Linhares, Bret Crim, Poonam Dubey, Kent Schwartz, Eric Burrough, Phillip Gauger, Rodger Main, Daniel Linhares**.

* Project coordinator (trevisan@iastate.edu). ** Principal investigator (linhares@iastate.edu).

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

Kansas State University: Rob McGaughey, Eric Herrman, Giselle Cino, Jamie Henningson.

South Dakota State University: Jon Greseth, Travis Clement, Jane Christopher-Hennings.

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 report: Benchmarks patterns of PRRSV RFLP pattern detected at the ISU-VDL 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 form of an ‘audio report’, and “video report” through SwineCast, YouTube, and the SDRS webpage (link below).

Advisory Group:

Reviews and discusses the data, providing their comments and perspectives on a monthly: Clayton Johnson, Emily Byers, Mark Schwartz, Paul Sundberg, Paul Yeske, Rebecca Robbins, Tara Donovan, Deborah Murray, Scott Dee, Melissa Hensch, and Scanlon Daniels.

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

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

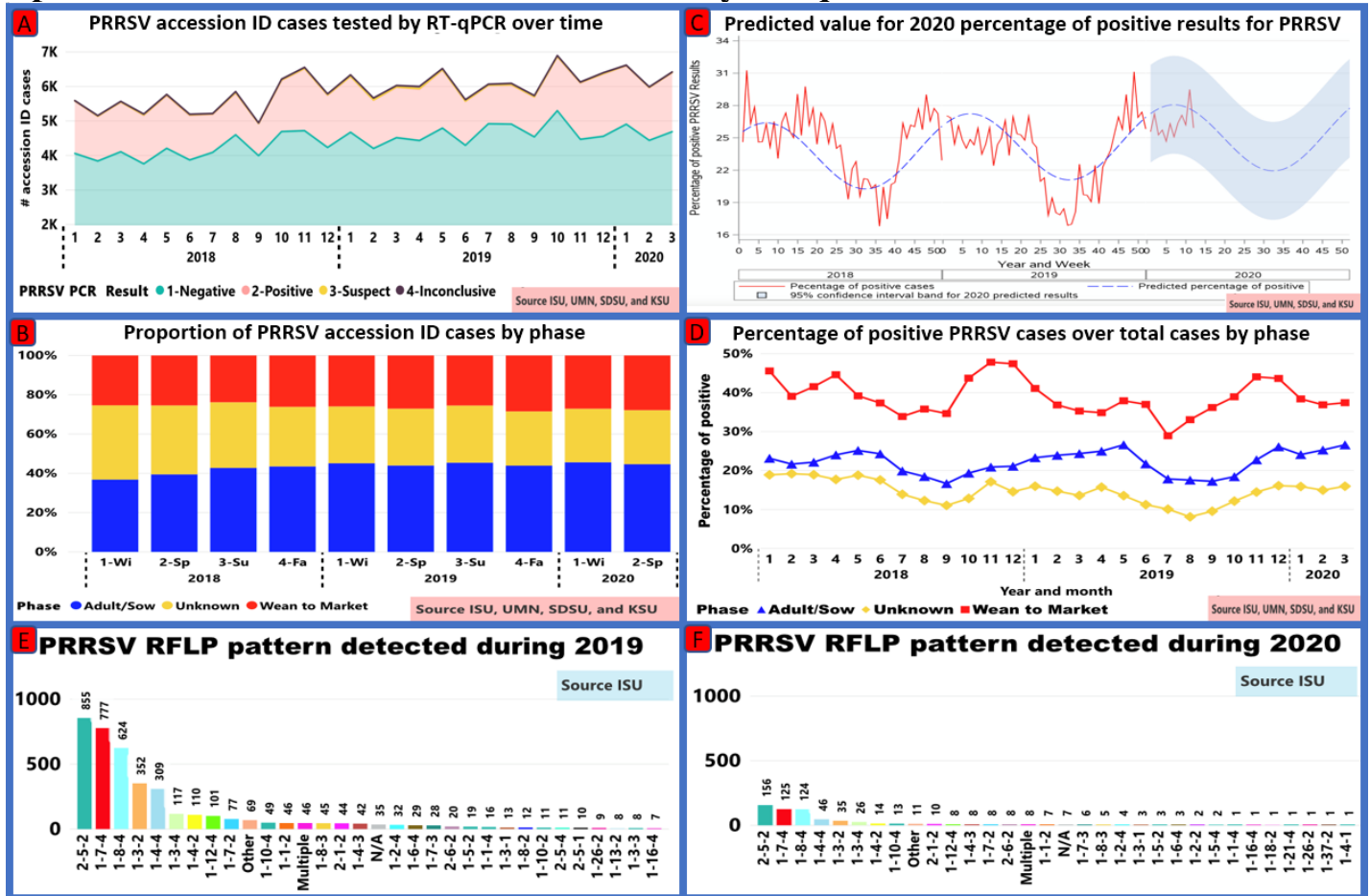


Figure 1. A: Results of PRRSV RT-qPCR cases over time. **B:** Proportion of accession ID cases tested for PRRSV by age group per year and season. **C:** expected percentage of positive results for PRRSV RNA by RT-qPCR, with 95% confidence interval band for predicted results based on weekly data observed in the previous 3 years. **D:** 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. **E:** RFLP pattern detected during year of 2019. **F:** RFLP pattern detected during year of 2020. RFLPs indicated as N/A represents not detected, or European PRRSV species.

SDRS Advisory Group highlights:

- The overall percentage of PRRSV-positive cases in March was 26.68% (1,713 of 6,421), increasing from 25.56% (1,530 of 5,986) in February;
 - The percentage of PRRSV-positive cases for the adult/sow farms in March was 26.59% (762 of 2,866), increasing from 25.27% (686 of 2,715) in February. The observed level of detection for adult/sow farm is the highest for the month of March since 2013;
 - There was a slight increase in the percentage of PRRSV-positive for wean to market cases in March (37.42% of 1,788) compared to February (36.87% of 1,619);
- The percentage of PRRSV-positive cases for this winter (December of 2019 to February of 2020) was 16.57%, similar to the previous two years (16.32% in 2018 and 16.34% in 2019);
- This was not surprising to advisory group who noted that winter climate conditions favor virus spread (colder temperature, overcast, windy, wet). Also, sow farms continue to report re-breaks with residing virus and with novel strains from various sources (construction and maintenance personnel, grow-finish, and many still unknown sources). Additionally, there is a perception that better monitoring tools have been providing evidence that some PRRSV strains, like for example some 1-7-4s and 1-8-4s, are resilient in the herd and taking a long time to be eliminated.

Topic 2 – Detection of RNA of enteric coronaviruses by RT-qPCR

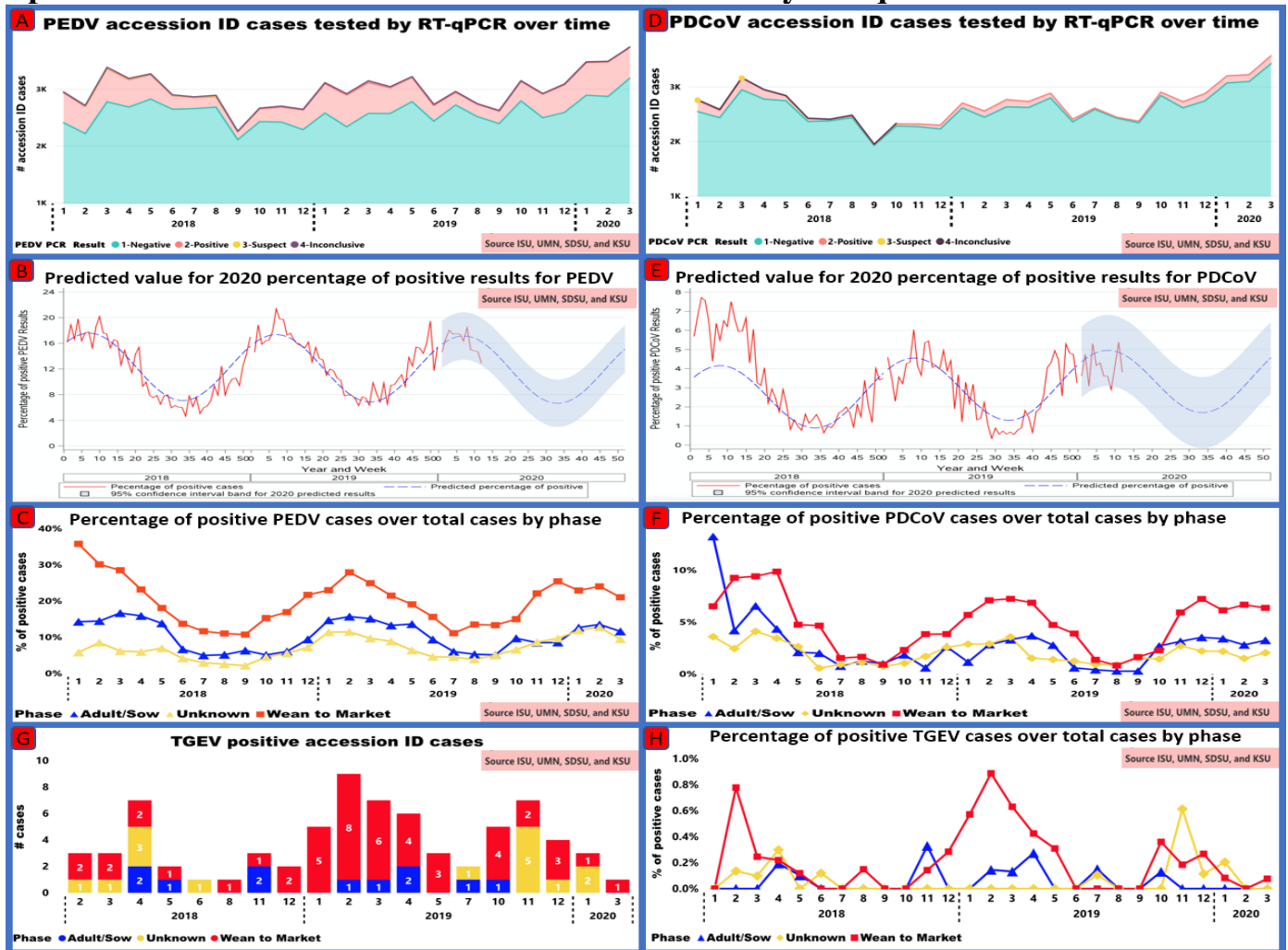


Figure 2. A: results of PEDV RT-qPCR cases over time. B: expected percentage of positive results for PEDV by RT-qPCR and 95% confidence interval for 2020 predicted value. C: percentage of PEDV PCR-positive results, by category over time. D: results of PDCoV RT-qPCR cases over time. E: expected percentage of positive results for PDCoV by RT-qPCR and 95% confidence interval for 2020 predicted value, based on weekly data observed in the previous 3 years. F: percentage of PDCoV PCR-positive results, by age category over time. G: number of PCR-positive accession ID results of TGEV by age category. H: percentage of PCR-positive results for TGEV by age category. Each color represents one distinct age category.

SDRS Advisory Group highlights:

- The overall percentage of PEDV RNA-positive cases in March was 14.38% (538 of 3,741), decreasing from 17.42% (608 of 3,491) in February. The decrease in percentage of positive cases occurred in all age categories;
 - The percentage of PEDV RNA-positive cases during winter months (December 2019 - February 2020) was 16.57%, similar to the previous two years (16.32% in 2018 and 16.34% in 2019);
- The overall percentage of PDCoV-positive cases in March was 4.03% (144 of 3,571), slightly up from 3.91% (126 of 3,225) in February;
 - The percentage of positive PDCoV-positive cases for 2020 winter was 4.18%, which was similar to the previous two years (5.22% in 2018, and 3.60% in 2019);
- PEDV and PDCoV RNA-positive cases are both within the forecasted levels for this time of the year;
- There was one positive case for TGEV RNA in March over a total of 3,466 cases tested;
- There was consensus among advisory group members that the activity of enteric coronaviruses remain similar this year compared to 2019, following the expected seasonality. Expectation is decreased activity between now and the end of this summer.



Topic 3 – Detection of *Mycoplasma hyopneumoniae* (MHP) DNA by PCR

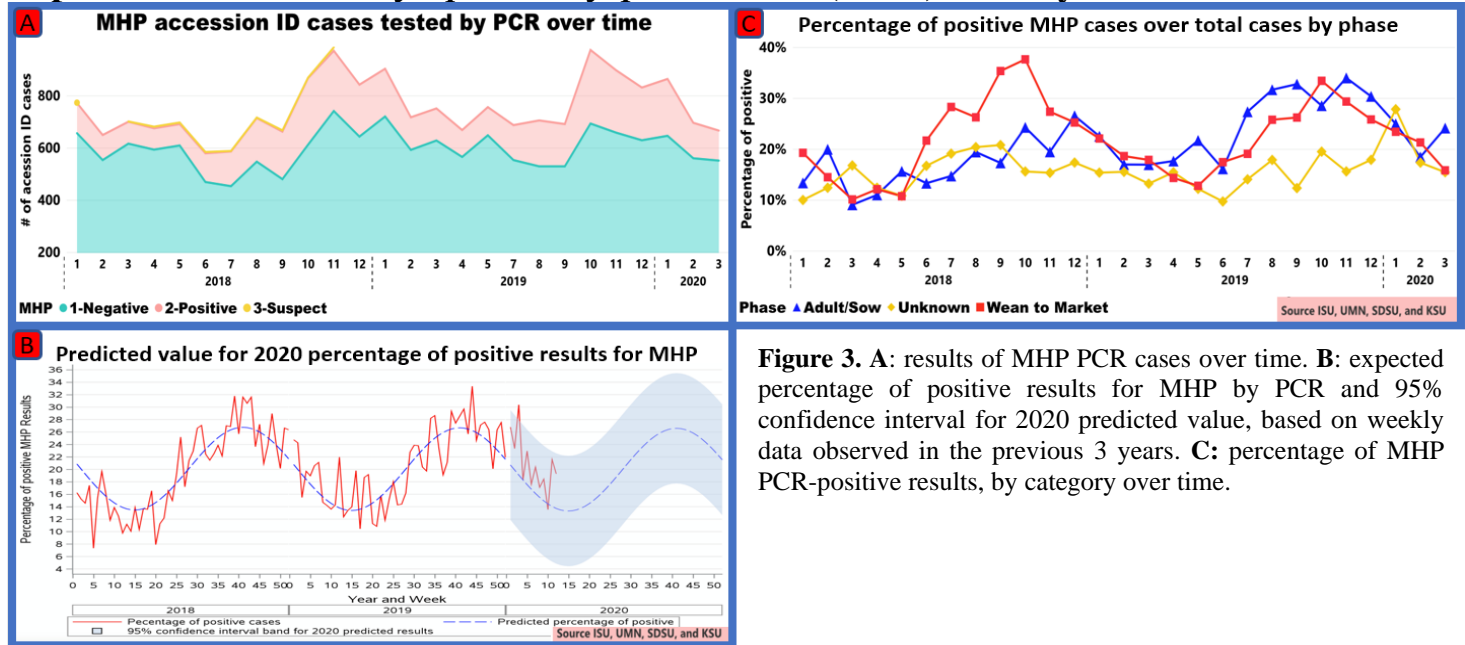


Figure 3. A: results of MHP PCR cases over time. B: expected percentage of positive results for MHP by PCR and 95% confidence interval for 2020 predicted value, based on weekly data observed in the previous 3 years. C: percentage of MHP PCR-positive results, by category over time.

SDRS Advisory Group highlights:

- The overall percentage of MHP-positive cases in March was 17.63% (115 of 652), down from 19.54% (136 of 696) in February, as expected based on the forecasting model;
- Despite of the overall decreased detection of MHP in March when compared to February, there was an increased detection for adult/sow farms;
 - The percentage of MHP-positive cases for adult/sow farms in March was 24.79% (29 of 117), increasing from 18.49% (22 of 119) in February. It is important to note that 62% of the positive cases in March occurred during the last two weeks of the month (March 12 to 28);
- The advisory group pointed out that veterinarians and production systems continue to have to choose between complete elimination of the pathogen or establishing positive/immunized herds. Either way, the decisions are being made with better monitoring tools and strategies.

Topic 4 – Disease diagnosis at the ISU-VDL

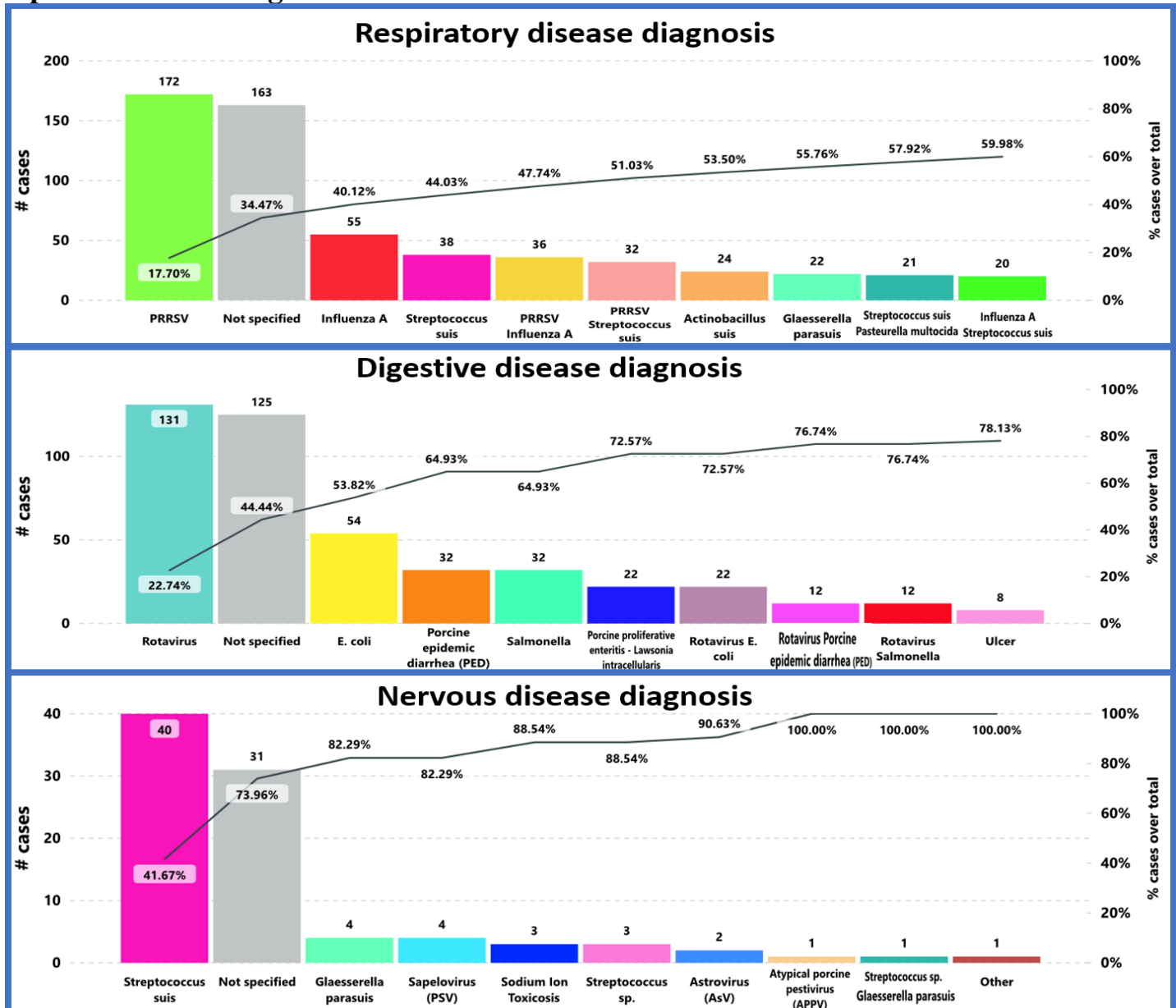


Figure 5. Most frequent disease diagnosis by physiologic system at ISU-VDL . Presented system is described in the title of the chart. Colors represent one agent and/or the combination of 2 or more agents. Only the physiologic systems with historic number of cases per season above 100 are presented in the report.

Note: Disease diagnosis takes one to two weeks to be performed. The graphs and analysis contains data from February 1st to March 21st.

SDRS highlights:

- There were no significant increases (signals) in diagnosis of any pathogen or disease syndrome.
- PRRSV (n=171 of 969) continues to lead the number of respiratory diagnosis, rotavirus (n=130 of 574) the enteric diagnosis, and *S. suis* (n=40 of 96) the nervous diagnosis.