Swine Disease Reporting System
Report 27 (May 5, 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 in making 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 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 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, 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 the form of an audio report and video report through SwineCast, YouTube, Linkedin, and the SDRS webpage (link below).

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

In addition to this report, interactive dashboards with aggregated test results are available at www.fieldepi.org/SDRS.
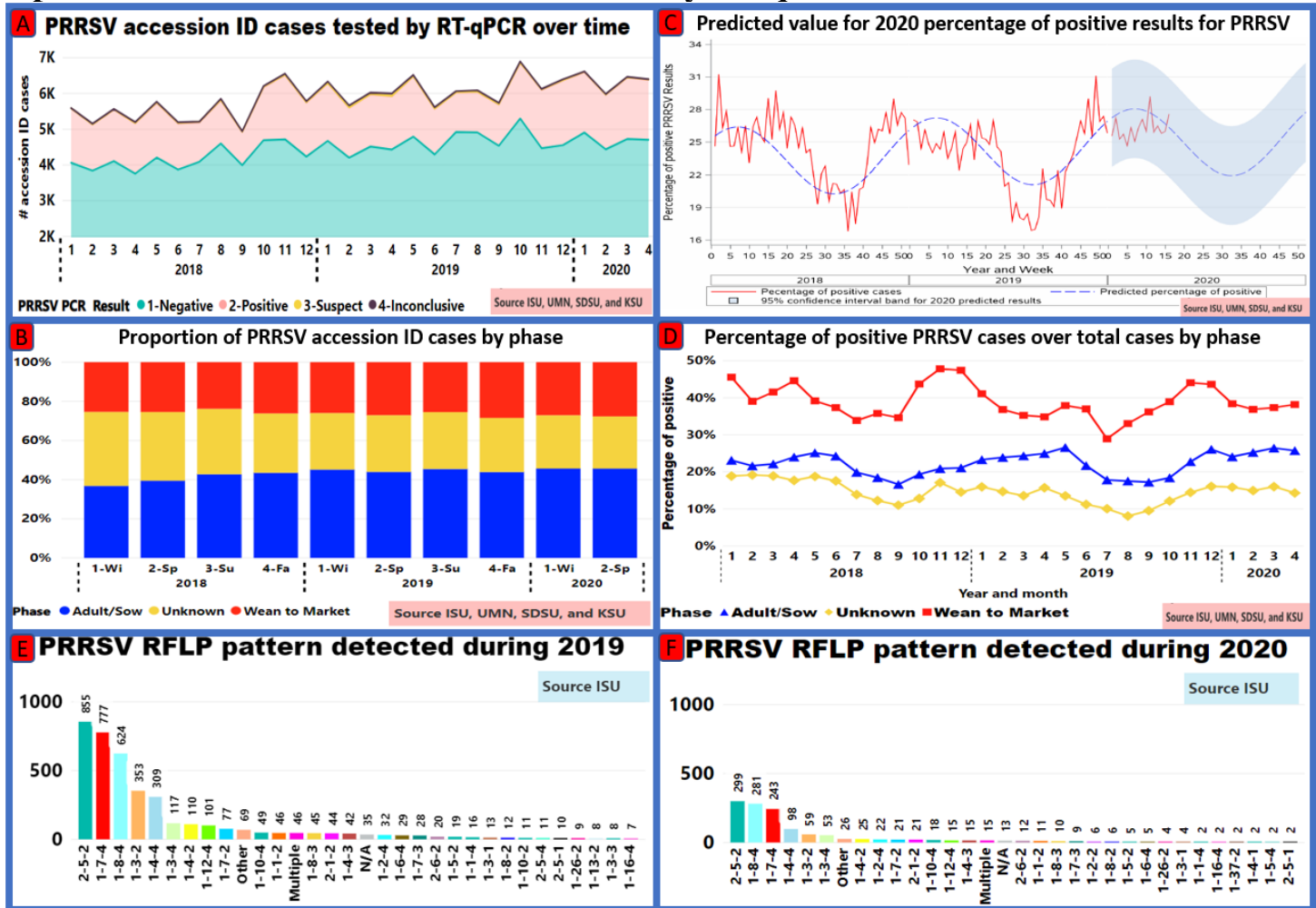
Topic 1 – Detection of PRRSV RNA over time by RT-qPCR.

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

SDRS Advisory Group highlights:

- The overall percentage of PRRSV positive cases in April was 26.21% (1,678 of 6,403), decreasing from 26.62% (1,722 of 6,468) in March;
  - The percentage of PRRSV positive cases in April was similar to March, for all age categories.
  - The overall detection of PRRSV positive cases is within the forecasted levels for this time of the year.
  - From January to April, the RFLP 1-8-4 moved from the third to the second most frequently detected when compared with the year of 2019.
- The advisory group pointed out that, despite the stable detection of PRRSV during this month, the COVID-19-related packing plant shutdowns have led to the retention of animals in the field and caused negative market impact. The resulting economic losses may affect the implementation of health interventions, as well as cause disruptions of pigs and people flows. Altogether, these factors can lead to increased pressure of pathogen infection in the field in the near term.

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.

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Swine Disease Reporting System:
Domestic Swine Disease Surveillance

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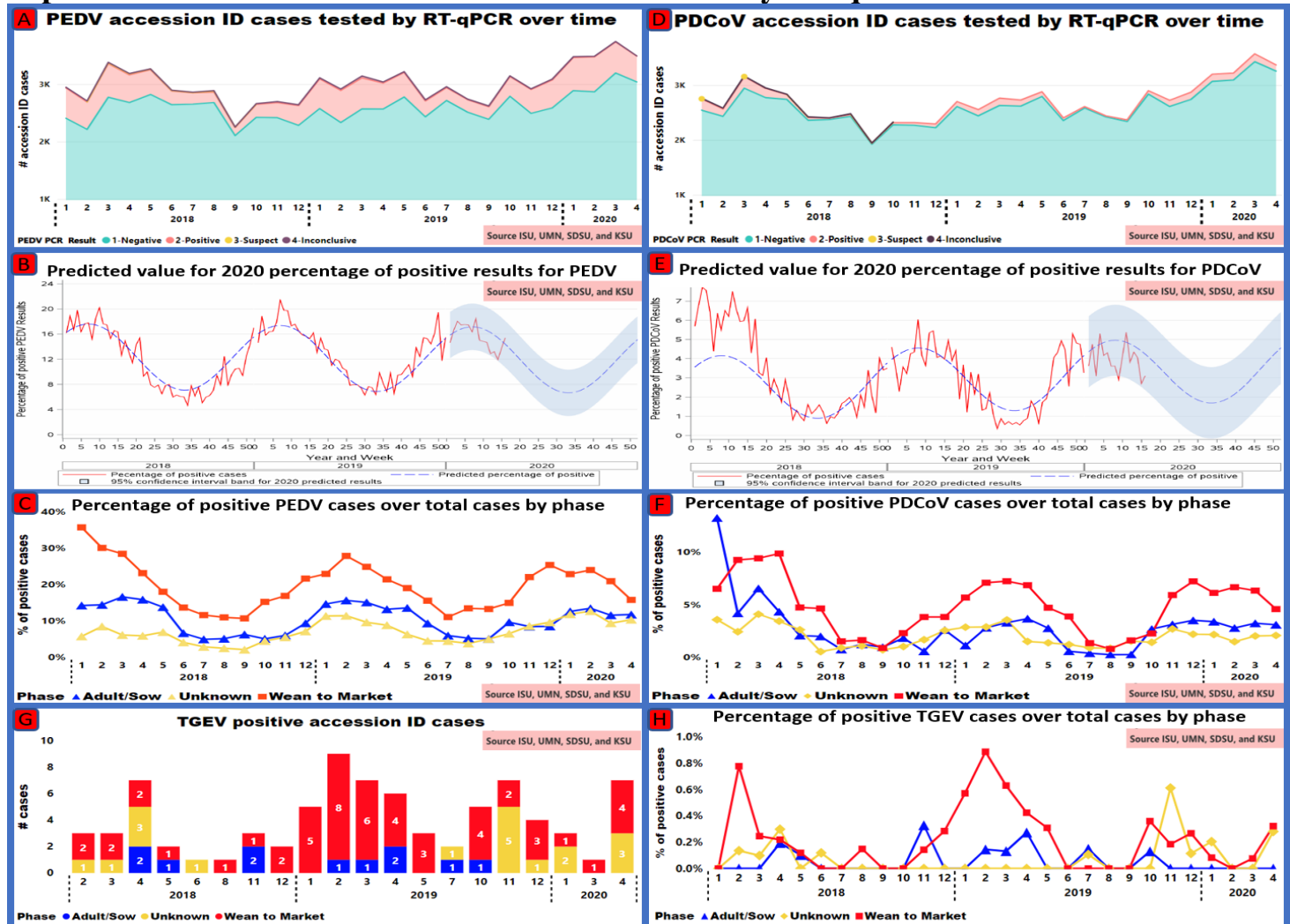

Figure 2. A: results of PEDV RT-qPCR cases over time. **B**: expected percentage of positive results for PEDV by RT-qPCR and 95% confidence interval for 2020 predicted value. **C:** percentage of PEDV PCR-positive results, by category over time. **D**: results of PDCoV RT-qPCR cases over time. **E**: 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 April was 12.86% (450 of 3,498), decreasing from 14.40% (540 of 3,749) in March;
  o The decrease in the percentage of PEDV RNA positive cases occurred mainly in wean to market category, dropping to 15.87% (205 of 1292) in April, compared to 21.03% (291 of 1,385) in March.
▪ The overall percentage of PDCoV positive cases in April was 3.35% (113 of 3,374), decreasing from 4.03% (144 of 3,576) in March;
▪ The overall detection of PEDV RNA and PDCoV RNA positive cases is within the forecasted levels for this time of the year;
▪ There were five positive cases for TGEV RNA in April 2020 over a total of 3,291 cases tested;
▪ The advisory group highlighted that this time of the year, when there is a consistent pattern of decreased detection observed, is ideal to start a plan for reducing the incidence of enteric coronaviruses in the swine industry.

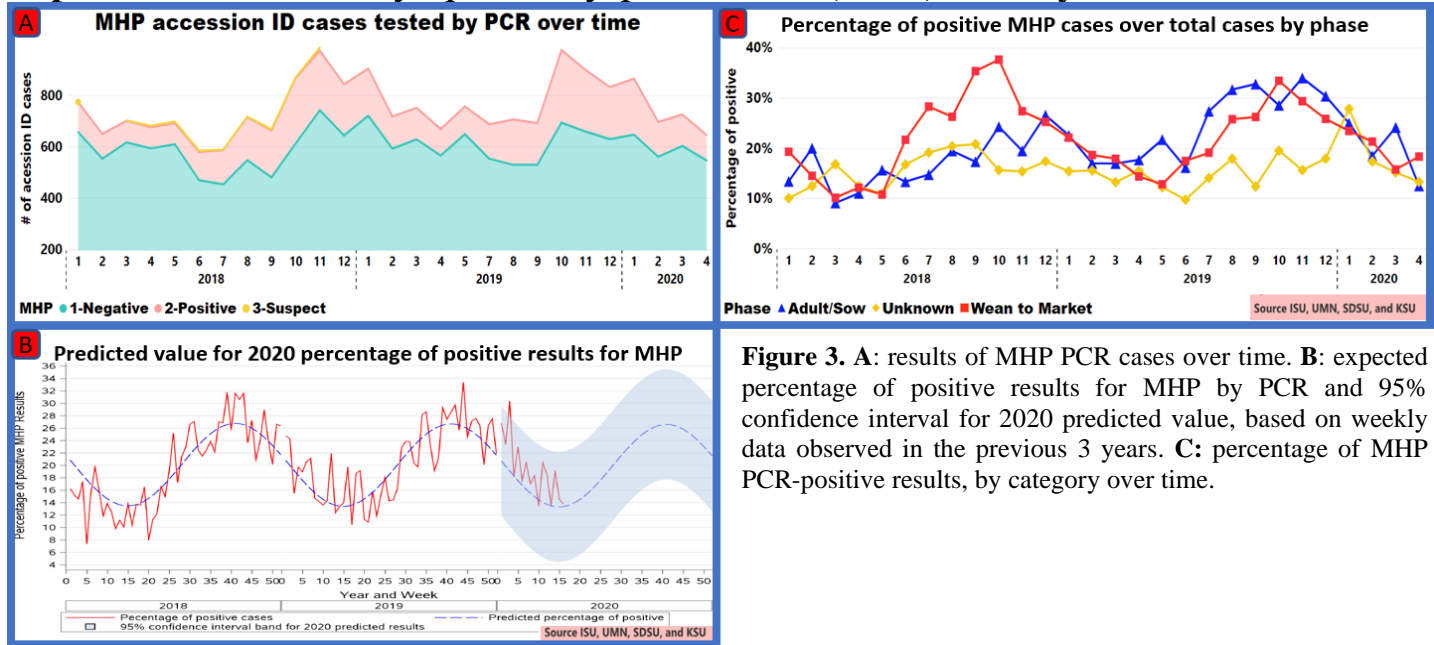## Topic 3 – Detection of *Mycoplasma hyopneumoniae* (MHP) DNA by PCR

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 *Mycoplasma hyopneumoniae* positive cases in April was within the forecasted levels, at 15.33% (99 of 646), down from 16.94% (123 of 726) in March.

- The Advisory Group pointed out that veterinarians and production systems continue to implement elimination programs or protocols for controlling the pathogen within the herd, by increasing herd immunity. Altogether with better monitoring tools and strategies.

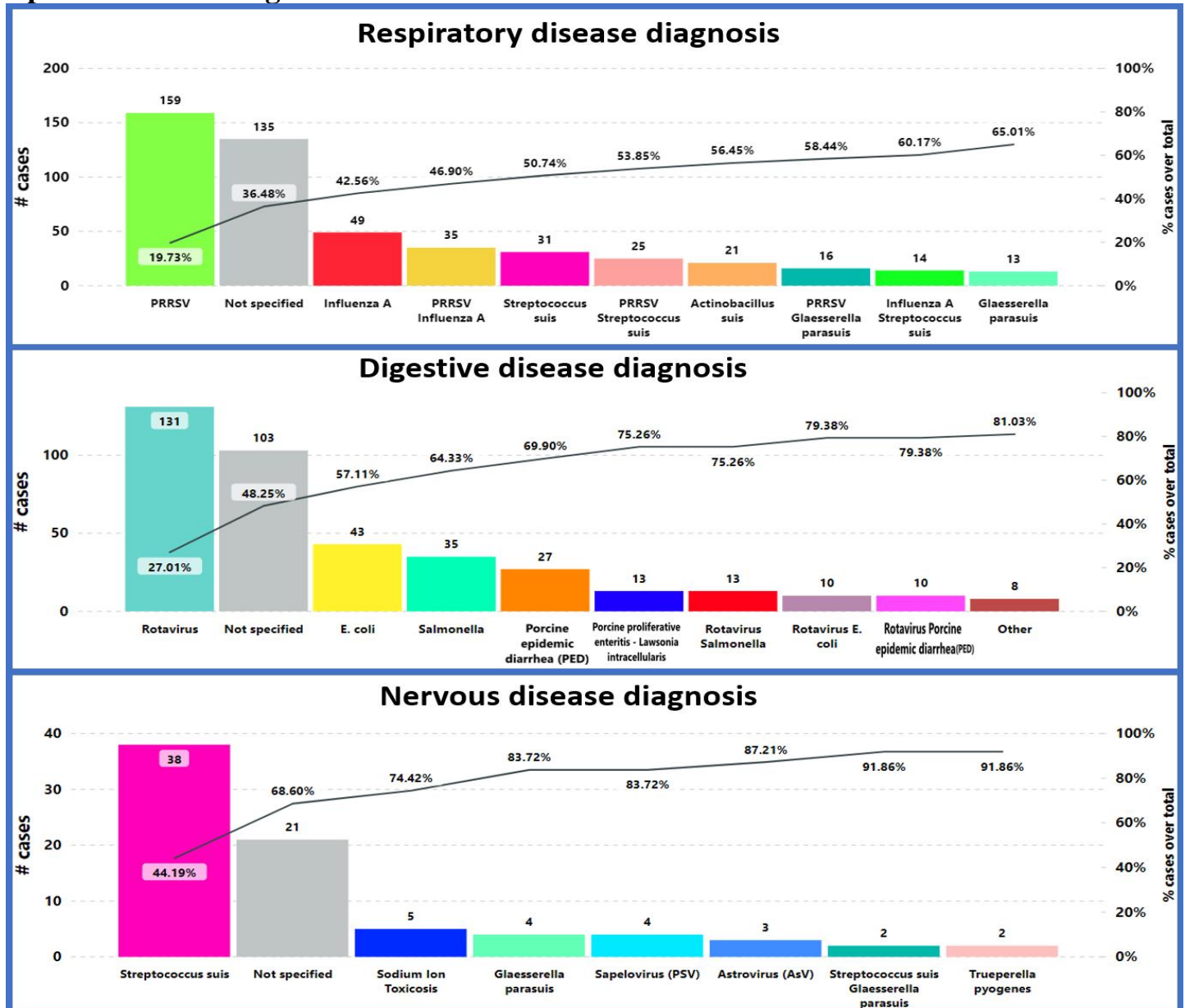## Topic 4 – Disease diagnosis at the ISU-VDL

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 contain data from March 1st to April 18th.

SDRS highlights:

▪ There were no significant increases (signals) in the diagnosis of any pathogen or disease syndrome.

▪ PRRSV (159 of 806) continues to lead the number of respiratory diagnosis, rotavirus (131 of 485) the digestive diagnoses, and *S. suis* (38 of 86) the nervous diagnosis.