Swine Disease Reporting System
Report 23 (January 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, 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 programs are available at www.fieldepi.org/SDRS:

Swine Health Information Center (SHIC)-funded Domestic Disease Surveillance Program: collaborative project among multiple VDLs, with the goal to aggregate swine diagnostic data and report in 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 C. Hennings.

Disease Diagnosis System: This is a pilot program with the ISU VDL which consists of reporting *disease detection* (not just pathogen detection by PCR), based on diagnostic codes assigned by veterinary diagnosticians.

FLUture: This is a project that aggregates *Influenza A virus (IAV) diagnostic data* from the ISU VDL, including test results, metadata, and sequences.

PRRS virus RFLP report: Benchmarks patterns of PRRSV RFLP type detected at the ISU VDL over time, USA state, specimen, and age group.

Audio and video reports: Key findings are summarized monthly in a conversation between investigators and available in the form of an audio report and video report though YouTube.

Advisory Council:

The advisory group reviews the data to discuss it and provide their comments to try to give the data some context and thoughts about its interpretation: Clayton Johnson, Emily Byers, Mark Schwartz, Paul Sundberg, Paul Yeske, Rebecca Robbins, Tara Donovan, Deborah Murray, Scott Dee, Melissa Hensch.

This report is an abbreviated version of the content available online at www.fieldepi.org/SDRS.

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

Figure 1. A: Results of PRRS 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 PRRS 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 type detected during year of 2019. **F**: RFLP type detected during year of 2018. RFLPs indicated as N/A represents not detected, or European PRRSV type.

SDRS Advisory Council highlights:

▪ The overall percentage of PRRS-positive cases in December was 27.66% (1,743 of 6,302), up from 26.71% (1,637 of 6,128) in November;

▪ The overall percentage of PRRSV-positive cases in December for adult/sow farms was 24.99% (708 of 2,833). It was 22.75% (617 of 2,712) in November. This level of detection for the adult/sow farm is the highest since 2013 for the months of November and December;

▪ After four months of consecutive increase in the percentage of positive results for the wean to market cases there was a decrease in the percentage of positive results from 44.06% (783 of 1,777) in November to 43.20% (766 of 1,773) in December;

▪ The number of PRRSV-positive cases from December 1 to December 28 was above the expected in Minnesota (MN), and Nebraska (NE);

▪ The major changes in RFLP detection during 2019 when compared to 2018 included: 1-12-4: +64 cases (100 vs. 36); 1-8-3: +28 (45 vs. 17); 1-4-2: + 20 (109 vs. 89), 1-6-3: -52 (0 vs. 52); 1-7-4: -77 (772 vs. 849); 2-5-2: -195 (852 vs. 1047);

▪ The Advisory Council pointed out that the increased detection in sow farms was associated with recently observed outbreaks. A delayed pumping season may be contributing to some outbreaks in highly dense areas. On the other side, naïve systems operating in lower density areas are not experiencing increased incidence.

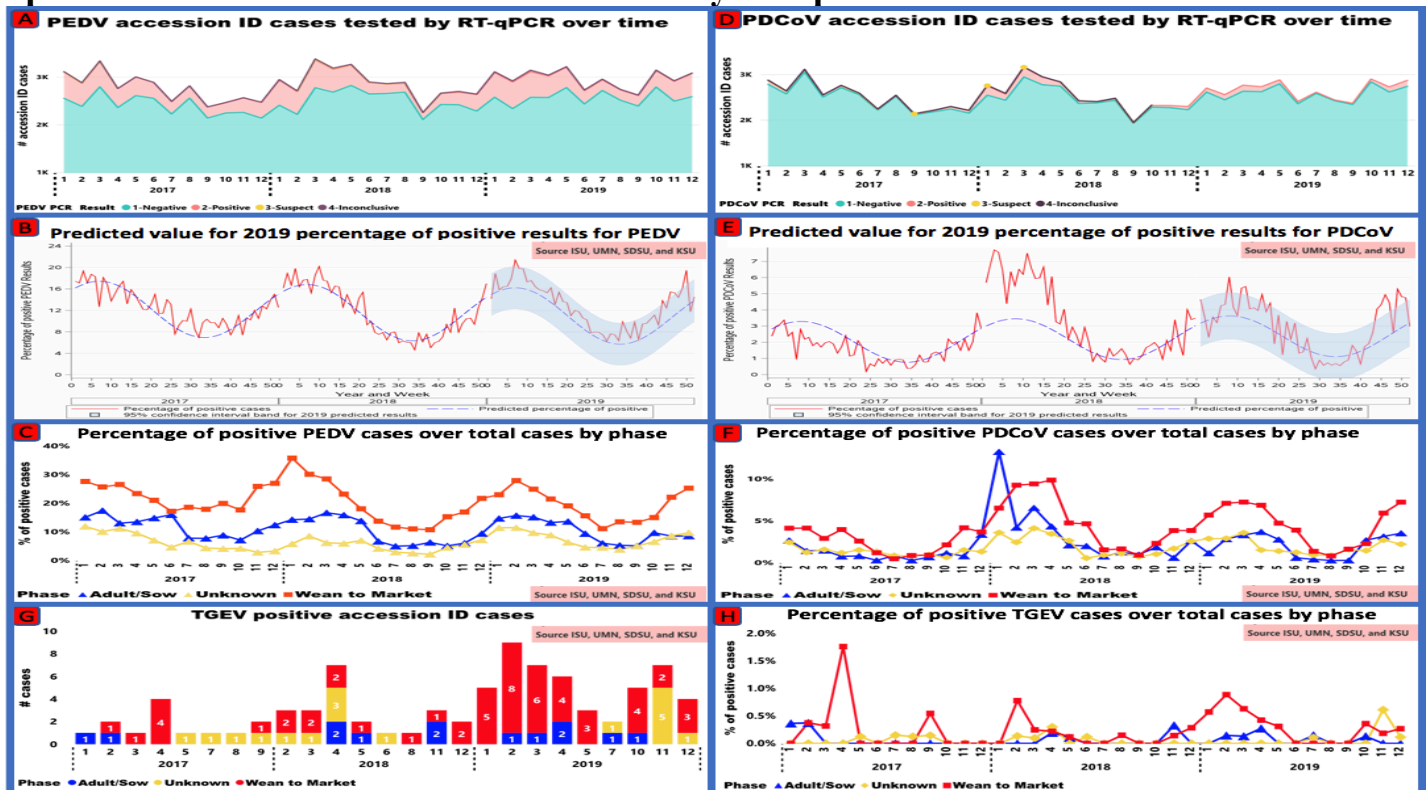# Topic 2 – Detection of enteric coronaviruses by RT-qPCR

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 2019 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 2019 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 Council highlights:

- The overall percentage of PEDV RNA-positive cases in December was 15.64% (483 of 3,089), up from 14.19% (415 of 2,925) in November;
  - o The increased detection of PEDV RNA above expected during week 49-50 (December 1 to 14) was mostly driven by wean-to-market cases, mostly from Iowa. In November the percentage of positive for wean-to-market cases was at 25.30% (313 of 1,237), up from 22.11% (267 of 1,206) in November;
  - o The percentage of PEDV RNA positive cases for the adult/sow farm cases was 8.46% in December, which was the lowest historical December level for adult/sow farm;
- The overall percentage of PDCoV RNA-positive cases in December was 4.59% (132 of 2,835), up from 4.37% (113 of 2,730) in November;
  - o The increased detection of PDCoV RNA above expected during week 49 to 51 (December 1 to 22) was mostly driven by wean-to-market animals, mostly from Iowa. In December, the percentage of positive for wean-to-market animals was at 7.25% (82 of 1,131), up from 5.94% (65 of 1,094) in November;
- There were four positive cases for TGEV RNA over a total of 2,802 cases tested in December. All positive cases were detected in Iowa;
- The Advisory Council pointed out that an increased detection in PEDV and PDCoV RNA during October had contribution from accidental contamination of sow farms after planned gilt exposure. The current increased detection in wean-to-market animals is potentially associated with placement of positive animals, period of the year (cold weather) helping with virus survivability, lower biosecurity level in grow-finish sites compared with sow farms, and a potentially momentary short turn around for placement feeders/weanners placement associated with removal of ractopamine from feed.
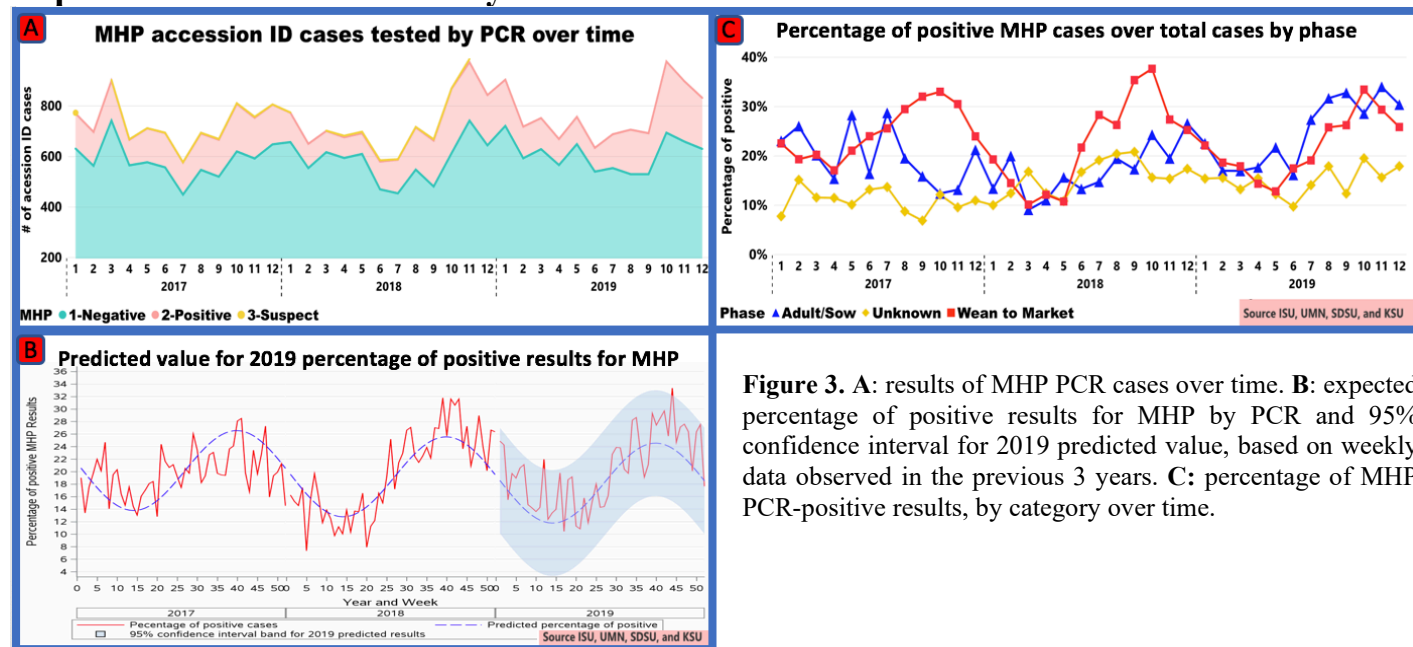
Topic 3 – Detection of MHP by PCR

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 2019 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 Council highlights:

- The overall percentage of *Mycoplasma hyopneumoniae*-positive cases in December was 24.28% (202 of 832). It was 26.61% (239 of 898) in November;

- The level of detection of *Mycoplasma hyopneumoniae* during December followed the expected predicted decrease in detection for this period of the year.

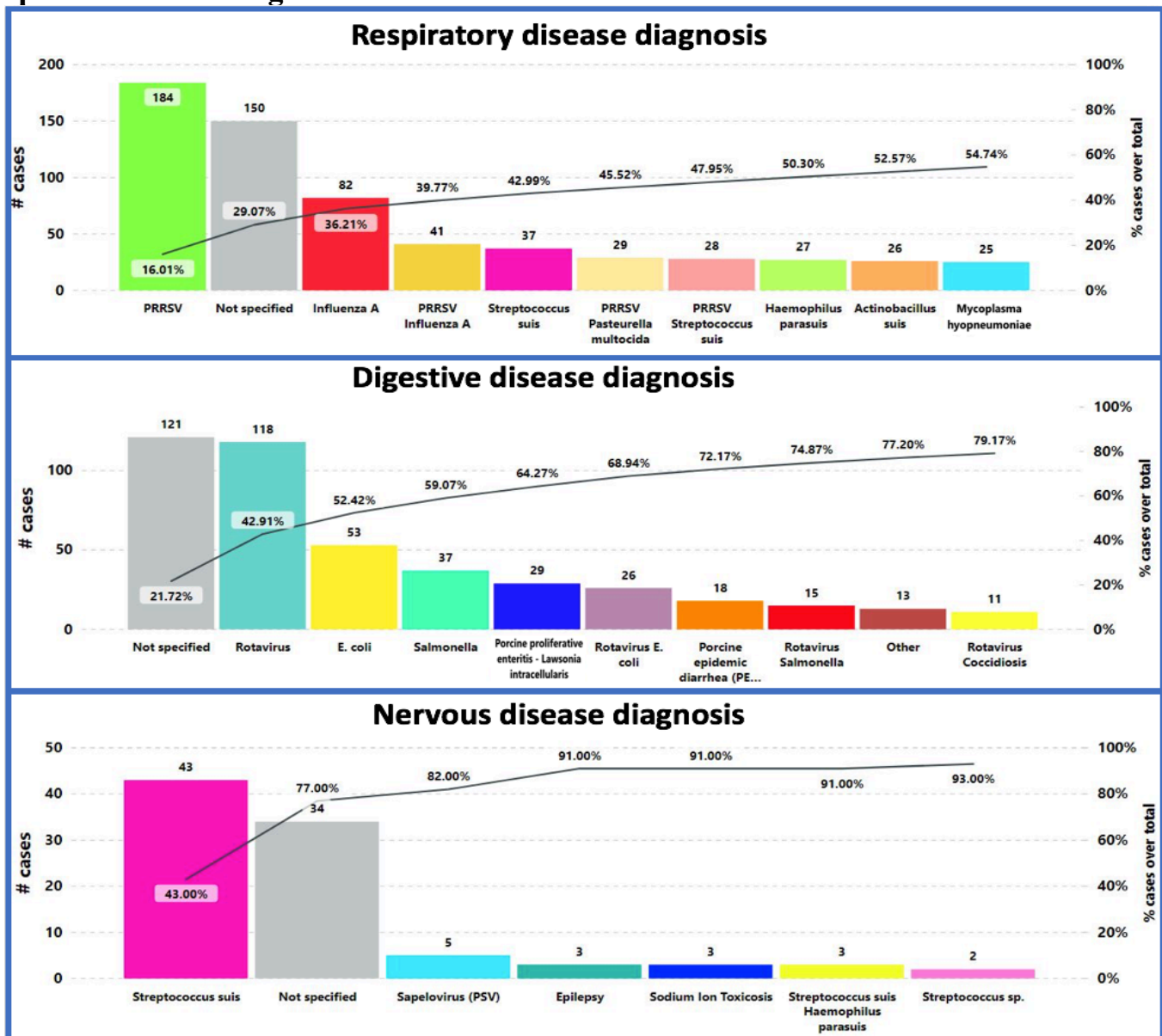## Topic 4 – Disease diagnosis at ISU-VDL

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 graph and analysis contain data from November 1 to December 15.

SDRS Advisory Council highlights:

- Among the cases submitted for diagnosis at ISU-VDL from November 1 to December 15 there were signals for increased number of clinical cases diagnosed with PRRSV, PEDV, and *P. multocida*.