Swine Disease Reporting System
Report # 16 (June 4, 2019)

What is the SDRS?

SHIC-funded, veterinary diagnostic laboratories (VDLs) collaborative project, with goal to aggregate swine diagnostic data from participating reporting VDLs, and report in an intuitive format (web dashboards), describing dynamics of disease detection by pathogen or disease syndrome over time, specimen, age group, and geographical space.

For this report, data is from the Iowa State University VDL and South Dakota State University ADRDL. University of Minnesota VDL and Kansas State University VDL. Specifically, for PRRSV RFLP data, and syndromic information the results are from Iowa State University VDL.

For all "2019 predictive graphs", the expected value was calculated using a statistical model that considers the results from 3 previous years. The intent of the model is not to compare the recent data (2019) to individual weeks of previous years. The intent is to estimate expected levels of percent positive cases based on patterns observed in the past data, and define if observed percentage positive values are above or below the expected based on historic trends.

Collaborators:

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

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

Kansas State University: Rob McGaughey, Jamie Henningson, Eric Herrman, Gregg Hanzlicek, Ram Raghavan, Douglas Marthaler.

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

* Giovani Trevisan: Project coordinator. E-mail: trevisan@iastate.edu.
** Daniel Linhares: Principal investigator. E-mail: linhares@iastate.edu.

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, Hans Rotto, Mark Schwartz, Paul Sundberg, Paul Yeske, Rebecca Robbins, Tara Donovan, Matthew Turner, Deborah Murray.

This report is an abbreviated version of the dashboards that are available online.

To access the full data and hear the podcast for the reports, use your computer, tablet, or phone and go to: https://fieldepi.research.cvm.iastate.edu/swine-disease-reporting-system/ and explore the dashboard corresponding to each pathogen or syndrome.

Swine Disease Reporting System

Page 1 – Detection of PRRSV RNA over time by rRT-PCR.

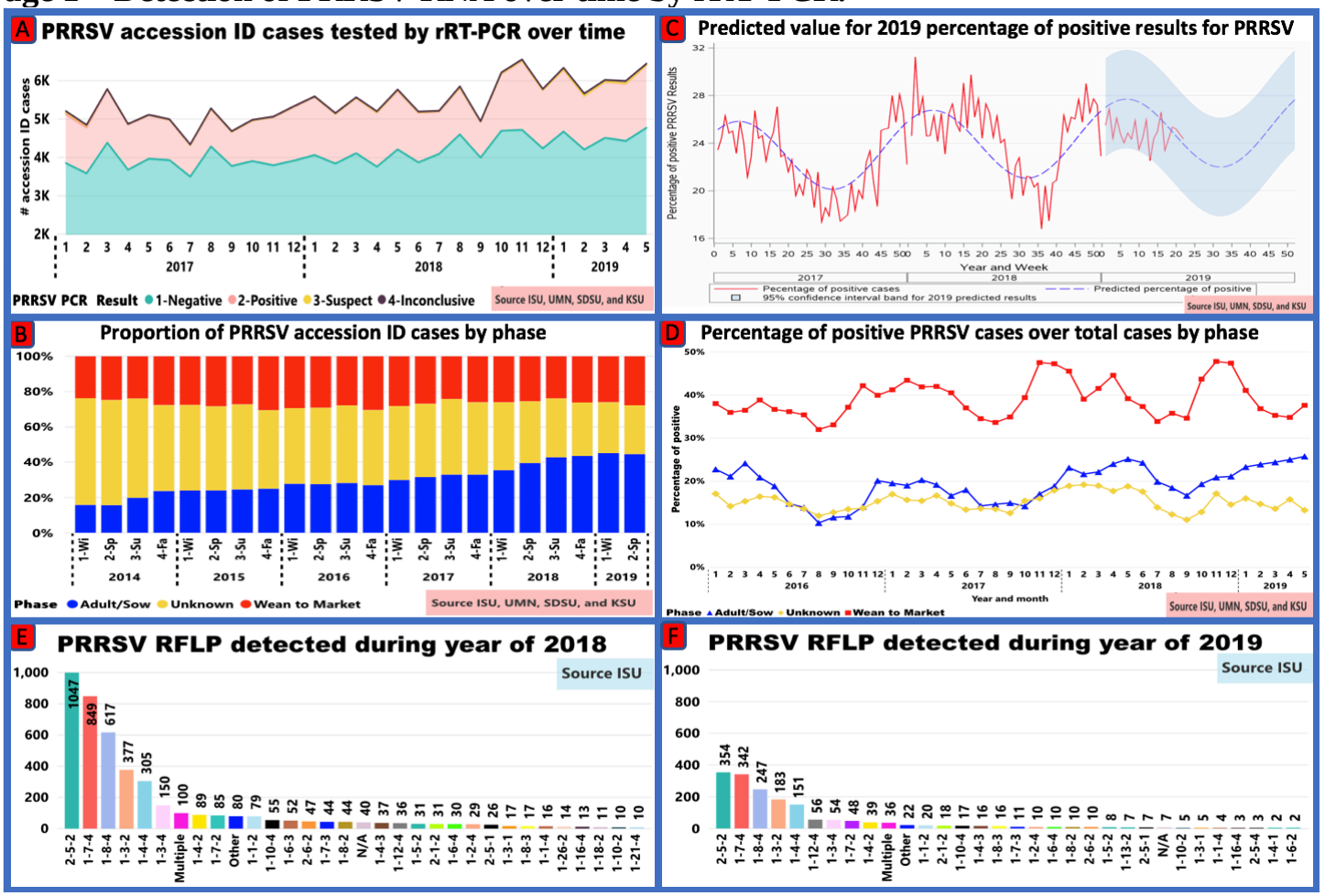


Figure 1. A: Results of PRRS rRT-PCR cases over time. **B**: Proportion of accession ID cases tested for PRRSV by age group per year and season. **C**: expected percentage of positive results for PRRSV RNA by rRT-PCR, with 95% confidence interval band for predicted results. **D**: percentage of PRRS 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:

- PRRSV activity remains within the predicted values for 2019;
- May had 6,444 cases tested for PRRSV which is the highest for the year of 2019;
- The percentage of positive cases in wean-to-market increased from 34.82% in April to 37.62% in May;
- The percentage of positive cases for adult/sow farm reached 25.76% in May. The week of May 12th to 18th had 27.20% percent of positive cases which is the highest weekly results for the year of 2019. The average weekly number of cases tested for PRRSV from adult/sow farm was 600 (±5) for May.

Page 2 – Detection of enteric coronaviruses by rRT-PCR

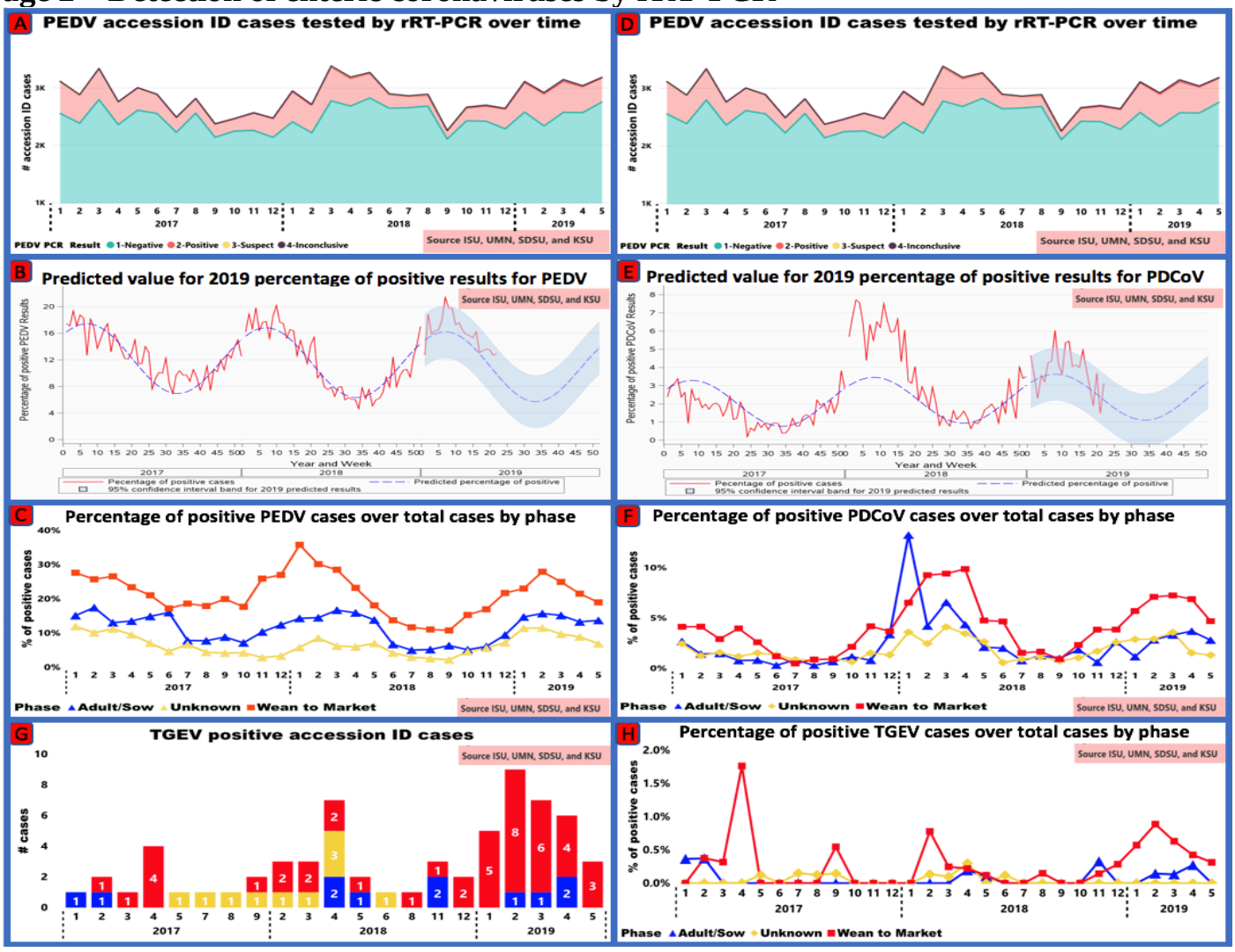


Figure 2. A: results of PEDV rRT-PCR cases over time. **B**: expected percentage of positive results for PEDV by rRT-PCR and 95% confidence interval for 2019 predicted value. **C:** percentage of PEDV PCR-positive results, by category over time. **D**: results of PDCoV rRT-PCR cases over time. **E**: expected percentage of positive results for PDCoV by rRT-PCR and 95% confidence interval for 2019 predicted value. **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:

- Level of detection of PEDV by PCR is within the expected value for May. There were 3,188 cases tested for PEDV in May which was the highest monthly level in 2019;
- Level of detection of PDCoV by PCR is within the expected value for May. There were 2,860 cases tested for PDCoV in May, which was the highest monthly level in 2019;
- The number of cases testing positive for TGEV continue to decline (3 of 2,464 tested positive in May).

Page 3 – Detection of MHP by PCR

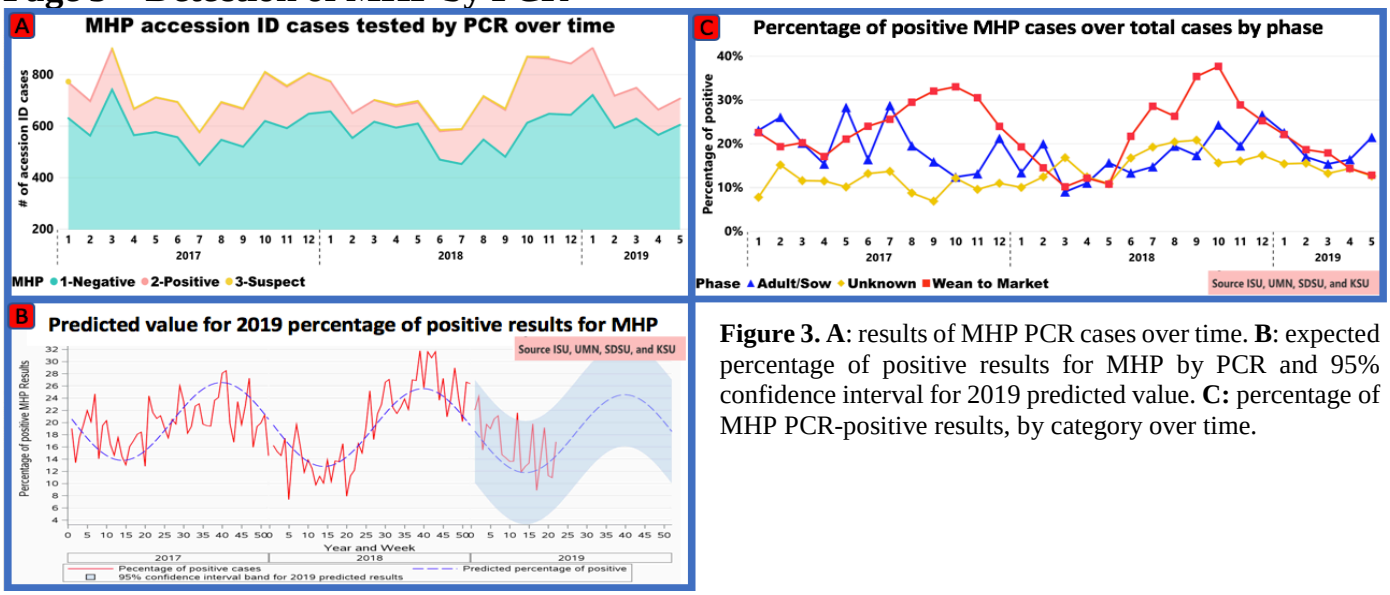
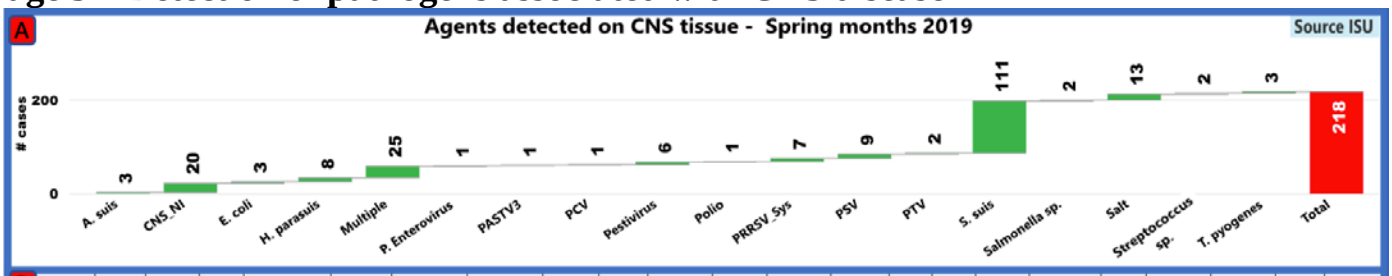


Figure 3. A: results of MHP PCR cases over time. **B**: expected percentage of positive results for MHP by PCR and 95% confidence interval for 2019 predicted value. **C:** percentage of MHP PCR-positive results, by category over time.

Page 3 – Detection of pathogens associated with CNS disease



B

	A. suis	CNS_NI	E. coli	E. rhusiopathiae	H. parasuis	Multiple	P. Enterovirus	PASTV3	PCV	Pestivirus	Polio	PRRSV	PRRSV_Sys	PSV	PTV	S. suis	Salmonella sp.	Salt	Streptococcus sp.	T. pyogenes	Toxic	Total
Spring months 2017	3	8	3		13	26	2		4	2		1	17			109		5	2			195
Spring months 2018	2	13	3		12	27		2	4				17	5		136	1	7	9	9		247
Spring months 2019	3	20	3		8	25	1	1	1	6	1		7	9	2	111	2	13	2	3		218

Figure 4. Pathogen detection on CNS tissue over time. Each green bar indicates a different agent or syndrome, the red bar accounts for the sum of the green bars. **A:** spring months of 2019. **B**: Table for agents detected in CNS tissue during spring months of 2017, 2018 and 2019. Spring months contains results of March, April, and May. 'Multiple agents' represent cases with more than one pathogen detected on CNS tissues.

SDRS Advisory Council highlights:

- Even though the overall level of detection of MHP by PCR is within the expected value for May of 2019, there was a substantial increase of positive cases among adult/sows, from 16.41% in April to 21.48% in May. There was no change in weekly number of cases tested for this age category;
- Spring of 2019 had a decrease of 11.74% of CNS cases when compared with spring months of 2018 and similar number of cases from spring months of 2017;
- *Streptococcus suis* (S. suis) continues to be the major agent detected on CNS tissue and its detection in spring months of 2019 was 18.38% less compared to same period of 2018*;*
- Even though the number of cases is limited, 2019 Spring months had an increased detection of salt intoxication (Salt) detected on CNS tissue when compared with Spring season of 2018 and 2017.

Page 4 – Detection of pathogens in respiratory tissue over time.

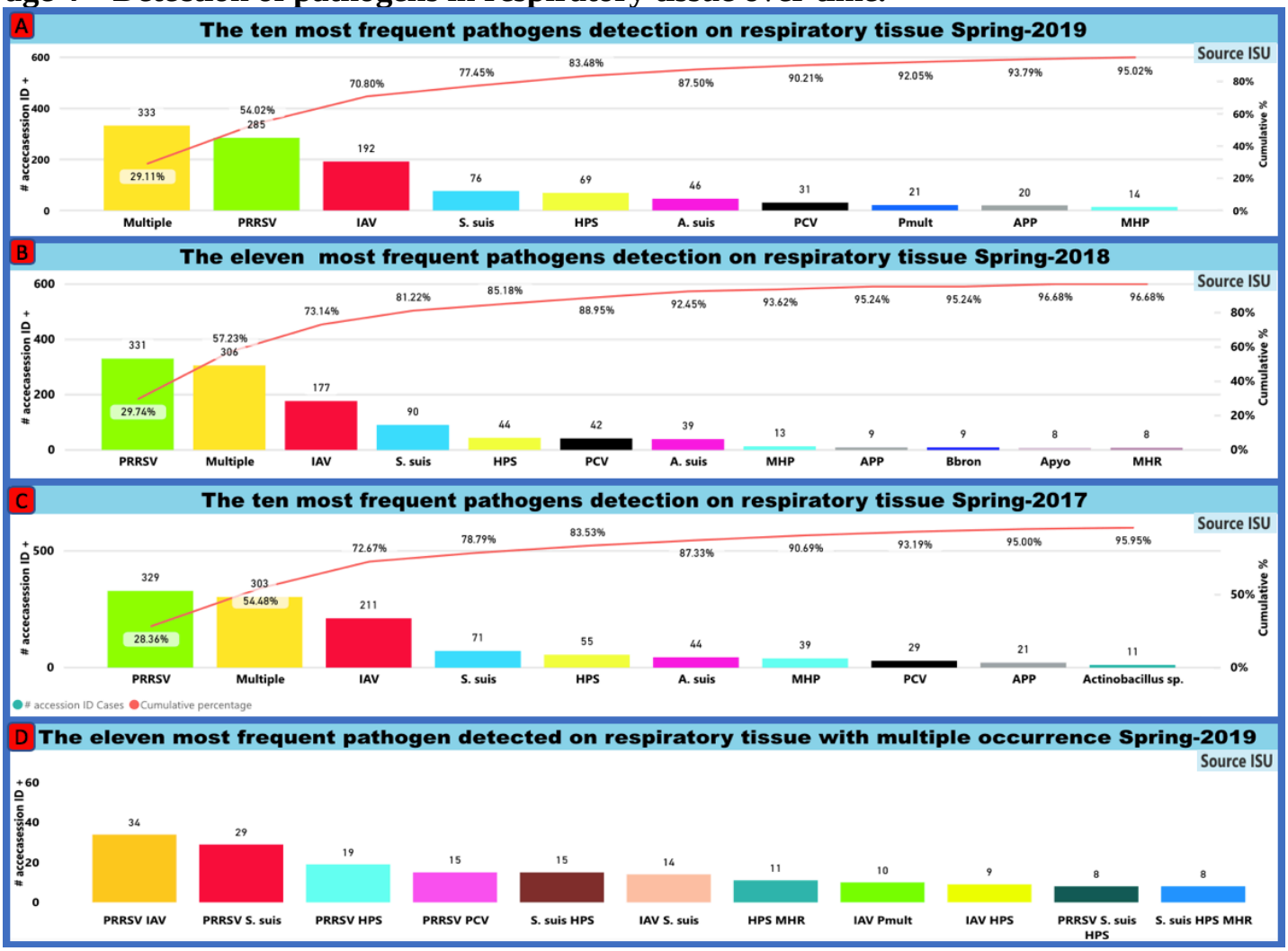


Figure 5. Pathogen detection on respiratory tissues over time. **A**, **B**, and **C** each bar and color indicate a different agent or syndrome. The red line accounts for the cumulative percentage of the bars. **A**: spring months of 2019. **B**: winter spring of 2018. **C**: spring months of 2017. Spring months include March, April, and May. 'Multiple agents' represent cases with more than one pathogen detected on respiratory tissues**. D:** Multiple agents detected in respiratory tissue per accession ID case level. Each bar and colour bar represent a combination of 2 or more agents. Presented results are based on diagnostician interpretation.

SDRS Advisory Council highlights:

- Number of cases diagnoses of respiratory syndromes for spring months of 2019 has been very similar to 2018 spring months. There were 1,144 cases in 2019 vs. 1,113 cases in 2018;
- The 3 insultants with increased detection in 2019 spring months compared to 2018 spring months were: *Haemophilus parasuis* (HPS) from 44 to 69 cases, *Pasteurella multocida* (Pmult) from 3 to 21 cases, Influenza A virus (IAV) from 177 to 192 cases, *Actinobacillus pleuropneumoniae* (APP) from 9 to 20 cases. The 3 pathogens with less frequent detection in respiratory tissue were PRRSV from 331 to 285 cases, *S. suis* from 90 to 76 cases, and Porcine circovirus (PCV) from 42 to 31 cases;
- Cases having multiple pathogens are a combination of the major agents reported as individual pathogens. Combination of PRRSV + IAV, or PRRSV + *S. suis*, and or PRRSV+HPS were the most frequent detected during 2019 spring months. This was similar to the pattern of detection during previous years spring months.

Page 5 – Detection of pathogens in enteric tissue over time.

Figure 6. Pathogen detection on enteric tissues over time. **A**, **B**, and **C** each bar and color indicate a different agent or syndrome. The red line accounts for the cumulative percentage of the bars. **A**: spring months of 2019. **B**: spring months of 2018. **C**: spring months of 2017. Spring months include March, April, and May. 'Multiple agents' represent cases with more than one pathogen detected on respiratory tissues**. D:** Multiple agents detected in enteric tissue per accession ID case level. Each bar and colour represent a combination of 2 or more agents. Presented results are based on diagnostician interpretation.

SDRS Advisory Council highlights:

- There was a 28.47% (731 vs 569) increase in the number of enteric diagnoses during spring months of 2019 when compared with spring months of 2018. Spring months of 2017 had 581 cases;
- There was no insultant with decreased number of diagnosis. The 3 groups with major number of increased diagnoses in 2019 spring months when compared with 2018 spring months were: Multiple increased from 82 to 132 cases, rotaviruses (ROTA) increased from 177 to 201 cases, Salmonellosis (Salm) increased from 39 to 60 cases, cases with viral miscellaneous insultant increased from 26 to 40 cases, coccidia (COOC) increased from 11 to 21 cases, and brachyspiral colitis (BRAC) from 1 to 11 cases;
- Cases having multiple insultant represents a combination of major agents detected as a single insultant were the ROTA insultant is detected in 7 of the 11 major combination [ROTA + *E. coli*, ROTA + PEDV, ROTA + Salm, ROTA + *Clostridium difficile* (C. diff), ROTA + COOC, ROTA + E. coli + *Clostridium perfringens* (C. perf), ROTA + *E. coli* + Salm, ROTA + PEDV + E.coli] and Salmonellosis in 4 of the 11 major combinations (*E. coli* + Salm, ROTA + Salm, PEDV + Salm, and ROTA + *E. coli* + Salm).