

Swine Disease Reporting System report 9 (November 6th, 2018)

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, the results are from Iowa State University VDL.

For all “2018 predictive graphs”, the expected value was calculated using a statistical model that takes into account the results from 3 previous years. The intent of the model is not to compare the recent data (2018) 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*, Leticia Linhares, Bret Crim; Poonam Dubey, Kent Schwartz, Eric Burrough; Rodger Main, Daniel Linhares**.

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

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

South Dakota State University: Jon Greseth, Travis Clement, Jane C. 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, Jeremy Pittman, Mark Schwartz, Paul Sundberg, Paul Yeske, Pete Thomas, Rebecca Robbins, Tara Donovan.

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

To access the full data, use your computer, tablet, or phone to:



1) Scan the code below, or go to: www.powerbi.com

2) Login: sdrs@iastate.edu

3) Password: Bacon 100

4) On the left bar, click on ‘Apps’

5) Select your dashboard of interest (e.g. PRRS)

5) More information at the SDRS webpage <https://fieldepi.research.cvm.iastate.edu/swine-disease-reporting-system/>

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Page 1 – Detection of PRRSV RNA over time by rRT-PCR (1 of 2).

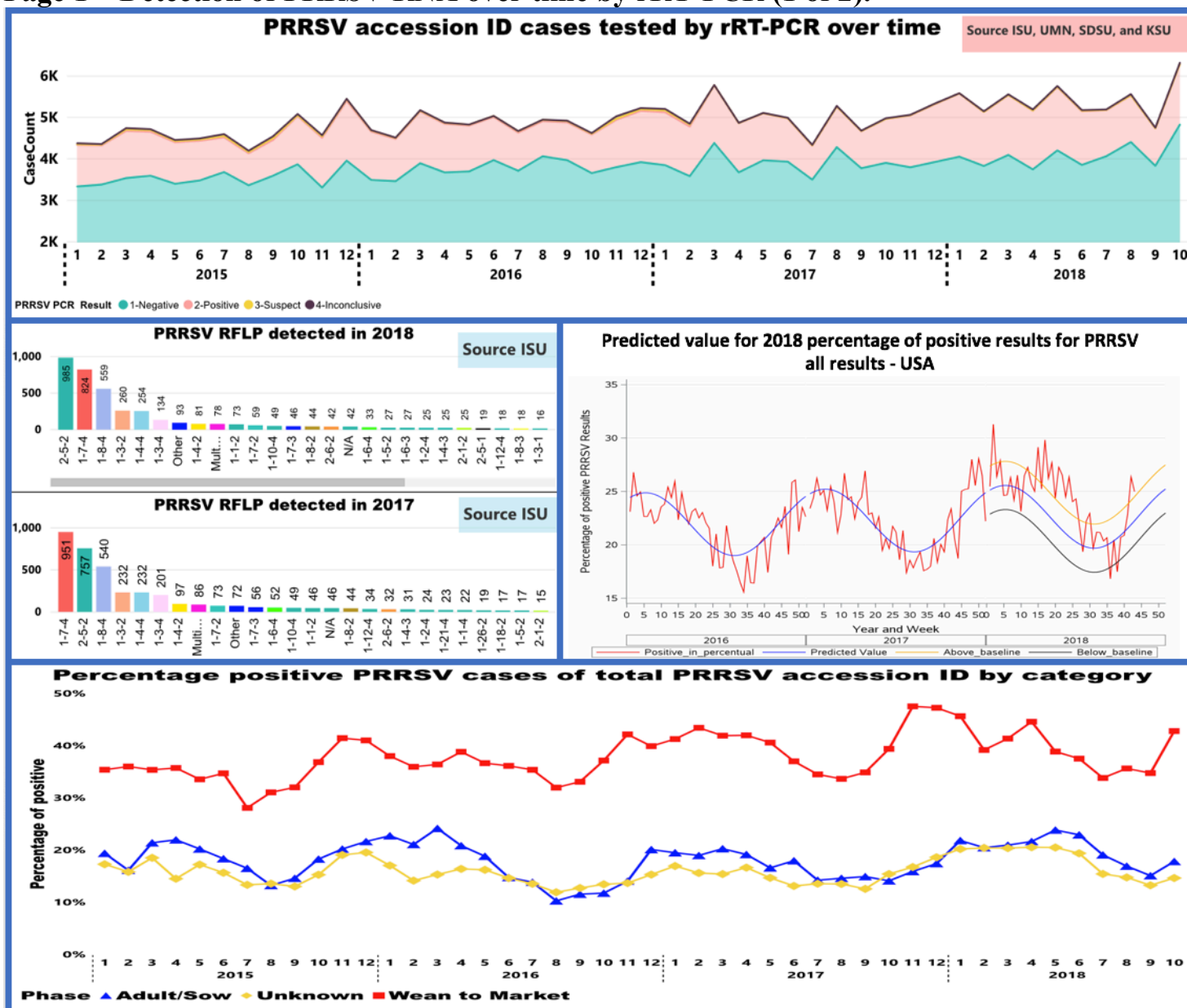


Figure 1 Top chart: Results of PRRS rRT-PCR cases over time. Middle right: expected percentage of positive results for PRRSV RNA by rRT-PCR, with 1 standard deviation above and below the expected value. Middle left: PRRS virus RFLPs detected on 2017, and 2018 for Winter, Spring, and Summer months. Bottom: Percentage of PRRS PCR-positive results, by 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

PRRS rRT-PCR data were consolidated from Iowa State University Veterinary Diagnostic Laboratory (ISU-VDL), University of Minnesota Veterinary Diagnostic Laboratory (UMN-VDL), South Dakota State University Animal Disease Research & Diagnostic Laboratory (SDSU-ADRDL), and Kansas State University Veterinary Diagnostic Laboratory (KSU-VDL).

SDRS Advisory Council highlights:

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Swine Disease Reporting System



- a) October of 2018 reported > 6,000 PRRS PCR cases for the first time for on a single month;
- b) Significant increase in the percentage of positive results was detected during the weeks of 42 and 43 of 2018 (Calendar days 14th to 27th of October), indicating perhaps the beginning of the PRRS season for the 2018-2019 winter.
 - Most of the increased PRRS PCR positivity was driven by cases from wean-to-market pigs, which has been consistent with previous years.
 - PCR-positive cases increased from 34.77 to 42.82% in wean to market, 15.12 to 17.84% in adult/sow, and 13.28 to 14.67% in unknown age category. The case load increased from 1,110 to 1,658 (+ 49.37%) in wean to market, from 2,010 to 2,451 (+ 21.94%) in adult/sow, and from 1,815 to 2,088 (+ 15.04%) for unknown. Similar pattern of detection in Iowa, Illinois, Missouri, Nebraska, and Oklahoma.
- c) In 2018 there has been a relative increase of RFLP 2-5-2, and decrease of RFLP 1-7-4 compared to previous year, likely reflecting increased use of attenuated virus vaccination in pig herds.
- d) Wild-type PRRSv sequences increased by 89.06% from September to October (128 to 242), and vaccine-like sequences increased by 81.71% (82 to 149) in the same period.
 - Wild type increase was 102.71% (37 to 75) in Adult/Boar Stud/Breeding Herd/Replacement/Sucking piglets, and 118.86% (53 to 116) in Nursery/Grow-finish
 - Vaccine type increase was 90.32% (31 to 59) for Adult/Boar Stud/Breeding Herd/Replacement/Sucking piglets, and 138.71% (31 to 74) in Nursery/Grow-finish

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Page 1 – Frequency of detection of multiple PRRSV RFLP during 2018 (2 of 2).

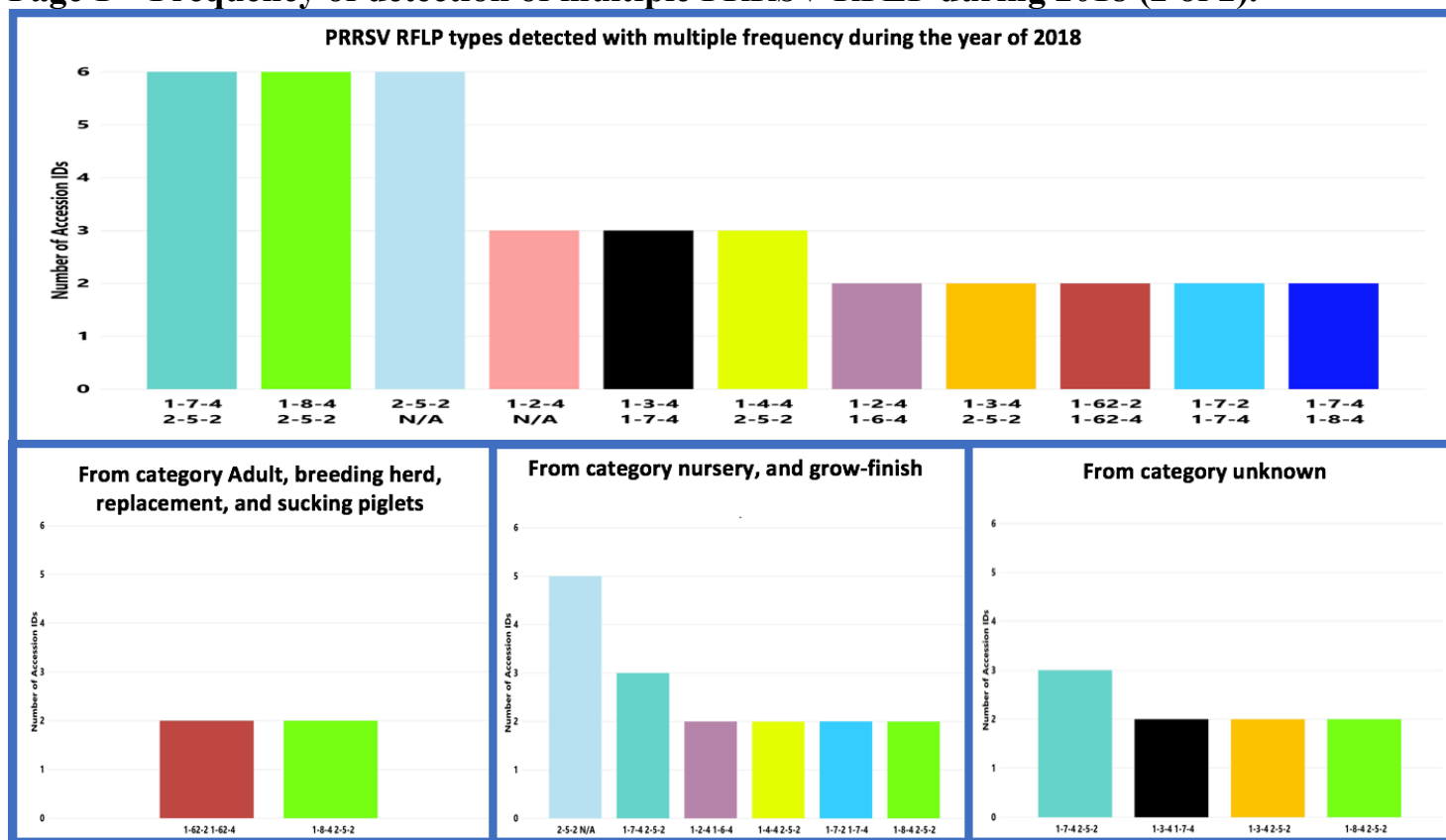


Figure 2 Multiple PRRSV RFLP detection during year of 2018. Each green bar indicates a different combination of RFLP. RFLPs indicated as N/A represents European PRRSV type sequence.

SDRS Advisory Council highlights:

- Most cases with multiple RFLP detection were from nursery, and grow-finish animals. Multiple RFLP sequences were obtained majorly from oral fluids (51%), serum (14%), followed by and lung tissues (17%).



Page 2 – Detection of enteric coronaviruses by rRT-PCR

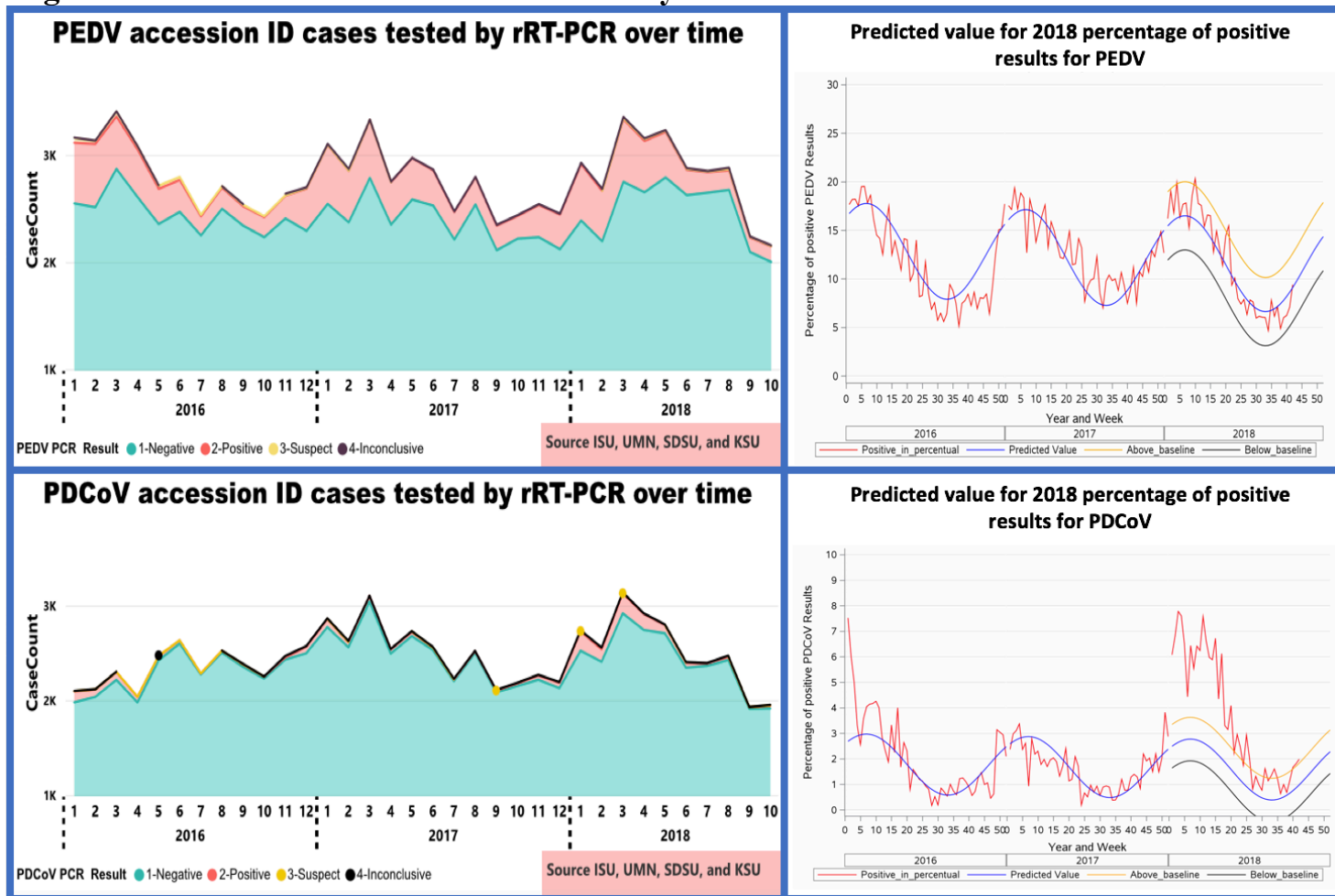


Figure 3 Left side: results of PEDV, and PDCoV rRT-PCR cases over time. Right side charts: expected percentage of positive results for PEDV and PDCoV by rRT-PCR, with 1 standard deviation above and below the expected value, respectively.

PEDV, PDCoV, and TGEV rRT-PCR test results were consolidated from Iowa State University Veterinary Diagnostic Laboratory (ISU-VDL), University of Minnesota Veterinary Diagnostic Laboratory (UMN-VDL), South Dakota State University Animal Disease Research & Diagnostic Laboratory (SDSU-ADRDL), and Kansas State University Veterinary Diagnostic Laboratory (KSU-VDL).

SDRS Advisory Council highlights:

- Level of detection of PEDV by PCR continues to meet the expected value, indicating that the increased detection level is within the expected for the beginning of the winter season.
- PDCoV PCR testing still has positivity above expected for the year of 2018.

Page 3 – Detection of pathogens associated with CNS disease

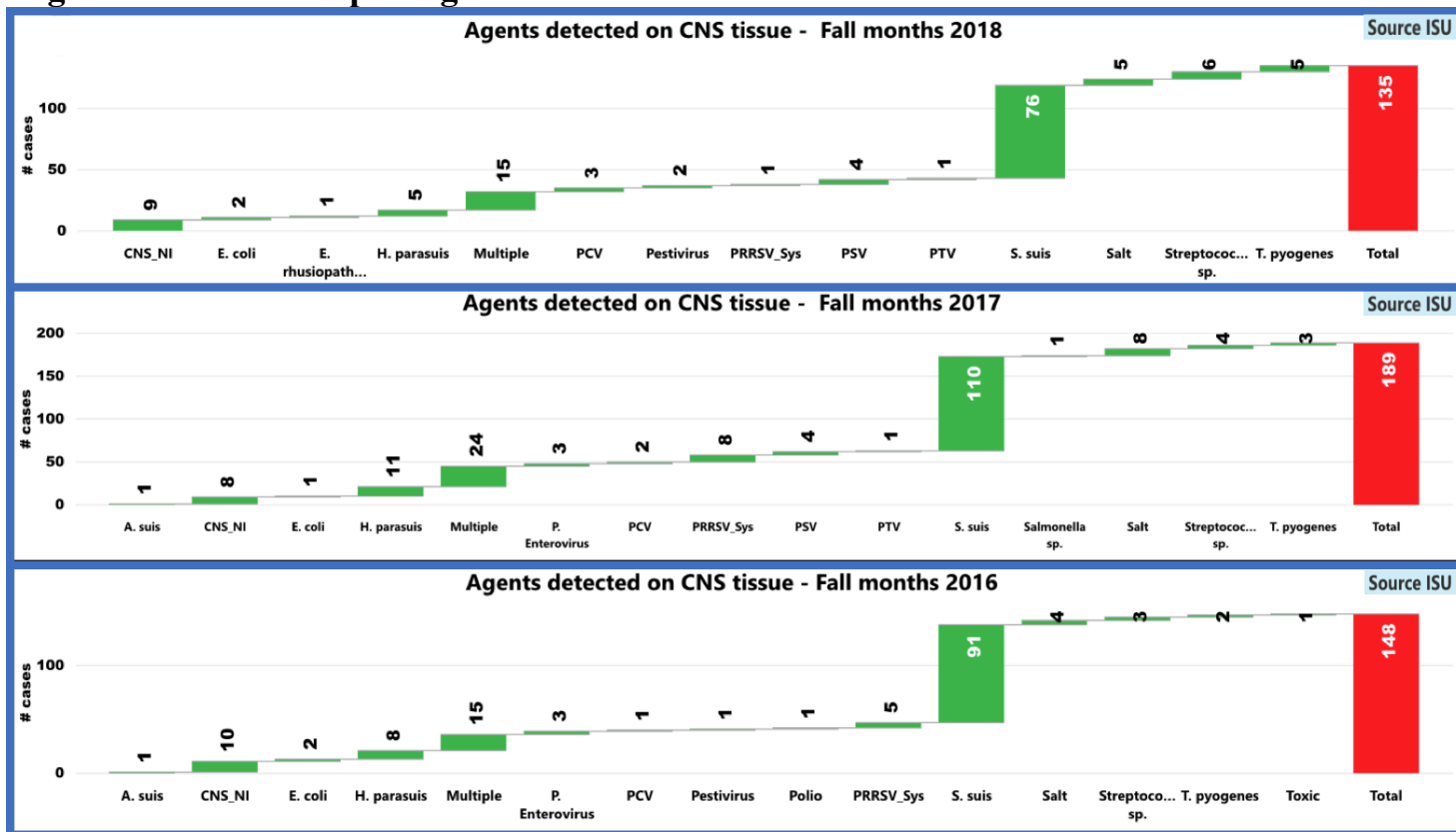


Figure 4 Pathogen detection on CNS tissue over time. Each green bar indicates a different agent or syndrome. The red bar accounts for the sum of the green bars. Bottom: fall months of 2016, middle fall months of 2017, top summer fall of 2018. Fall months contains results of September, October, and November. ‘Multiple agents’ represent cases with more than one pathogen detected on CNS tissues.

SDRS Advisory Council highlights:

- There was 1 case of *E. rhusiopathiae* on the 2018 Fall season, and similar detection number for PCV2, and PSV for 2018 and 2017 Fall seasons.
- There were 2 cases of Pestivirus (Shaker Pig Syndrome) for Fall season of 2018, which is above the same season of 2016 and 2017.



Page 4 – Detection of pathogens in respiratory tissue over time (1 of 2)

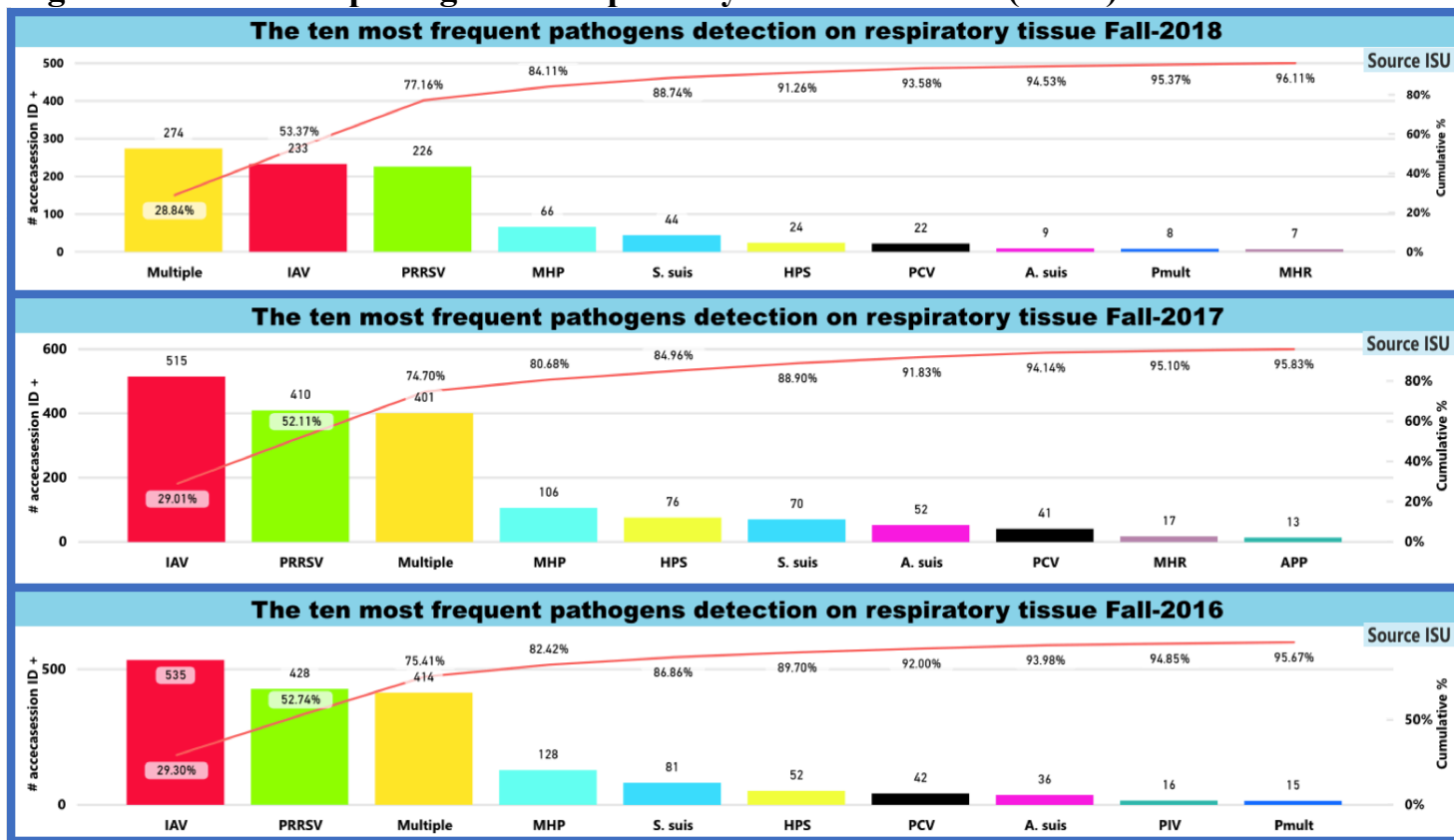


Figure 5 Pathogen detection on respiratory tissues over time. Each green bar indicates a different agent or syndrome. The red line accounts for the cumulative percentage of the green bars. Bottom: fall months of 2016, middle fall months of 2017, top fall months of 2018. Fall months include September, October, and November. ‘Multiple agents’ represent cases with more than one pathogen detected on respiratory tissues.

SDRS Advisory Council highlights:

- Number of accession ID cases that reported detection of multiple agents in Fall 2018 has been more frequent than previous years.



Page 4 – Detection of pathogens in respiratory tissue over time (2 of 2)

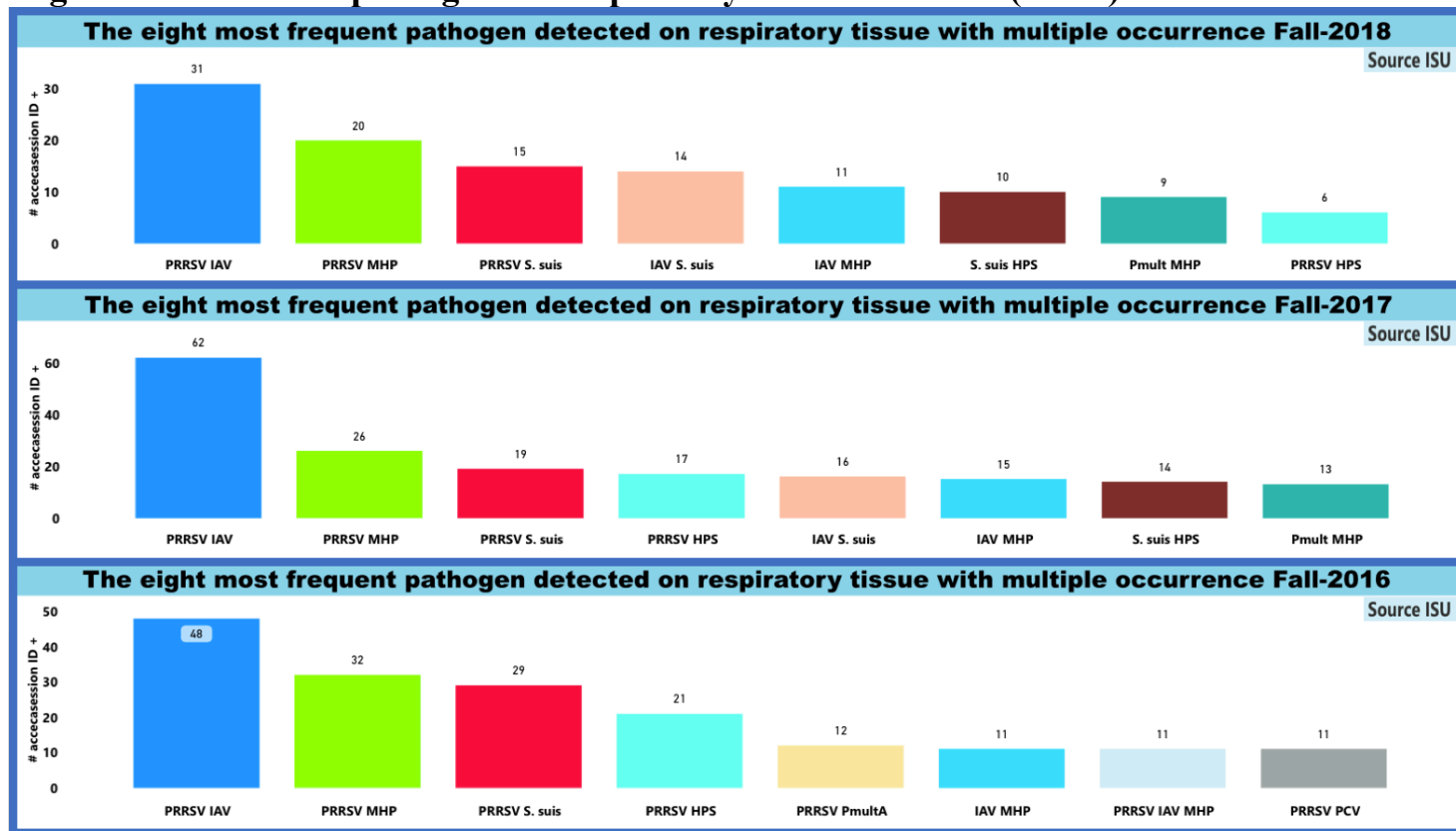


Figure 6 Multiple agents detected in respiratory tissue per accession ID case level. Each bar represents a combination of 2 or more agents.

SDRS Advisory Council highlights:

- Association of Influenza A virus and *S. suis* (IAV *S. suis*) in respiratory tissues was more frequent in Fall season of 2018 than previous years.



Page 5 – Detection of pathogens in enteric tissue over time (1 of 2)

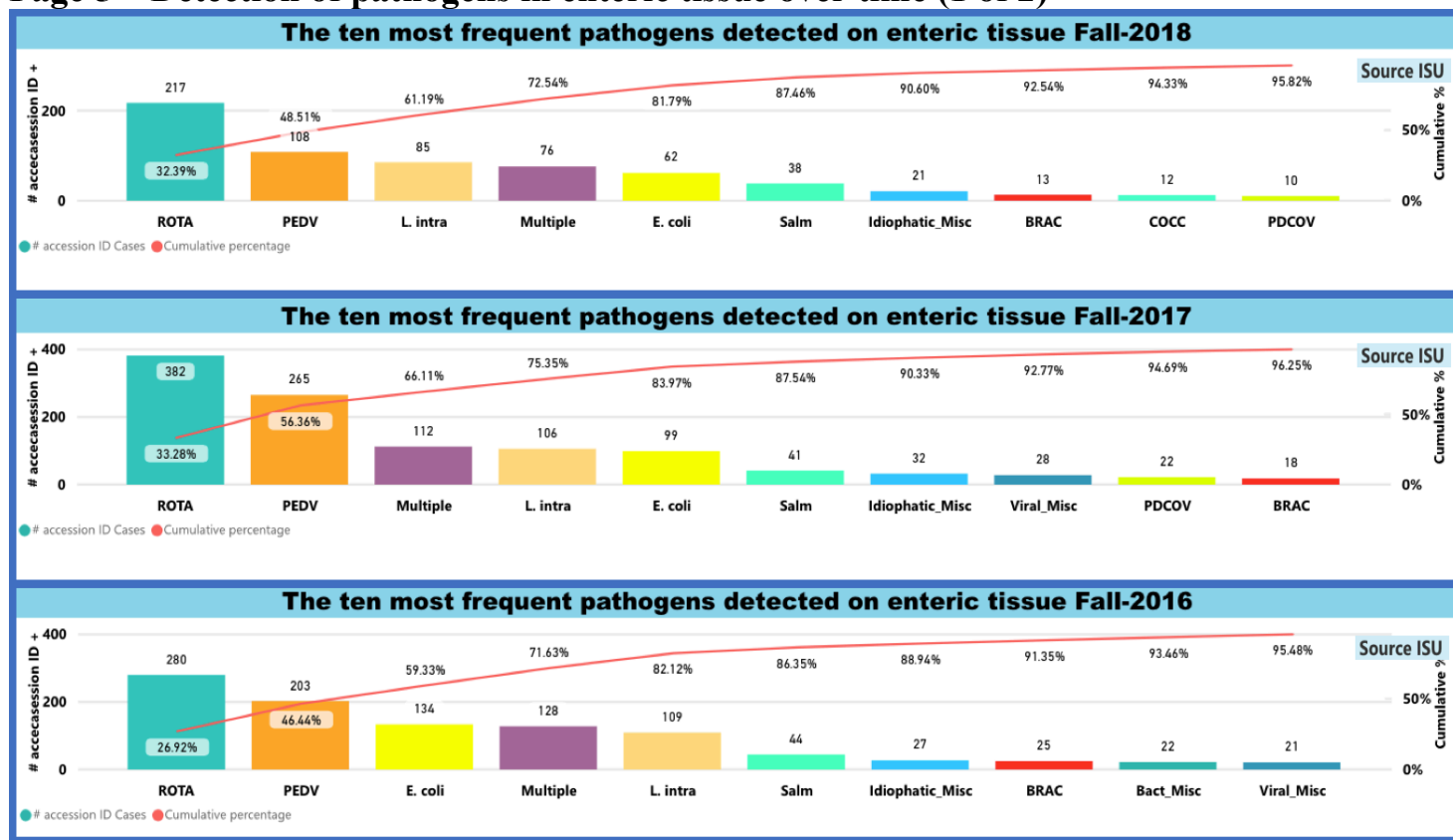


Figure 7 Pathogen detection on enteric tissues over time. Each green bar indicates a different agent or syndrome. The red line accounts for the cumulative percentage of the green bars. Bottom: fall months of 2016, middle fall months of 2017, top fall months of 2018. Fall months include September, October, and November. ‘Multiple agents’ represent cases with more than one pathogen detected on respiratory tissues.

SDRS Advisory Council highlights:

- L. intracellularis* (L.intra) and Salmonellas (Salm) had increased frequency of detection in Fall seasons over the recent years.
- From the last report information, Coccidia (COCC) continues to be a frequently detected agent.
- All COCC cases were diagnosed as enteritis.

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Page 5 – Detection of pathogens in enteric tissue over time (2 of 2)

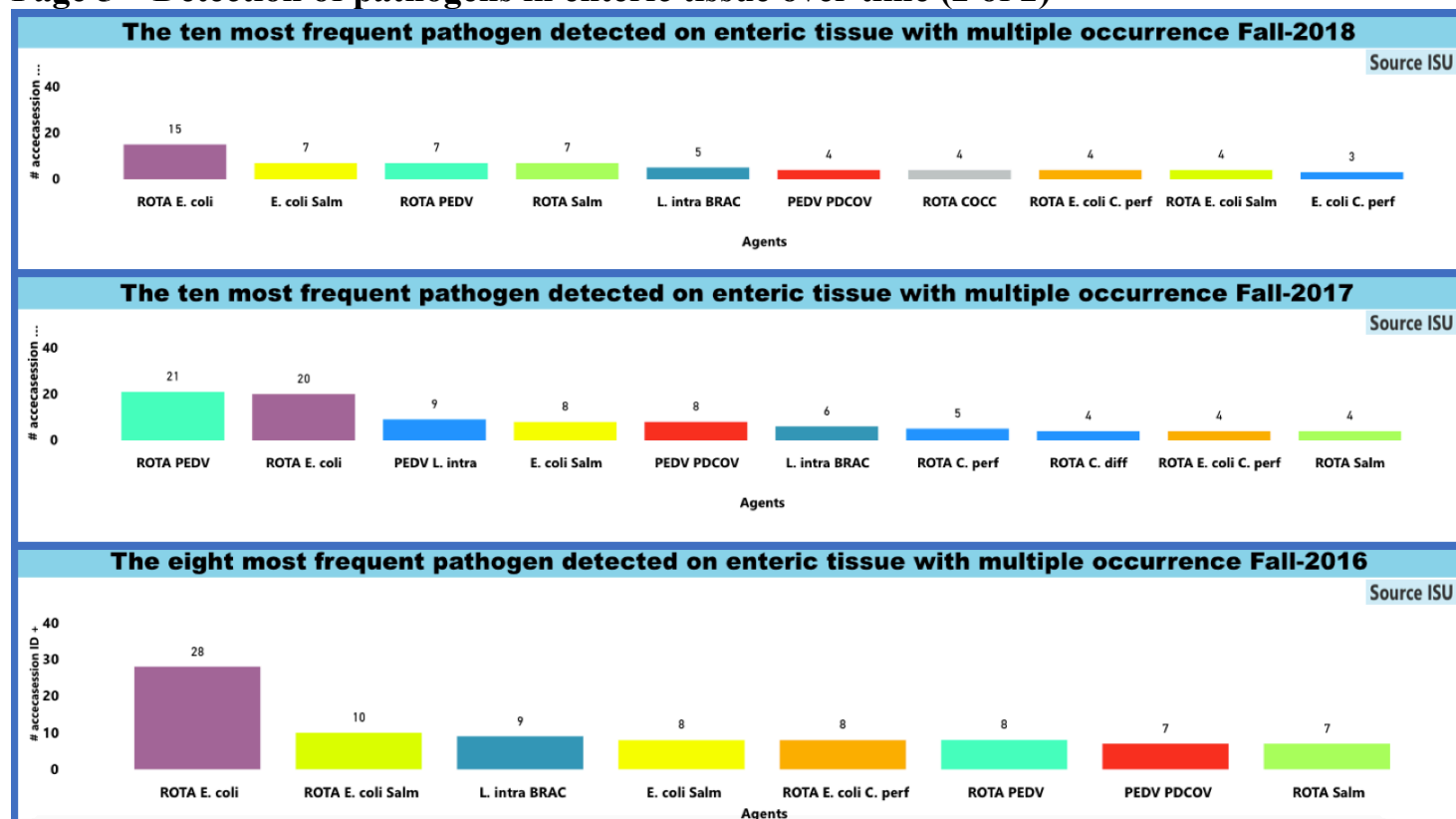


Figure 8 Multiple agents detected in enteric tissue per accession ID case level. Each blue bar represents a combination of 2 or more agents.

SDRS Advisory Council highlights:

- Coinfection between *E. coli* and Salmonellas (*E. coli* Salm), Rotaviruses and Salmonellas (ROTA Salm), and Rotaviruses, *E. coli* and *Clostridium perfringens* (ROTA E.coli C.Perf) have increased detection for Fall of 2018 compared to the same period of previous years.
- All cases of *E. coli* and Salmonellas, those for Rotaviruses, *E. coli*, and *Clostridium perfringens*, and 6 of 7 for Rotaviruses and Salmonellas were diagnosed as enteritis.
- There were 4 cases of enteritis caused by coinfection between Rotaviruses and Coccidia (ROTA COCC) reported in Fall season of 2018.

Page 6 – Summary of summer submissions by category (1 of 1)

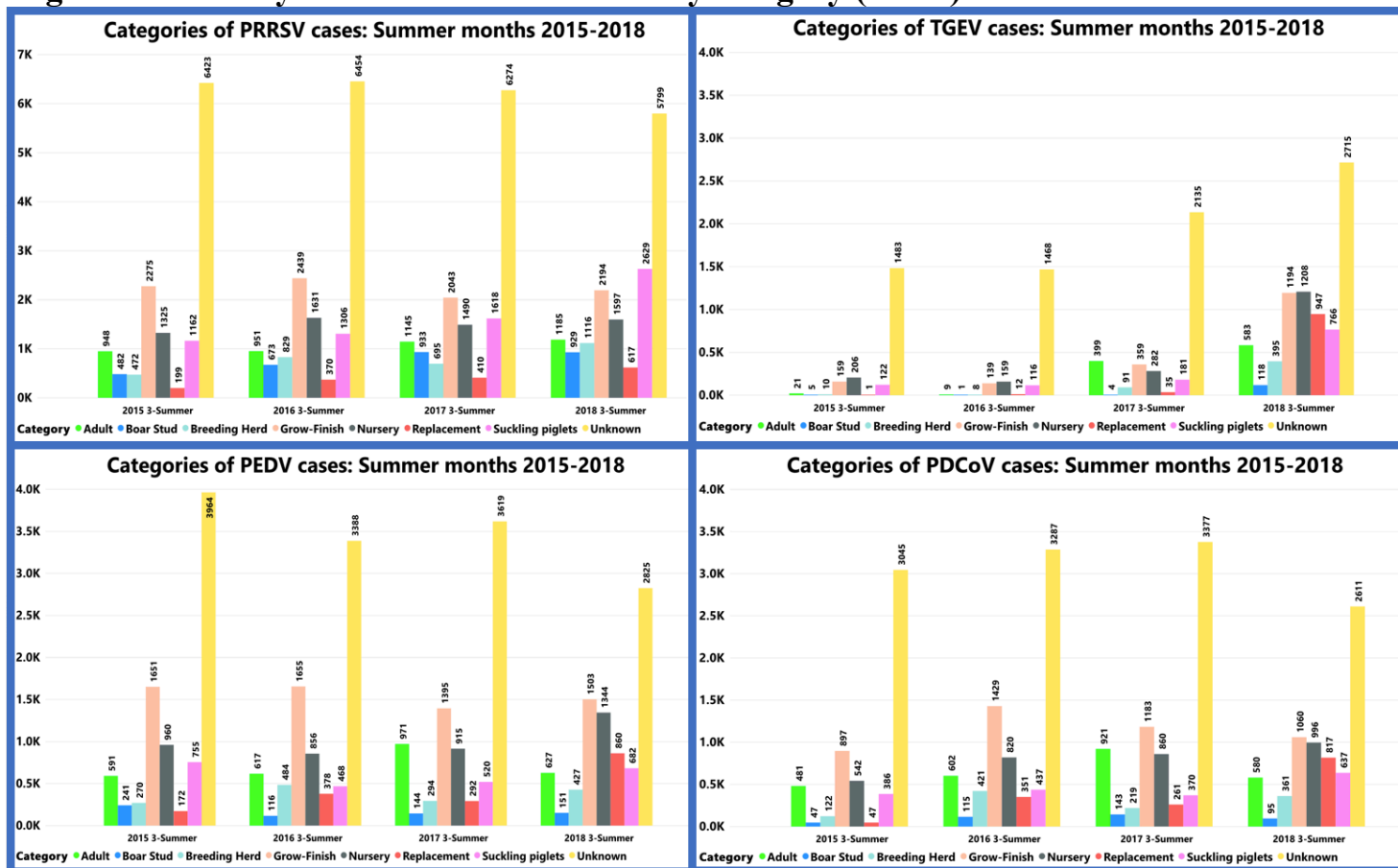


Figure 9 Number of accession IDs submitted to VDL's for testing according to the site category for Summer season of years 2015 to 2018. Each color represents one category. *Top left:* categories for PRRSV. *Top right:* categories for TGEV. *Bottom left:* Categories for PEDV. *Bottom right:* Categories for PDCoV

SDRS Advisory Council highlights:

a) PRRSV:

- Number of unknown categories decreased in summer of 2018 compared with previous summer seasons (2015 to 2017).
- Number of accession ID from replacement and suckling piglets had the highest increase in number of submissions.

b) TGEV:

- Expressive increase in the number of tests, which can be attributed to a change in procedure at some VDL's, that started testing cases submitted for PEDV, and PDCoV for TGEV as well.

c) PEDV:

- Lower unknown accession ID cases in summer 2018, than summer season of years 2015 to 2017.
- Replacement, nursery, and suckling piglets had higher number of accession ID tested in summer of 2018 than previous years.

d) PDCoV:

- Lower unknown accession ID cases in summer 2018 than summer season of years 2015 to 2017.
- Replacement, and suckling piglets had higher number of accession ID tested in summer of 2018 compared to summer season of previous years. Number of accession ID cases for grow-finished decreased between 2016 and 2018

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Page 7 – Summary of summer submissions by specimen (1 of 1)

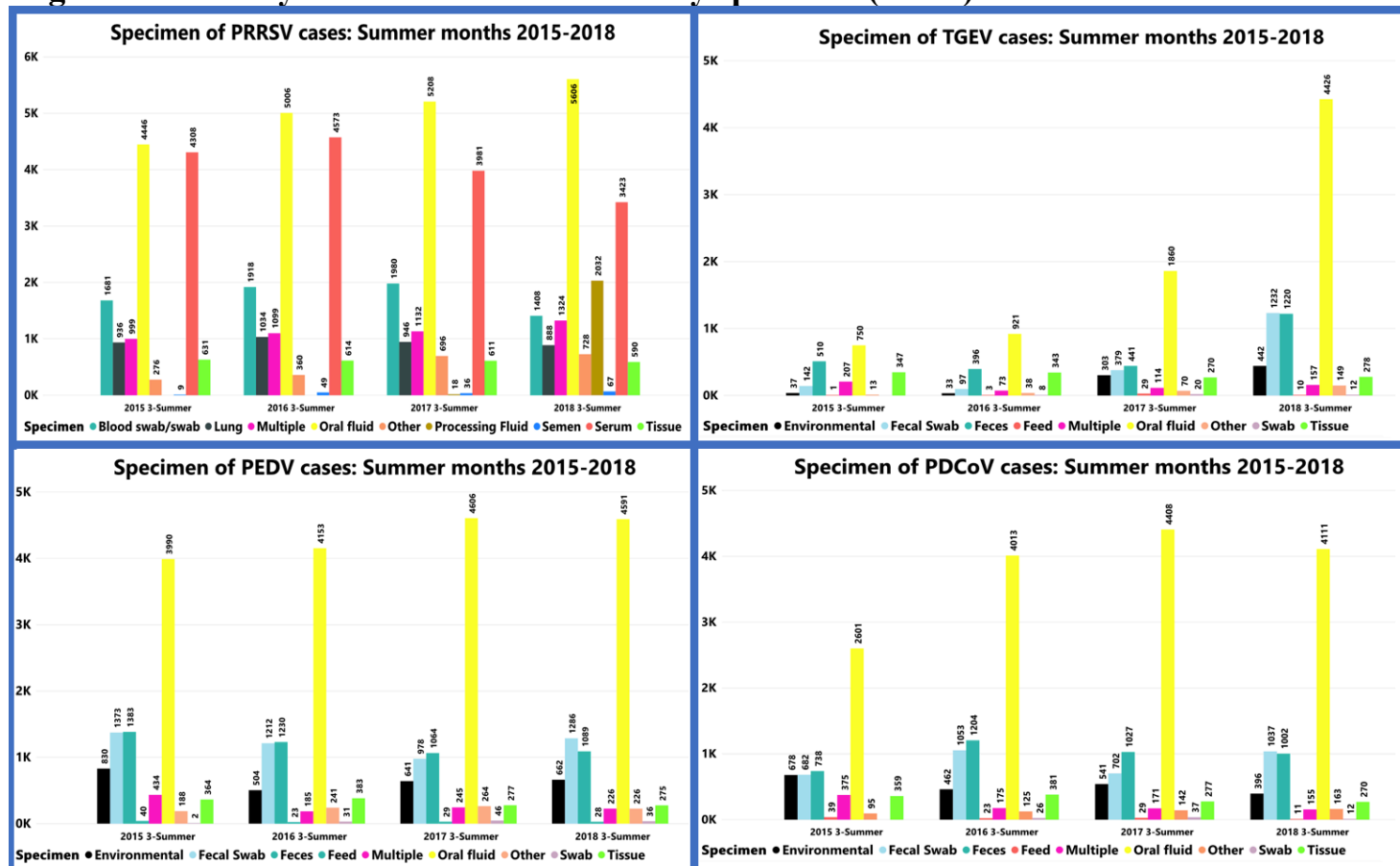


Figure 9 Number of accession ID's submitted to VDL's for testing according to the specimen for Summer season of years 2015 to 2018. Each color represents one specimen within each agent. PRRSV chart is in different scale of other agent charts (due to higher number of testing). *Top left:* specimens for PRRSV. *Top right:* specimens for TGEV. *Bottom left:* specimens for PEDV. *Bottom right:* specimens for PDCoV

SDRS Advisory Council highlights:

a) PRRSV:

- Number of blood swab/swab and serum accession ID cases decreased in 2018 compared to previous summers (2015 to 2017).
- Multiple and oral fluid accession ID cases increased on summer of 2018 compared to previous years.
- Processing fluid significantly increased in number of accession ID cases for summer season of 2018.

b) TGEV: oral fluid, fecal swab, and feces were the major specimens tested for TGEV in 2018.

c) PEDV: very similar specimen submissions over summer season and years.

d) PDCoV: Less environmental samples on summer of 2018 than previous summers.