

# Swine Disease Reporting System

## Report # 44 (October 5, 2021)

**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](http://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, Bret Crim, Kent Schwartz, Eric Burrough, Phillip Gauger, Pablo Pineyro, Christopher Siepker; Rodger Main, Daniel Linhares.

Project coordinator [Giovani Trevisan](#). Principal investigator [Daniel Linhares](#).

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

*Kansas State University:* Rob McGaughey, Roman Pogranichniy, Rachel Palinski, Jamie Retallick.

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

*Ohio Animal Disease and Diagnostic Laboratory:* Melanie Prarat, Yan Zhang, Richard French, Dennis Summers.

*The Ohio State University:* Andreia Arruda.

**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 and Lineage report:** Benchmarks patterns of PRRSV RFLP pattern and Lineages detected at the ISU-VDL, UMN-VDL, and KSU-VDL over time, USA state, specimen, and age group.

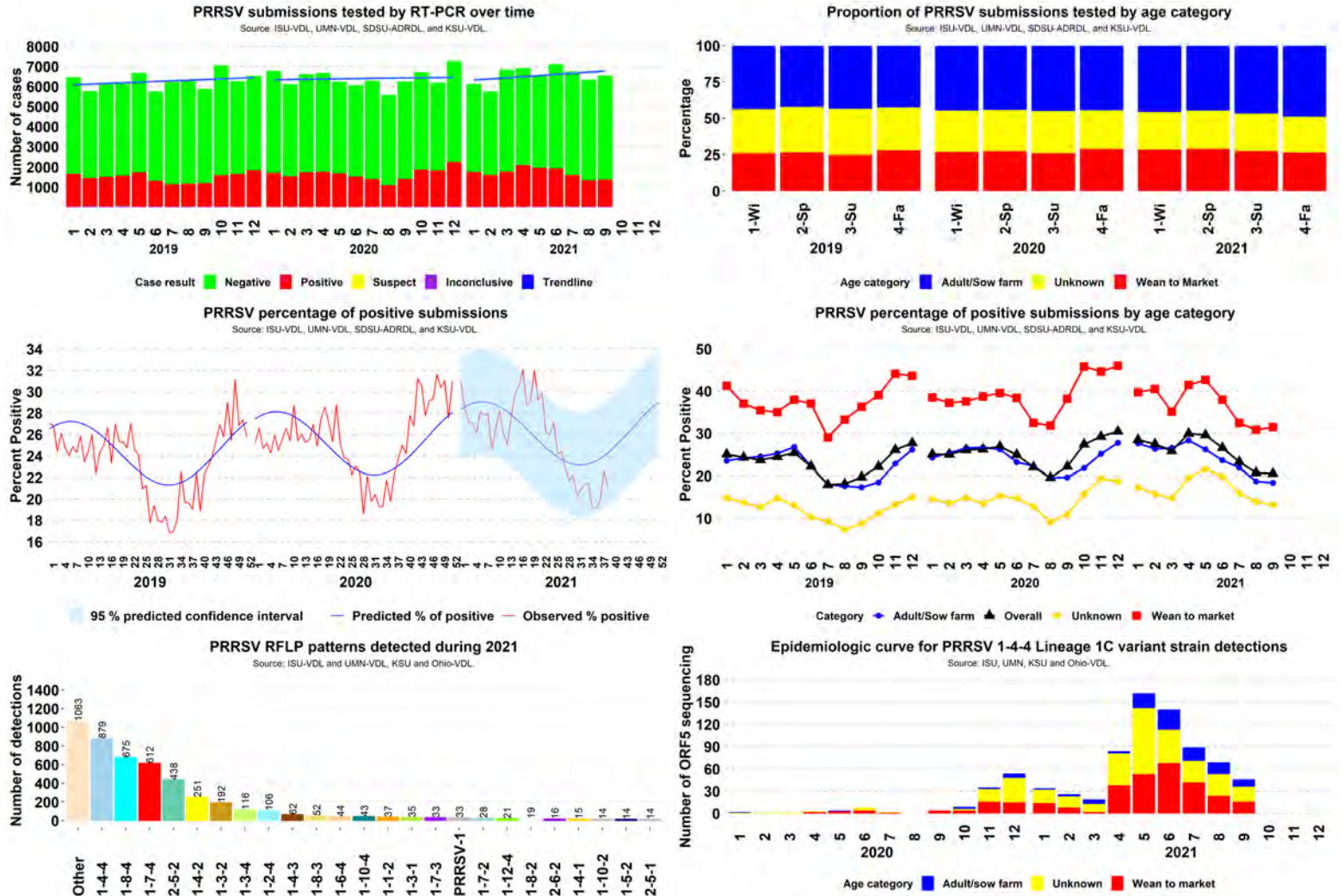
**Audio and video reports:** Key findings from SDRS projects are summarized monthly in a conversation between investigators, and available in the form of an ‘audio report’, and “video report” through [SwineCast](#), [YouTube](#), [LinkedIn](#), and the [SDRS webpage](#).

**Advisory Group:** Reviews and discusses the data, providing their comments and perspectives on a monthly: Mark Schwartz, Paul Sundberg, Paul Yeske, Tara Donovan, Deborah Murray, Scott Dee, Melissa Hensch, Brigitte Mason, Peter Schneider, Sam Copeland, and Luc Dufresne.

In addition to this report, interactive dashboards with aggregated test results are available at [www.fieldepi.org/SDRS](http://www.fieldepi.org/SDRS).

**Note:** This report contains data up to September 30, 2021.

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



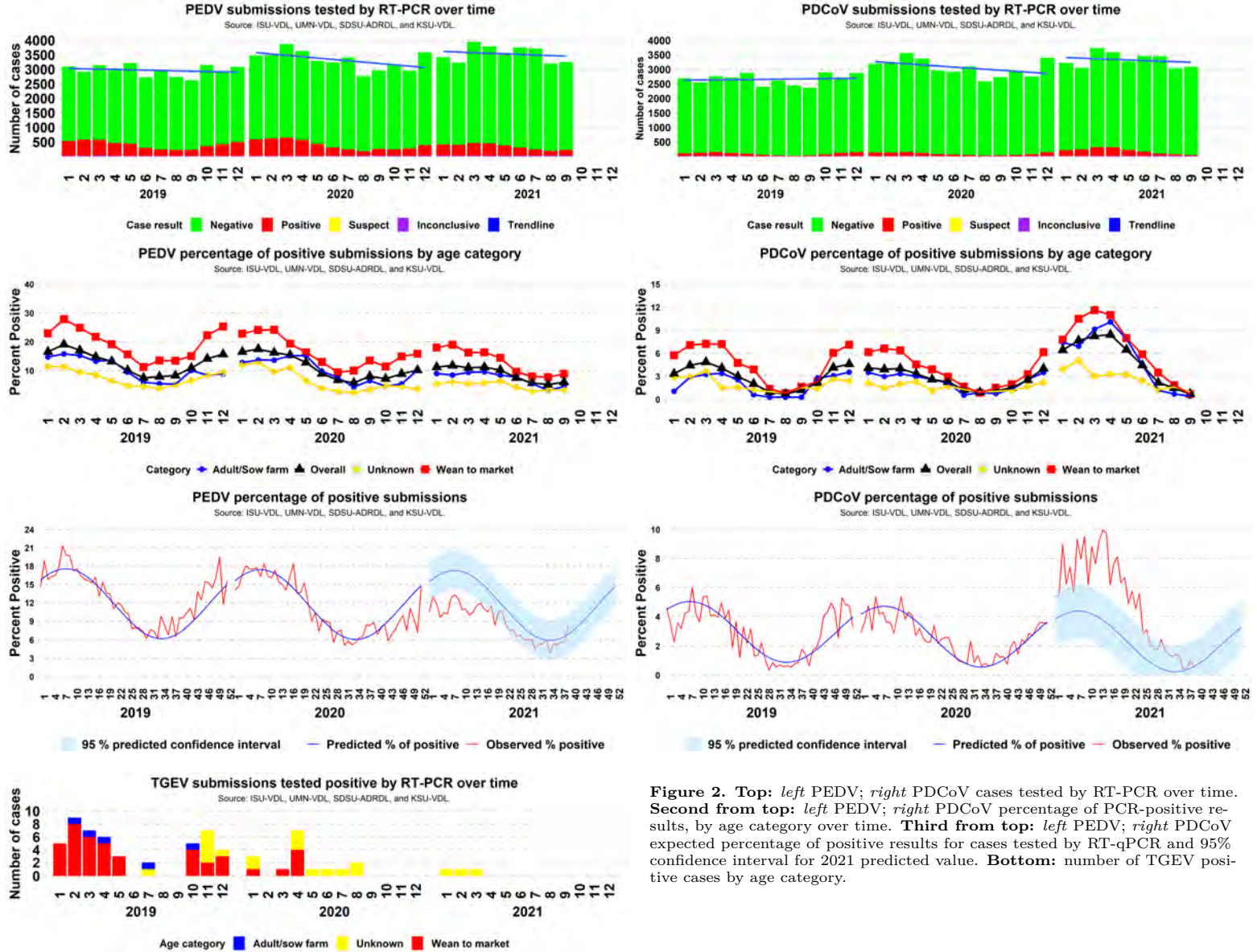
**Figure 1.** **Top: left:** Results of PRRSV RT-PCR cases over time. **Right:** Proportion of accession ID cases tested for PRRSV by age group per year and season. **Middle: Left** expected percentage of positive results for PRRSV RNA by RT-qPCR, with 95% confidence interval band for predicted results based on weekly data observed in the previous 3 years. **Right:** 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. **Bottom left** the 25 most frequently detected RFLP patterns during 2021; **right** Epidemiological curve of detection for PRRSV 1-4-4 Lineage 1C variant strain.

## SDRS Advisory Group highlights:

- Overall, 20.55% of 6,544 cases tested PRRSV-positive in September, similar to 20.76% of 6,340 in August;
- Positivity in adult/sow category in September was 18.39% (590 of 3,208), similar to 18.75% (579 of 3,088) in August;
- Positivity in wean-to-market category in September was 31.47% (541 of 1,719), similar to 30.87% (517 of 1,675) in August;
- Overall PRRSV-percentage of positive cases was 3 standard deviations from state-specific baselines in OH;
- The advisory group reminds stakeholders that 2020-2021 has been a tough PRRS year and recommends closely monitoring PRRSV activity and continuously practicing biosecurity measures to detect and contain the spread of contemporary or emergent strains early.



## Topic 2 – Detection of RNA of enteric coronavirus by RT-qPCR

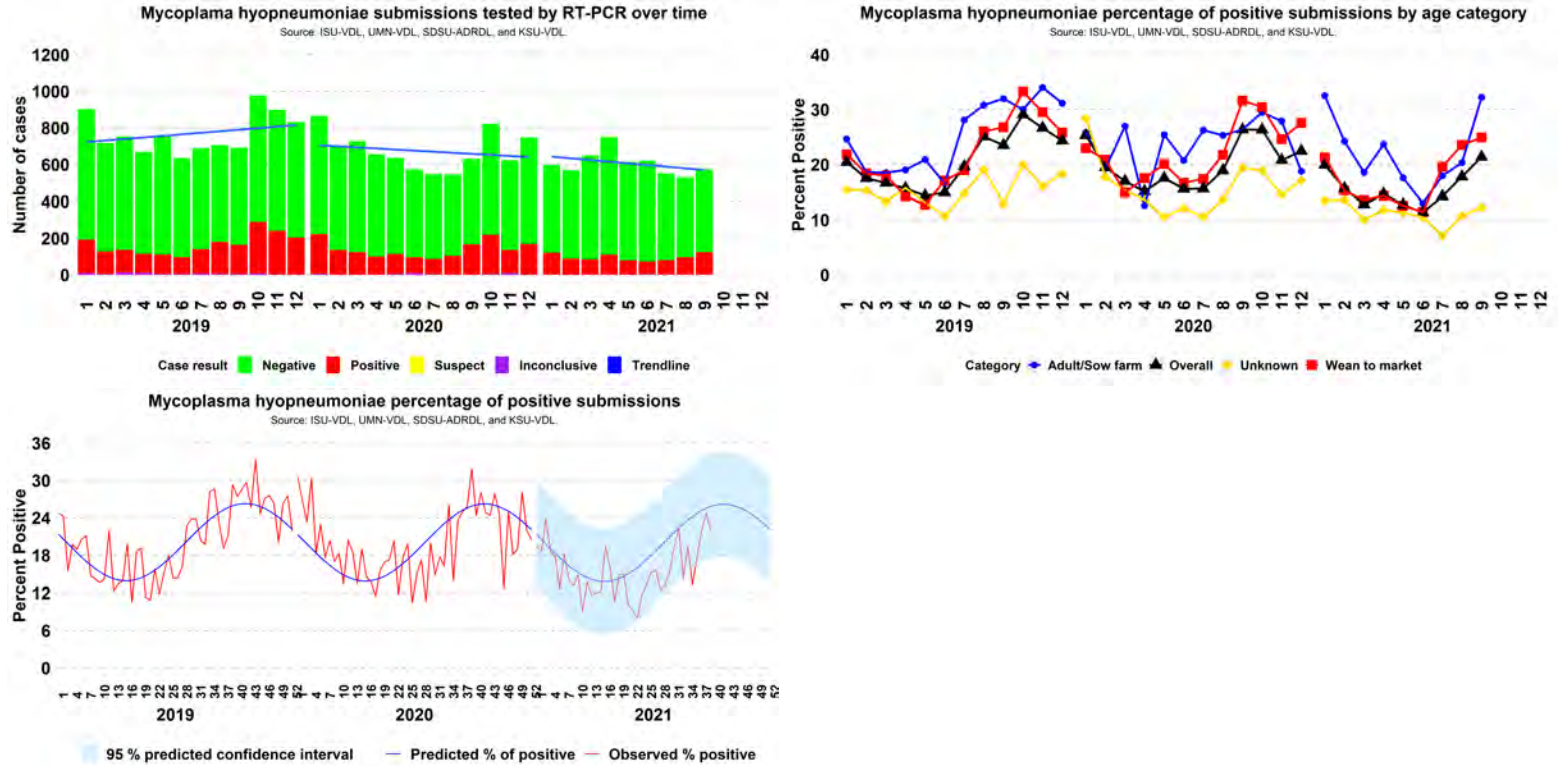


**Figure 2.** Top: left PEDV; right PDCoV cases tested by RT-PCR over time. Second from top: left PEDV; right PDCoV percentage of PCR-positive results, by age category over time. Third from top: left PEDV; right PDCoV expected percentage of positive results for cases tested by RT-qPCR and 95% confidence interval for 2021 predicted value. Bottom: number of TGEV positive cases by age category.

### SDRS Advisory Group highlights:

- Overall, 5.96% of 3,253 cases tested PEDV-positive in September, similar to 5.17% of 3,208 in August;
- Positivity in adult/sow category in September was 4.47% (43 of 962), similar to 3.2% (29 of 906) in August;
- Positivity in wean-to-market category in September was 8.86% (120 of 1,355), similar to 7.74% (105 of 1,357) in August;
- The overall PEDV-percentage of positive cases was 3 standard deviations from state-specific baselines in IL and OK;
- Overall, 0.71% of 3,090 cases tested PDCoV-positive in September, similar to 1.48% of 3,048 in August;
- The overall PDCoV detection was outside of the upper boundaries of the forecasted levels since January;
- Positivity in adult/sow category in September was 0.44% (4 of 899), similar to 0.71% (6 of 840) in August;
- Positivity in wean-to-market category in September was 0.7% (9 of 1,292), similar to 1.86% (24 of 1,291) in August;
- Overall PDCoV-percentage of positive cases was 3 standard deviations from state-specific baselines in MO;
- There was 0 positive case for TGEV RNA in September, 2021 over a total of 3,011 cases tested. **From September 1, 2020 to September 30, 2021 there were 40,753 cases containing 130,357 tested samples by RT-PCR for TGEV virus. Only 3 cases had a positive test result for TGEV;**
- The advisory group pointed out that active surveillance protocols detected activity of PEDV in the wean-to-market age category. The advisory group reminds us that surveillance and monitoring for early detection of emerging animal health threats is a key component to guide the implementation of biocontainment measures to protect animal health.

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



**Figure 3.** Left top: results of MHP PCR cases over time. Right top: percentage of MHP PCR-positive results, by category over time. Bottom: 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.

#### SDRS Advisory Group highlights:

- Overall, 21.37% of 571 cases tested *M. hyopneumoniae*-positive in September, a moderate increase from 17.77% of 529 in August;
- Positivity in adult/sow category in September was 32.26% (20 of 62), a marked increase from 20.31% (13 of 64) in August;
- Positivity in wean-to-market category in September was 24.92% (78 of 313), similar to 23.55% (57 of 242) in August;
- Overall MHP-percentage of positive was within expected state-specific baselines in all 11 monitored states;
- The advisory group considered that the recent increase in detection of *M. hyopneumoniae* expected for this time of year.





**Note:** The SDRS is a collaborative project among multiple VDLs in the US swine industry. The VDL collaborators and industry partners are all invited to submit content to share on this bonus page related to disease prevention, control, and management. Stay tuned for more content in future editions.

## Ohio Animal Disease Diagnostic Laboratory joins the Swine Disease Reporting System network

The Animal Disease Diagnostic Laboratory (ADDL) provides regulatory testing support for disease control programs and full diagnostic laboratory services for veterinarians, livestock producers and agribusinesses within and beyond Ohio. In 2017, the total hog & pig inventory in Ohio was 2,950,000, generating a gross income of \$696,334,000 (USDA-NASS). Ranked #8 nationally in hog & pig inventory, Ohio's swine industry depends on high quality, fast turnaround testing provided by the ADDL. The Ohio ADDL is accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD), a designation it has maintained since 1999. The lab is also accredited in accordance with ISO/IEC 17025:2017 to perform the following tests: *Salmonella enteritidis* culture from environmental samples, *Salmonella enteritidis* testing for eggs, MALDI-TOF for bacterial identification, Pseudorabies gB and gI ELISAs, and whole genome sequencing of bacteria isolates. At the national level, the ADDL is a Level 1 lab in the USDA National Animal Health Laboratory Network (NAHLN), providing capacity and capabilities for diagnostic testing to respond to emerging and emergency animal disease situations at the state, regional and national level. The laboratory also is one of the FDA Vet-LIRN regional whole genome sequencing centers and is a member of the FDA Global GenomeTrakr network, providing sequencing services for local, national, and international case investigations and surveillance studies. More than 420,000 tests are performed annually across 9 lab sections: Aquaculture, Avian Serology, Bacteriology, Histology, Immunohistochemistry, Molecular Diagnostics, Pathology, Serology, and Virology. Swine pathogen PCR testing made up approximately 67% of the ADDL Molecular Diagnostics workload in 2020. Same-day test results are provided to clients for PRRS, swine influenza, swine enteric coronaviruses, and *Mycoplasma hyopneumoniae*. Sequencing is also performed for PRRS and swine influenza to monitor for emerging viruses and epidemiology studies. Ohio will be contributing data to the SDRS to further enhance its capabilities as a surveillance tool and for early detection of pathogens of economic consequence to U.S. livestock production.

Dennis Summers, DVM, DACVPM, Interim State Veterinarian for the state of Ohio, participated in the inaugural US SHIP House of Delegates meeting earlier this year, to support development of the [US SHIP ASF-CSF Certification Program](#) that will enhance competitiveness and sustainability of the US pork industry. Richard French, MS, DVM, PhD, Laboratory Director of the Ohio ADDL, spent the previous six years building laboratory infrastructure in China and was working in China during the first several years of the ASFV outbreaks. Yan Zhang, MS, DVM, PhD, Virology Section Head, [identified porcine deltacoronavirus](#) in the United States in 2014 and produced the first report linking the virus to a disease outbreak. He has developed many molecular assays for a variety

of swine pathogens. Melanie Prarat, MS, previously worked at Plum Island Animal Disease Center studying pathogenesis and vaccine development for classical swine fever virus and coordinates molecular assay development and swine disease epidemiology studies at the ADDL.

The SDRS provides data that is used for disease prevention & biosecurity, disease monitoring, disease management, and disease forecasting. Ohio ADDL is excited to join the Domestic Swine Disease Monitoring Program and looks forward to collaboration with the other members of the SDRS.



**Figure 1.** ADDL team left to right: Dr. Yan Zhang, Dr. Dennis Summers, Dr. Richard French, and Dr. Melanie Prarat.