

# Porcine reproductive and respiratory syndrome prevalence and processing fluids use for diagnosis in United States breeding herds

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## INTRODUCTION

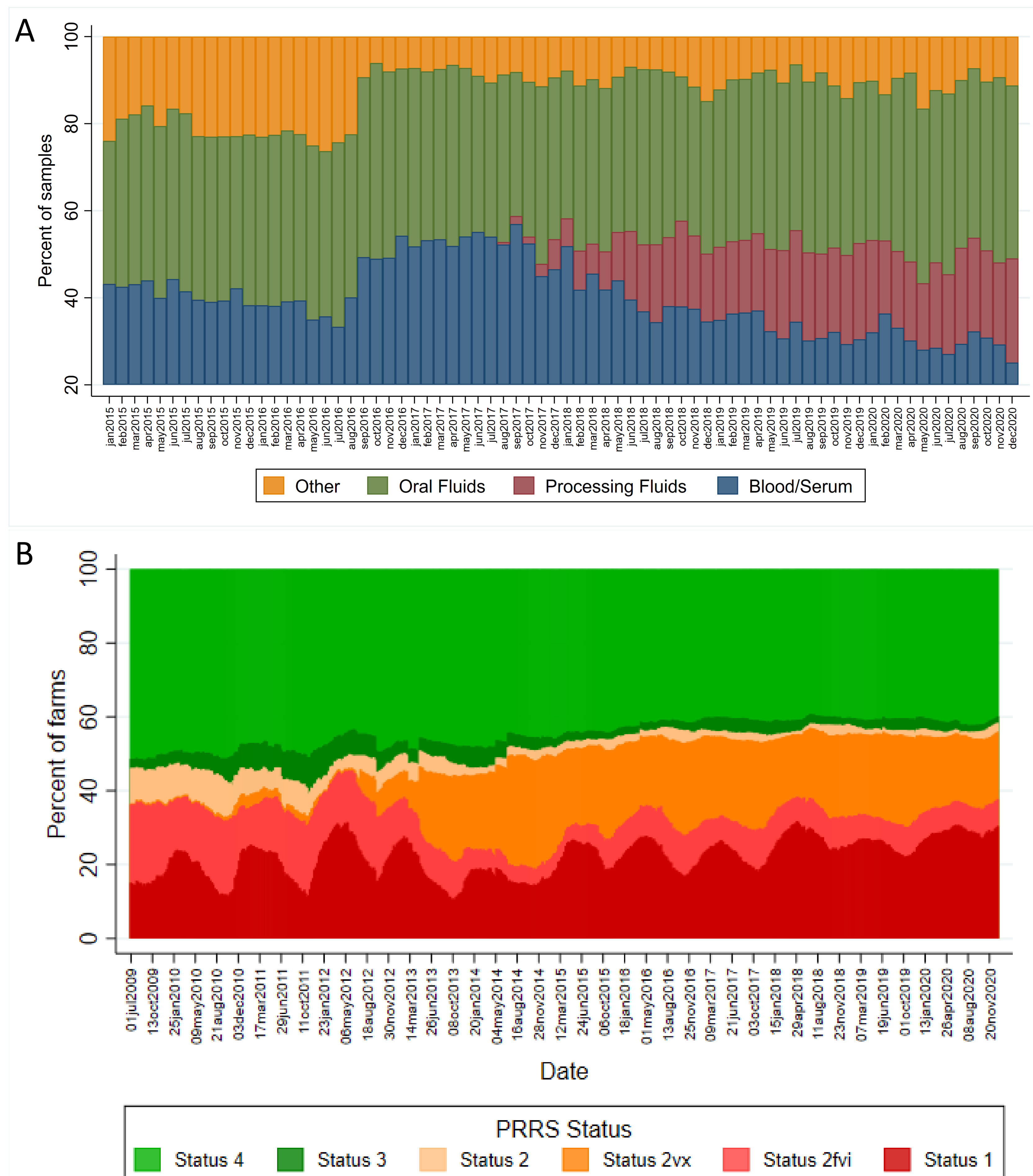
- Porcine reproductive and respiratory syndrome (PRRS) has been a burden to the United States (U.S.) swine industry for over three decades.
- Processing fluids are the serosanguineous fluid obtained from tails and testicles as part of castration and tail docking practices.
- This sample type has been recently adopted by the U.S. swine industry as a breeding herd PRRS monitoring tool due to its increased representativeness of animals within the herd.
- Here, we describe processing fluids submissions for PRRS diagnosis and its relation to PRRS breeding herd prevalence and time to stability (i.e. wean PRRS free pigs) over time between 2009 and 2020.

## METHODS

- Morrison Swine Health Monitoring Project (MSHMP) data representing approximately 50% of the U.S. swine breeding herd was used in the study.
- Participating systems report changes (i.e. outbreak, stability, elimination) in the health status for each of their breeding farms weekly according to the AASV PRRS breeding herd classification guidelines.
- Data regarding sample type submitted for PRRS virus diagnosis by RT-PCR between January 2015 and December 2020 from participants were obtained from both UMN and ISU VDLs.
- An ecological time series Poisson regression modeling the number of status 1 farms and weekly percentage of processing fluids submissions for PRRS diagnosis was built using total sites reporting statuses as exposure.
- Time to stability was calculated for sites that detected a PRRS outbreak within the study period.

## RESULTS

- Processing fluids diagnosis submissions increased starting in 2017 (Figure 1A), around which time the overall PRRS prevalence seasonal pattern changed (Figure 1B).
- The difference between each year's highest and lowest weekly prevalence averaged 10.9% between 2009 and 2017, whereas it averaged 5.0% in 2018-2020 period.
- Each year's lowest weekly prevalence ranged from 11.3% to 19.5% in 2009-2017 and from 22.4% to 29.2% in 2018-2020.
- We also detected an increasing proportion of breeding sites that did not reach stability within one year of reporting an outbreak (chi-square for trend  $p < 0.0001$ ).
- A higher proportion of system-wide processing fluids use and year in which the outbreak occurred was associated with lower rate to reach stability (HR 0.16,  $p < 0.001$ ).



**Figure 1.** Percentage of sample type specimens submitted for PRRS RT-PCR diagnosis (A) and PRRS prevalence (status 1) according to AASV sow herd statuses (B).

## DISCUSSION

- Altogether, the temporal concurrence of processing fluids used for PRRS virus monitoring suggests that the adoption of this sampling strategy may help explain the changes observed in PRRS status 1 prevalence since 2018.
- Other factors must be considered as additional explanatory factors for the increased prevalence, particularly because PRRS occurrence and processing fluids use were not consistently associated throughout the different ecological analysis.
- This study not only describes the industry-wide adoption of processing fluids as a monitoring tool for PRRS diagnosis, but also a temporal correlation between its adoption and an increased PRRSV prevalence and time to stability in recent years.
- Still, additional studies are necessary to ascertain the direct relationship between processing fluids use and longer time to stability.

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