

Time to a new PRRS outbreak in naïve breeding herds

Mariana Kikuti, Catalina Picasso-Risso, Claudio Marcello Melini and Cesar A. Corzo

Key points:

- A total of 17% of the monitored breeding herds achieved a naïve status (status 4) for PRRS between July 2009 and October 2021.
- The median time between achieving status 4 to the new PRRS introduction was 602 days (inter-quartile range: 259–1050).
- The year in which the site reached status 4, region and air filtration status were not associated with time to a new PRRS introduction in naïve breeding herds.

Porcine Reproductive and Respiratory Syndrome (PRRS) control and elimination face different challenges, including the absence of a vaccine that confers sterilizing immunity. Elimination through herd closure is possible, however, it can be lengthy, uncertain, and costly, as it often takes herds around 41 weeks to start consistently weaning virus-free piglets. Thus, producers and practitioners may hesitate in pursuing elimination if there is a perception that the herd will soon face another PRRS outbreak, opting instead to maintain some level of immunity indefinitely. In 2021, we shared preliminary results on the average time breeding herds stay in a naïve PRRS status. Here, we share additional analyses on the topic using MSHMP's weekly breeding herd PRRS status data from July 2009 up to October 2021.

During this period, 221 (17%) breeding herds achieved PRRS status 4 (S4) 273 times (48 from S1, 167 from S2, 30 from S2fvi, 20 from S2vx, and 8 from S3). The number of sites reaching S4 each year ranged from 3 in 2009 to 35 in 2014, with an average of 21 herds reaching S4 each year throughout the studied period. Most sites (67.40%, n=184) that achieved S4 were from the Midwest region, followed by the South (19.41%, n = 53), Northeast (6.96%, n = 19), and West (1.10%, n = 3), while 14 had no information on location. Filtration status was available for 139 of the sites that reached S4 status, with 38 sites not filtered, 5 sites partially filtered and 18 sites filtered year-round.

In 91 out of the 273 times herds achieved the S4 classification, the status was successfully maintained until the end of the study period, whereas in 163 (59.71%) cases, herds eventually lost such status due to wild-type virus introduction. On 15 occasions, herds switched from S4 to S2vx as a result of herds being vaccinated with a modified-live vaccine. Information on the new status was not available for four S4 events that had ended during the study period. For sites that moved from S4 to S1, the median time between achieving status 4 to the new introduction was 602 days (inter-quartile range: 259–1050). Bivariate survival models that were adjusted for production system and multiple events in the same site showed that air filtration and the year in which the site reached a naïve status did not impact the time to a PRRS introduction. However, time to PRRS introduction was only assessed in farms that had reached a naïve status. Breeding herds that had opted to pursue a naïve status are likely different from those that opt to endure at positive stable statuses in terms of location, regional pig density and general biosecurity practices. That, together with the different regional distribution of sites that achieve S4 compared to sites that never achieve S4, combined with the perceived risk of investing in air filtration, likely explain this difference. In fact, all of the sites that achieved S4 and were either partially or year-round filtered were from the Midwest.

We found that the year reaching S4 was not statistically significant for the PRRS rate of introduction when accounting for sites and systems. Regarding region, S4 sites in the Northeast and South were less likely to have a PRRS introduction than the Midwest S4 sites (hazard rate of 25% and 31% compared to the Midwest S4 sites, respectively). A possible explanation is that while over 20 systems participate in MSHMP in the Midwest, the South and the Northeast are mostly dominated by less than five production systems. While the production system was accounted for in our model, the inherent heterogeneity of other factors such as PRRS prevention, control, and elimination philosophy affecting transmission and heterogeneity of production systems distribution might not have been captured.

Although we were unable to study other factors, such as the decision process to continue pursuing S4 and additional biosecurity practices implemented, among others that might impact days as S4 and the PRRS incidence rate, our study provides insights on how frequently sites are striving to eliminate and how long can they maintain their naïve status.

The full analysis can be accessed here: <https://doi.org/10.3390/ani13020310>.