

Assessment of the Relationship Between Bioexclusion Practices Applied in Wean-to-Harvest Sites and PRRS Outbreaks

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Highlights

- Finisher sites had the highest PRRS outbreak frequency (82.4%).
- Transporting pigs of unknown status (OR 9.79), rendering (OR 6.47), natural ventilation (OR 10.88), and employee cohabitation with other swine workers (OR 6.15) were also identified as risk factors.
- Assigned parking areas (OR 0.07), exclusive manure pumping equipment (OR 0.07), and overnight downtime for multi-farm employees (OR 0.15) were identified as protective factors, decreasing the odds of outbreaks.
- In the final model, the finisher sites and the number of nearby swine sites within a 1-mile radius remained significant. The density around the farm was associated with an increased outbreak odds of 1.62 for each additional swine site within a 1-mile radius.

Background

PRRSV remains one of the costliest pathogens in U.S. swine production, with the majority of losses occurring during the wean-to-harvest phase. While sow farms have well-characterized biosecurity practices, fewer data exist for wean-to-harvest sites. This study evaluated the association between bioexclusion practices and PRRS outbreaks across commercial wean-to-harvest sites.

Methods

A total of 95 sites across six Midwestern states were monitored during one production cycle. Each site completed a standardized 115-question biosecurity survey, and oral fluids were collected every four weeks for PRRSV PCR and sequencing. Outbreaks were defined as the detection of PCR-positive oral fluids in unvaccinated sites or the identification of a wild-type ORF5 sequence in vaccinated sites. Logistic mixed-effects models were used to assess the associations (odds ratio [OR]) between bioexclusion variables and PRRS outbreak, with the production system included as a random intercept.

Results

PRRS outbreaks occurred in 33.3% (11/33) of nurseries, 66.7% (30/45) of wean-to-finish sites, and 82.4% (14/17) of finishers. Multiple PRRSV lineages were detected, with L1C.5 predominating across production types. In univariate analysis, hauling pigs of unknown PRRS status (OR 9.79), rendering (OR 6.47), natural ventilation (OR 10.88), and employee cohabitation with others working in swine operations (OR 6.15) were significantly associated with increased odds of outbreaks. Protective practices included defined parking areas (OR 0.07), dedicated manure pumping equipment (0.07), mandatory overnight downtime for multi-farm employees (OR 0.15), and a bench system for entering the farm (OR 0.27). In the multivariable model, site type and the number of swine sites within a one-mile radius remained significantly associated with outbreaks.

Conclusions and Implications

This study highlights the importance of bioexclusion practices and site characteristics associated with PRRS outbreaks. While not indicative of causation, these associations may help producers and veterinarians prioritize which practices warrant closer evaluation when refining biosecurity protocols.

Reference: This study is available at: <https://doi.org/10.3390/vetsci12101000>