

**Title:** Quantifying risk factors for PRRS virus introduction into swine herds through the use of the PRRS Risk Assessment – NPB #08-255

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### Scientific Abstract

The total cost of productivity losses due to PRRS virus in the US national breeding and growing pig herd was recently estimated to be \$664 million annually. Fifty-five percent, or \$365 million of the total was attributed to the growing pig herd. In the same study, it was also estimated that 60 percent of pigs in the U.S. were negative for PRRS virus at weaning but 58 percent of those that were negative at weaning became positive before they were marketed. Therefore, 34.8 percent of all pigs marketed in the U.S. were PRRS virus negative at weaning but become infected by lateral introduction of the virus prior to marketing. Relative to pigs that are negative at weaning and remain negative all the way to market, the cost of productivity losses for pigs that are negative at weaning but become positive prior to marketing was estimated to be \$2.61 per pig placed and for pigs that are positive to PRRS virus at placement the cost was estimated to be \$4.90 per pig placed. While there is opportunity to increase the percentage of growing pigs that are negative at weaning, the greater opportunity may be to improve upon the 58% of pigs that are negative at weaning but become positive before marketing. In 2011, 106.6 million pigs were marketed. If, as estimated, 34.8 percent were PRRS virus negative at weaning but infected prior to marketing this represents 37.1 million pigs marketed or about 38.9 million pigs placed assuming a 5 percent mortality rate. If these pigs were kept negative to the PRRS virus to marketing, the cost of productivity losses attributed to PRRS virus would be reduced by \$101.5 million annually. Application of effective bio-security measures has been inhibited by the lack of understanding of what key practices must be implemented to reduce PRRS VIRUS introduction into production premises. Therefore, the objective of this study was to assess and quantify which risk factors are the most common causes of

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lateral introduction of PRRS virus into growing pig production premises using the American Association of Swine Veterinarians (AASV) PRRS Risk Assessment for the Growing Pig Herd to collect information about individual risk factors.

One-hundred and twenty groups of pigs that were negative at placement were enrolled in the study. Groups of pigs that were negative at placement were identified for inclusion in the study. For wean-to-finish groups, the negative status of the pigs was determined by the reported status of the breeding herd(s) from which the pigs were sourced. For groups of finishing pigs, the pigs were tested for the presence of antibodies to the PRRS virus by enzyme-linked immuno-sorbent assay (ELISA) to confirm their PRRS virus-negative status. Other inclusion criteria for the groups enrolled were specified for the premises at which the pigs were raised. Because the ELISA is not able to distinguish between antibodies induced by vaccines and those induced by wild-type virus, only non-vaccinated pigs were enrolled. To eliminate the possibility that there were not already infected pigs on the premises where negative pigs were placed, enrollment was limited to groups of pigs at premises that were flowed all-in-all-out by premises and premises that had no breeding animals. For some premises, multiple groups of pigs were enrolled in the study. The primary outcome variable for the study was whether the pigs were infected before marketing. To determine if a group was infected with PRRS virus, each group was sampled and tested by ELISA for the presence of antibodies to the PRRS virus just prior to when the group was closed and the pigs were marketed. Any group with 1 or more true-positives was considered infected. Version 1 of the AASV PRRS Risk Assessment for the Growing Pig was used to collect information about risk factors for each premises in the study. A risk assessment was completed when the first group at each premises was enrolled in the study. The questions about risk factors for PRRS in the assessment were treated as categorical variables for the analysis. The association between the questions and the outcome variable were assessed using univariate logistic regression. P-values for each of the questions (variables) were reported. Odds ratios for the categorical responses to each question and 95% confidence intervals were also reported.

Variables that were significantly associated with the PRRS virus status of groups of pigs before marketing included washing of facilities between all-in-all-out groups, disinfection of vehicles and trailers that transport incoming pigs, ownership of truck washes where vehicle and trailers used to transport incoming pigs are washed, frequency of service visitor and delivery vehicle visits per month to the site, sanitation procedure for maintenance service personnel and visitors entering the site, downtime required of on-site employees after visiting other pig sites, periodic formal retraining of all employees on biosecurity procedures and topography at the site.