Assessing anti-PRRSV biosecurity: proof of concept phase

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Key Points

- Biosecurity (for PRRSv or other pathogens) is measurable, correlating scores w/ frequency of outbreaks.
- We developed a scoring system with good correlation with frequency of outbreaks using a small dataset.
- Resulting scores were based on "personal opinions" about the relative importance of each factor. As more field data becomes available, we will update the model, generating scores based on "real/field data", further improving the scores (=phase 2 of this project).
- If you are interested to measure biosecurity of your herd using a 10-12 minutes survey, contact us.

Why measuring biosecurity practices aspects?

PRRSV continues to infect/re-infect breeding herds in the US, keeping prevalence "high" over time. We are interested in objectively measuring the relative importance of key breeding herd biosecurity aspects on the risk (or probability) of becoming infected. In so doing, we will develop risk scores for sow herds. This project aims to develop a biosecurity scoring system to generate scores that correlate with frequency of PRRS outbreaks.

Study design and findings

Scoring system. The scoring system was based on providing weights to each key biosecurity category (pig movements, people movements, air exposure, so on). Weights were developed using Analytical Hierarchy Process (Saati et al., 1977), which uses a series of pairwise comparisons of the relative importance of factors as judged by a panel of experts. Then, weights were incorporated into a Multi-Criteria Decision Analysis matrix, which takes into account the relative importance of each factor and generates the score (0 to 1).

Validation of scores. We used data from all herds (n=13) from the Iowa Pork Producers Association-funded PRRSV outbreak investigation program. Available data included answers from a survey to capture biosecurity aspects (risk factors) and history of PRRS outbreaks. We applied the scores to each herd and correlated the frequency of outbreaks with the score.

Results. Most farms had a greater risk on "pig movement" and on "people movements" sections. Farms with ≤ 1 outbreak had a mean score of 0.45 (std dev 0.21). Farms that had 2 or 3 outbreaks had a mean score of 0.62 (sd dev 1.08) and the farms with ≥ 4 outbreaks had a mean of 0.68 (std dev 0.42). A positive correlation (r=0.62) was measured between the

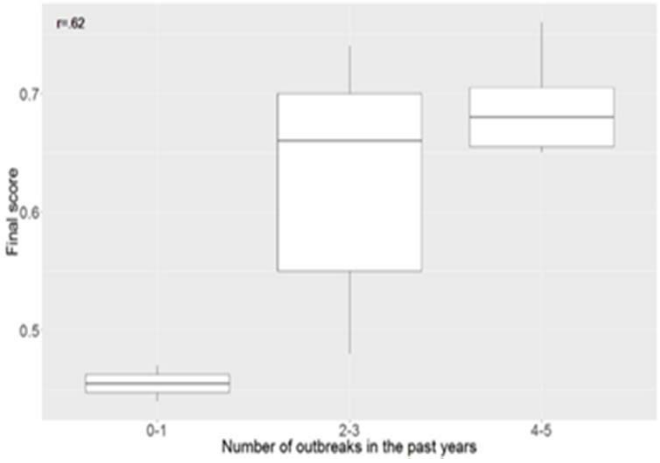

Figure 1. Relation between the final score and number of PRRSV

Limitations of this study include the use of personal opinions to assign weights for each category/factor and the low sample size. However, preliminary results encourage us to enroll additional herds to collect more information and to allow using *data-driven weights as opposed to personal opinion weights*.

The next step for this project (=phase 2) is to capture biosecurity data from herds with low- or high- incidence of PRRS (SHIC-funded). The project will provide within- and between-production system comparisons of biosecurity aspects on herds with low or high incidence of PRRS and use data to build robust scores to quantify biosecurity risk for PRRS. We have developed an Excel-based survey to capture key biosecurity information and each herd requires approximately 10-12 minutes.

Please contact Bob Morrison (BobM@UMN.Edu) or Daniel Linhares (Linhares@iastate.edu) if you are interested in the second phase of the study.