

Assessing internal personnel movements in swine farms to help direct PRRS control and elimination efforts

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Key points:

- Newly developed beacon-sensing technology can be used to better understand within-farm people movement; and particularly better quantify potentially “risky” movements in PRRS positive herds during control/ elimination efforts.
- Preliminary data analysis showed that an increase in commonly referred to “risky” movements (e.g. from loading areas/ nurseries to other parts of the farm) was associated with a decrease in number of pigs weaned per sow; and an increase in pre-weaning mortality.

Why are we doing this?

- Swine sites have different rates of success in controlling/eliminating PRRS.
- Farm-specific disease management strategies along with personnel education and compliance are likely important influencing factors; but quantitative data on movement patterns (especially “risky movements) inside swine farms is largely lacking.
- Measuring and describing movements of workers inside swine farms may facilitate the improvement of internal biosecurity and help focusing efforts during PRRS control and elimination programs.

What are we doing?

- We are using beacon-sensing technology to describe patterns of internal movements of farm workers in three farrow-to-wean swine sites located in the Midwest.
- Internet services were optimized throughout the farms and sensors were placed in each room, including farrowing rooms, nursery areas, gilt development areas, gestation barns, load out areas, supply rooms, office, etc.
- These sensors were set up to detect movement via Bluetooth from beacons, which were individually distributed to farm employees.
- Farms are being followed-up for approximately one year, after which production and PRRS data will be analyzed in conjunction with movement data.
- Besides providing short-term value to the producer by helping them understand “risky” movements happening in their farms, our long-term goal is to investigate whether an increase in “risky” movements is associated with production parameters of interest and PRRS occurrence in the sites; and to better understand what these “risky” movements are and how they could be minimized.

What does the preliminary data tell us?

- We used data from one of the three participating farms to look into preliminary results using a period of 14 weeks. This was a 4,400-sow farrow-to-wean filtered swine farm located in a high swine dense area with a history of PRRS outbreaks.
- For the purpose of this preliminary analysis, a “risky” movement was defined when an employee moved from a shipping point or nursery area to any other part of the farm.
- Production data was collected at the week level and univariable linear regression models were built using Stata-IC 14. Primary outcomes of interest were number of piglets weaned per litter and pre-weaning mortality, with movement type (“risky” or not) used as a predictor of interest.
- The mean number of movements per week was 1,810.64 (SD: 344.81), with a mean number of “risky” movements of 175.43 (SD: 77.12). An increase in pre-weaning mortality by approximately 3% was observed with an increase of “risky” movements the week prior ($P = 0.052$). Furthermore, an increase in “risky” movements tended to result in a decrease in the number of piglets per litter by 0.37 ($P = 0.09$).

Acknowledgements

Merck Animal Health provided funding for this project and the graduate student. PigCHAMP Pro Europa provided technological support for the platform (B-eSecure), and the means for data collection and processing.

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