

Measuring PRRSV reproductive outbreak severity in 3 naïve herds through statistical process control chart - Cumulative Sum (CUSUM) using modified live vaccine as an intervention tool

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Introduction

Porcine Reproductive and Respiratory Syndrome Virus (PRRSv) is a devastating disease causing mayor economical losses. The impact in an acute outbreak herd is \$250 Us Dollar per sow¹. The objective of this study was to measure the severity and duration of PRRSV outbreaks in 3 naïve sow farms using PRRS modified live vaccine as part of the contingency strategies during the outbreaks.

Materials and Methods

A monitoring through statistical process control was implemented in 3 naïve farms during reproductive outbreaks. The farms are part of the same production system, each farm is 1,200 sows capacity located in central Mexico at the same geographic area within a radius of 5 km and all farms have the same management procedures (Standard Operating procedures, SOPs). The three farms broke with PRRSV identifying the same virus by ORF-5 sequencing. The reproductive events were in series, and each farm implemented different contingency interventions. Farm A broke first, having as an intervention strategy do nothing, the farm let the clinical outbreak run without implementing a contingency intervention to manage immunity; 2 weeks after, farm B broke, in this farm the staff implemented a sow herd mass vaccination with Ingelvac PRRS MLV, this intervention was placed 4 weeks after observing clinical signs defined as abort rate increased. Farm C, broke with the same PRRSV isolate just 3 weeks after farm B, at this farm, we implemented sow mass vaccination with Ingelvac PRRS MLV right after diagnostic confirmation by serology but not presenting an increase of abort rate. Pre-wean mortality (PWM) was the most significant parameter in this specific production system and we proceed to monitor PWM% during the outbreaks in farms A, B and C. We used a run chart to visualize the impact on this parameter at each farm, and a Cumulative Sum (CUSUM 1-sided) SPC charts (MINITAB) in order to determine the cumulative deviation of the PWM target of 12% during the outbreak window using three different contingency strategies.

Results

The run chart in figure 1 shows the three farms PWM % during the PRRSV clinical outbreak window at each farm. Figure 2 is the cumulative deviation from a 12% target at each sow farm during the outbreak window. According to the CUSUM charts, Farm A ended up 666.3 %, Farms

B and C ended up 403.9 and 431.8% respectively above the target.

Figure 1. Run chart of PWM% during PRRSV outbreak at each naïve sow farm.

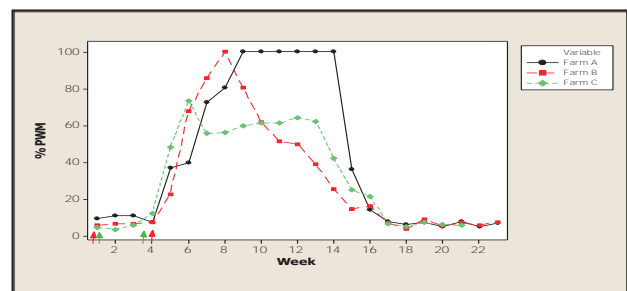
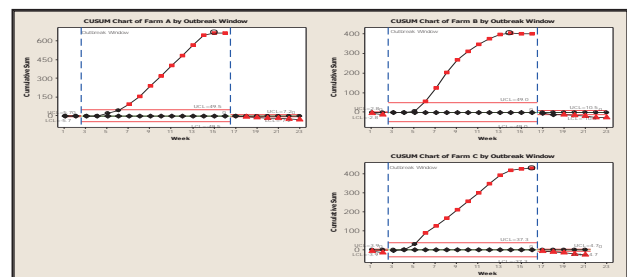


Figure 2. CUSUM charts of PWM% during PRRSV outbreak at each naïve sow farms (target 12%)



Discussion

CUSUM charts are useful tools to detect cumulative deviations from the target²; this SPC monitoring showed a potential benefit minimizing the severity and duration of PRRSV outbreaks in farms B and C using MLV vaccine as a contingency intervention. This may represent another tool for practitioners to mitigate the negative impact during PRRSV outbreaks. More studies are needed on this arena to confirm these field observations.

References

1. Holck T. et al. 2003. Financial impact of PRRS. PRRS compendium.
2. Montgomery DC.2000. Introduction to SPC, 4thEd.