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The “Holy Grail” of biosecurity: Achieving sustainable PRRSV freedom in swine-dense regions

S Dee¹; G Spronk²; D Reicks³; P Ruen⁴; J Deen¹

¹Swine Disease Eradication Center, University of Minnesota College of Veterinary Medicine, St. Paul, Minnesota; ²Pipestone Veterinary Clinic, Pipestone, Minnesota; ³Swine Vet Center, St. Peter, Minnesota; ⁴Fairmont Veterinary Clinic, Fairmont, Minnesota

Introduction

Airborne transport of PRRSV has been documented to occur from 4.7-9.2 km.^{1,2} Based on this information, the filtering of incoming air has been proposed as a means to reduce this risk.³⁻⁶ To test this intervention, a study was conducted under controlled field conditions.

Materials and methods

The study involved 10 treatment herds and 30 control herds and was conducted over a 36-month period (Sep 2008-Aug 2011). Herds were selected utilizing published criteria.^{5,6} Specifically, a candidate herd was required to have a breeding herd inventory of 2400 sows or more, needed to be surrounded by four or more growing pig sites within a 4.7 km radius¹ and had to have experienced a minimum of three external PRRSV infections over the past four years despite the use of industry standard biosecurity practices. A summary of characteristics of study herds is provided in Table 1. On a monthly basis, treatment and control herds were assessed for clinical evidence of PRRS and blood/oral fluid samples collected from 30 piglets at weaning and tested by PCR. If positive, the ORF 5 region was sequenced and compared to historical PRRSV isolates.

Results

Over the 36-month study period, 8 treatment herds remained free of infection; however, 2 herds became

infected due to documented breaches in transport and personnel biosecurity protocols. In contrast, 28 of 30 of control herds were re-infected with new variants. Of these 28 farms, 17 (62%) were infected one time, 7 (25%) were infected twice and 4 (13%) were infected three times. Chi square analysis indicated that treatment herds were significantly less likely to become infected when compared to control herds ($P = 0.0001$).

Discussion

These results suggest that air filtration is an effective means to reduce the risk of external PRRSV introduction to large breeding herds located in swine dense regions. Studies are currently underway to continue to assess the sustainability of air filtration and to calculate its cost: benefit. If proven efficacious over time, “**Sustainable PRRSV Freedom**” in swine-dense regions will be a reality.

References

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Table 1: Characteristics of study herds

Herd	#	# infected	BHI	# sites/4.7km	# infections/4 years
Treatments	10	2	3163	8	5
Controls	30	28	3238	8	5

Key

- 1: Herds designated as treatments are filtered while those designated as controls are non-filtered.
- 2: Number of herds in each study group.
- 3: Number of herds in each group which experienced an external PRRSV infection during the 24-month study period.
- 4: Mean breeding herd inventory across study groups.
- 5: Mean number of pig sites located within 4.7 km of the study herds.
- 6: Mean number of PRRSV infections secondary to the introduction of heterologous variants in herds over the four years prior to initiation of the study.

