Assessing production parameters and economic impact of swine influenza, PRRS and *Mycoplasma hyopneumoniae* on finishing pigs in a large production system

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Introduction

Currently, publications are available that analyze the cost of porcine reproductive and respiratory syndrome (PRRS),[1] but the cost of PRRS in combination with other common disease of swine is relatively unknown. The goal of this study was to link historical diagnostic reports with close out information in order to determine the production and economic impact of swine influenza virus (SIV), PRRS and *Mycoplasma hyopneumoniae (*M hyo*)* alone and in combination. The information generated can be used to make economically informed flow, production and vaccine decisions.

Materials and methods

Impact of disease in this study was measured as a difference from baseline in percent mortality, culls and tailenders (%MCT), average daily gain (ADG), and profit per head placed. Diagnostic reports, 2007-2011, for SIV, PRRS and M. hyo cases from a large production system were matched to corresponding close out data. ADG and %MCT were obtained from the closeout reports. PPRS cases exposed to wild type virus and PCR positive were included regardless of PRRS vaccination status, and all pigs were vaccinated for M hyo. System baselines were established using average production numbers for sites in the production system that were previously categorized as high health sites. Baselines were calculated separately for nurseries, wean-to-finish and finishing barns, as well as by year. Calculated baselines were compared to actual %MCT and ADG, and average difference from baseline was calculated. Costs per pig were determined using a wean-to-finish budgeting model (Dr. Holtkamp, Iowa State University). T-tests were run through Excel comparing uncomplicated pathogens to the combination of pathogens. T-tests were used to determine if the increase in impact from individual diseases to combinations of pathogens was statistically significant.

Results

The results are shown in Table 1. T Tests comparing %MCT from combinations to uncomplicated pathogens were all significant ($P < 0.10$). When comparing ADG all the data was found to be statistically significant ($P < 0.10$) except for SIV with M hyo compared to uncomplicated M hyo, and PRRS with SIV compared to uncomplicated PRRS. The greatest numerical economic losses in each category occurred when pathogens were combined.

Discussion and conclusions

The additive cost of uncomplicated M hyo and SIV was $3.86, but the actual cost for this combination of pathogens was more than double that figure. Actual PRRS and M hyo costs were one and a half times greater when compared to the additive costs of uncomplicated PRRS and M hyo. This data confirms that in this production system M hyo in combination with other pathogens produces more than additive losses in productivity. It is clearly demonstrated that detrimental impact is greater when pathogens are combined. As a result, the production system involved, and the industry as a whole, can re-evaluate their pig flow, vaccination protocols, and elimination strategies. Resources can be focused on eliminating risk of combined pathogens. The decisions they make moving forward as an industry will be economically informed and focused on areas with the greatest impact on production and profit.

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Table 1: Productivity and economic impact of SIV, PRRS, and *M hyopneumoniae*

Pathogen/combination	Difference from baseline in %MCT	Difference from baseline in ADG	Difference from baseline in loss per head placed
M hyo	2.15%	0.04	$0.63
PRRS	1.68%	-0.11	$5.57
SIV	1.87%	-0.04	$3.23
PRRS and M hyo	5.43%**M**P	-0.14*M*P	$9.69
PRRS and SIV	4.34%**S**P	-0.16**S	$10.41
SIV and M hyo	3.46%**M*S	-0.18**S	$10.12

** M,P,S = combinations vs. M/P/S; $P < 0.05$

* M,P,S = combinations vs. M/P/S; $P < 0.1$

Reference

1. Neumann E, Kliebenstein J, Johnson C, et al. Assessment of the economic impact of porcine reproductive and respiratory syndrome on swine production in the United States. J Am Vet Med Assoc 2005;227(3):385–392.