



UNIVERSITY OF MINNESOTA

Swine Disease Eradication Center

December 2016
Volume 6, Issue 1

[www.vetmed.umn.edu/
Centers-programs/swine-
program/research](http://www.vetmed.umn.edu/Centers-programs/swine-program/research)

SDEC Partners Research Update

Project Update: Measuring production losses from endemic animal disease: Porcine reproductive and respiratory syndrome (PRRS) in US sow farms

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Funded by: MnDrive

Background

- Porcine reproductive and respiratory syndrome (PRRS) is a costly endemic disease to the U.S. swine industry.
- Although vaccination helps to reduce its impacts in sow premises, PRRS still decreases the productivity of vaccinated farms.
- The complex epidemiology of the disease, along with the diverse clinical outputs observed in different types of infected farms, have hampered efforts to quantify PRRS' impact on production over time.

Objective

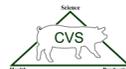
To estimate the effects of PRRS on production using longitudinal data routinely collected from sow farms.

Material and methods

- Weekly production records of sow farms vaccinated against PRRS virus from a production system experiencing PRRSV outbreaks during 2014-2015 were used in this study.
- The number of weaned pigs produced and seven indicators of performance (number of live births and number of stillbirths per litter, mortality number in pre-weaned pigs and sows, number of aborted sows, number of sows with repetition of service, and number of sows farrowing) were used to analyze the disease impacts.
- By comparing values after the PRRS outbreaks relative to those during the pre-outbreaks (baseline) period, we estimated the change in weekly weaned pig production and in the seven performance indicators mentioned above.
- We then used an average market price for weaned pigs during the time of the study (\$45.2) to estimate the impact of the disease on net farm revenue.



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Results:

- We observed a 5% decrease in production and an increase in the number of abortions, one week before the outbreak was declared.
- Production dropped consistently until the 6th week post-outbreak, when it reached its maximum failure in production with 24% (min= 13%, max=28%) fewer weaned pigs-per-week than the baseline.
- After the 6th week post-outbreak, we observed a moderate recovery in production, although with a second wave of decline between the 11th and 18th week post-outbreak.
- All performance indicators deteriorated at some point in time, either the week before, at, or immediately after the outbreak was reported
- Results suggested a slight decrease in the number of farrowings per sow/year, from 2.3 times/year (min=1.8, max= 2.8) to 2.2 times/year (min= 1.8, max=2.7) in absence and presence of an outbreak of PRRS respectively. This slight change would imply a 6% drop in the number of sows farrowing annually. Consequently, a corresponding 6% increase in the number of sows requiring repeated service was reported, while a gentle increase in the number of pre-weaned pigs' deaths per sow/year, and an overall 0.01 increase in chances of abortion sow/year were described.
- Finally, there was an annual decrease of 1.92 weaned pigs per sow (min=0.51, max=3.72), leading to \$86.6 reduction in revenue per sow/year (min=\$22.9, max=\$168.2).
- Only considering direct losses (i.e. decay of output production), PRRS virus caused on average an ~8% (min=4%, max=13%) yearly decrease in the value of production. Considering the scale of farms analyzed in our study, this is roughly \$393,506 of decrease in annual revenue per farm (min=\$178,969, max= \$664,299).

Conclusions and Implications:

- PRRS was shown to substantially decrease the production of weaned pigs in PRRS vaccinated farms for a considerable time, with important lags in recovery. Consequently, the decreased production is economically important.
- We found substantial variation in performance among a relatively standard dataset of farms; therefore generalizations of impacts of PRRS must consider distributions across farms.
- Because here we only measured direct production losses, the full economic impact of PRRS certainly may exceed our estimations. Furthermore, the impact may be higher in unvaccinated farms.
- The decrease in production is economically important. Results here provide quantitative knowledge that may be useful in estimating the cost-benefit of alternative interventions intended to prevent or control PRRS in sow farms of the US.