# Genetic Parameter Estimates for Large White Sow's Prolapse

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### Summary and Implications

The objective of the present study was to estimate the potential role that genetics plays in the prolapse incidence of the U.S. commercial sow population. Data from 22,577 purebred Large White sows from two multiplier farms were used in this study. Genetic parameters for prolapse incidence were estimated based on linear and threshold animal models utilizing AIREMLF90 and THRGIBBS1F90, respectively. Fixed effects included contemporary group as year-month of removal and removal parity. A random effect for sow's additive genetic effect was also included in the model. Sows born in 2014 had the largest prolapse incidence ($P<0.05$). Moreover, the highest rectal and reproductive tract prolapse incidence tended to occur in the 1st and 2nd parities. Heritability estimates for combined vaginal and rectal prolapse incidence were 0.03±0.01 and 0.003±0.003 for the linear and threshold models, respectively. The results from this study indicate that there is very little if any genetic impact on the prolapse incidence. Pork producers should focus on the environmental effects contributing to reducing prolapse incidence.

### Introduction

The predominant reason for removing sows from the breeding herd is reproductive failure; including failure to cycle, inability to conceive, and other reproductive disorders in the U.S. In late 2012, several U.S. commercial swine companies reported an increase in prolapse occurrences which subsequently increased sow mortality in both natural mortality and euthanasia, which leads to a loss of piglets and increased pre-weaning mortality. A study estimating the genetic parameter estimates for prolapse incidence could be conducted utilizing genetic potential and could improve genetic progress for this trait in the specific population. Basic knowledge of genetic parameters could be advantageous in monitoring genetic effects for prolapse incidence in the pig industry in the U.S. and worldwide.

The objective of this study is to estimate the genetic parameters for sow prolapse incidence.

### Materials and Methods

Animals included in this study consisted of purebred Large White (LW) from a commercial farm in the U.S. The animals with prolapse occurred from 2003 to 2017. A total number of records utilized in this study was 22,557 records. Prolapse incidence as rectal, and uterine prolapses was a dimorphic trait categorizing into 0 and 1.

Linear and threshold animal model models utilizing univariate analyses were fit to the data including all pedigree information. Fixed effects fit in the models included contemporary group as interaction between year and month of sow removal (146 groups), and removal parity (1 to >6 parity). Random effects in the model were an additive genetic effect of sows and residual error. A linear model as well as threshold model were utilized to obtain genetic parameter estimates using AIREMLF90 and THRGIBBS1F90 software packages, respectively.

### Results and Discussion

The relatively high prolapse incidence in this study occurred from 2013 through 2017 (Figure 1). The increased incidence of their occurrence have been associated with many predisposing factors including phytoestrogens, mycotoxins, vitamin deficiency, sow physiology, genetics, farrowing and gestation crate structure, acute diarrhea, severe cough and dystocia problems. Rectal and uterine prolapse incidences in primiparous sows tended to be highest when compared to multiparous sows ($P<0.07$).

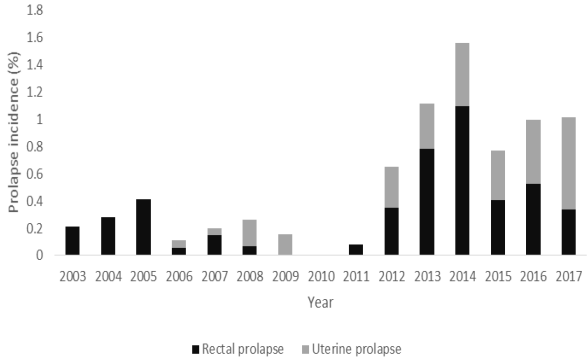


**Figure 1.** Rectal and uterine prolapse incidences in this study

The heritability estimates for prolapse were 0.03±0.001 and 0.003±0.003 when estimated using either the linear or the threshold models, respectively. These heritability estimates were close to zero, indicating that the majority of the variation between animals for presence or absence of prolapse type is due to environmental effects and less if any impacts resulting from genetic differences. Greater progress in reducing the prolapse incidence will be realized by implementing changes in management and environment factors known to affect this trait such as nutrition, gestation stall types, and other disease factors. Swine breeders should consider monitoring for sires that produce offspring that have prolapse and effectively removed them from their populations.

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