

Title: Identification of putative factors contributing to pelvic organ prolapse in sows - **NPB #17-224**

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Scientific Abstract

Sow mortality, specifically as the result of pelvic organ prolapse (POP), has significantly increased in the past five years in the U.S. swine industry. This epidemic sow welfare and production issue, while widely acknowledged among producers, academia and allied swine industry partners, has persisted and continues to worsen. However, the industry lacks mitigation strategies, or even the ability to execute mitigation-based research projects, since a fundamental understanding of the root cause(s) contributing to the increased POP in the swine industry is lacking. The Iowa Pork Industry Center (IPIC) initiated an industry-wide survey involving U.S. swine breeding herds to identify potential risk factors, to direct future research and test mitigation strategies. A comprehensive survey was administered to 104 swine breeding herds across 15 states including farms ranging from breeding herds within large production systems to smaller, independent producers, totaling approximately 385,000 sows. The survey examined data associated with potential factors associated with herd dynamics and management approaches, facility types, nutritional strategies, and animal-based measurements. On 62 of these farms, IPIC staff collected individual sow measurements including, but not limited to, perineal score, tail length, and body condition. Each week, all farms reported the number of sow deaths along with putative causes categorized into POP and non-POP deaths. This information was used to create the weekly POP incidence rate per 1,000 sows and an annualized POP rate. A Poisson mixed regression model using PROC GLIMMIX in SAS® (SAS Institute, Inc., Cary, NC) was utilized to assess risk factors associated with POP incidence rate. The weekly count of POP per farm was the outcome variable and the log of the inventory was included as an offset variable. System was included as a covariate in the analysis. The annualized POP mortality across the dataset was 2.7% (of the total inventory) with a range from 0.3% to 10.3% during a 52-week period starting with week 6 of 2018 during which time 21% of all mortality reported was due to POP. Sow farms that had the greatest incidence of POP also had greater variability in comparison to farms with average or below average POP incidence rate. Several factors that do not demonstrably influence POP incidence were herd size, the extent to which sow farms are inducing parturition or assisting in farrowing when using $P < 0.05$ as the threshold of significance. Feeding strategy prior to farrowing was identified as being important as utilization of bump feeding during late gestation was associated with reduced POP. This was consistent with our observation that sows with the lowest body condition score had a greater probability of POP compared to sows in optimal body condition or overweight. Utilization of water treatment systems also appeared to be associated with reduced POP incidence, as those farms using a water treatment system had lower POP than those farms that did not during the project period. It was also observed that the utilization of antibiotics in the feed may be associated with decreased incidence of POP. Results from this study have preliminarily identified several different risk factors needing further investigation to verify their causality for increased POP risk and potential mitigation strategies. Additional evaluation will be completed to further define and prioritize risk factors likely contributing to a greater incidence in POP in the farms evaluated in this study for additional testing

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