Improving Pig Survivability

Key Findings:

Integrated Approach to Improve Whole Herd Pig Livability Through Research and Industry Collaboration

1) **Economics associated with improving survivability in U.S. swine production:**
   - The first publicly available economic tool for swine producers to input their specific production information and costs, creating a farm level specific cost of mortality for both the breeding herd and post-weaning to market.

   Decision Tools Created:
   - Euken, R. and L. Schulz. 2022. Pig Survivability Project: Breed-to-Wean Mortality Economic Modeling *Ag Decision Maker B1-79.*
   - Euken, R. and L. Schulz. 2021. Pig Survivability Project: Wean-to-Finish Mortality Economic Modeling *Ag Decision Maker B1-78.*

2) **Key strategies found to reduce sow mortality:**
   - Monitor sow body condition score (BCS) during late gestation.
     - Thin sows are more likely to prolapse compared to normal or overweight sows.
     - Using a bump feeding strategy, increasing feed intake, in late gestation for sows that have a low body condition score resulted in lower rates of pelvic organ prolapse (POP) compared to farms not using a bump feeding strategy.
     - It is also important to note that incidence of POP is somewhat correlated with gilt size at time of breeding, with farms that had lighter gilts at the time of breeding (measured by flank-to-flank girth) also having a higher POP incidence.
   - Early intervention-monitor and treat lameness.
     - Monitor sows daily to identify more quickly those needing intervention and improve treatment outcomes.
     - 25.4% relative reduction in annualized sow mortality in commercial settings tested.
   - Feeding strategies prior to farrowing.
     - Feeding sows four 1.5-pound meals reduced farrowing assistance compared to ad libitum intake for 3-5 days prior to farrowing.
     - Farms feeding less than 5 pounds per day in farrowing crates prior to farrowing, compared to farms feeding 5 pounds or more per day had a greater incidence of POP.
   - Identify sows at risk for pelvic organ prolapse.
     - Perineal score evaluations resulted in discovering that sows with a score of 3 (protrusion, moderate to severe vulva swelling) are more likely to develop POP, thus interventions are needed to be developed to prevent POP in these sows.
     - Genomic data found POP is moderately heritable and there is moderate to high genetic correlations between parities indicating a similar genetic basis of POP between parities.
     - The vaginal and fecal microbiome differ based on risk of POP; thus more research is needed to determine how to identify these sows to improve livability.

   Strategies that do not reduce sow mortality:
   - Bacitracin methylene disalicylate (BMD) through the feed and water did not reduce sow mortality, however the use of BMD significantly reduced the incidence of stillborn pigs in sows at elevated risk for POP.
   - Vaginal infusion of ampicillin in late gestation did not reduce the incidence of POP.

3) **Key strategies found to reduce pre-weaning mortality:**

- Adequate consumption of colostrum.
    - Colostrum should be 300-350 grams per piglet to improve newborn livability.
- Enrichment ropes.
    - Piglet mortality was reduced by milky cheese addition during the enrichment period. Semiochemical treatment had the lowest percent mortality at weaning.
- Feeding strategies prior to farrowing.
    - Feeding sows four 1.5-pound meals prior to farrowing reduced piglet deaths, compared to sows fed ad libitum prior to farrowing.

Strategies that do not reduce pre-weaning mortality:

- Sow essential fatty acids (EFA) intake during lactation did not influence litter survivability or subsequent reproductive performance.
- Birthing induction did not influence born alive, stillbirths, mummies, assistance required at farrowing, fetal blood oxygen levels.

4) **Key strategies found to reduce wean to finish mortality:**

- Whole-herd analysis of 2,568 WTF closeouts revealed sow farm parameters associated with improved livability include:
    - Better sow farm health status and productivity was associated with lower WTF mortality. For example, ↑ farrowing rate, ↓ preweaning mortality, ↑ weaning age were predictive of higher survivability downstream.
    - Quantified the increased mortality associated with *Streptococcus suis, Glaeserella parasuis,* PRRSv, *Mycoplasma hyopneumoniae* and PEDv.
- Genetic influence on post-weaning stress and growth.
    - Early maturing duroc sired pigs had reduced stress, higher feed intake, lower % losing weight post weaning, and higher gain during the nursey period.
- Biscuit enrichment increased pig interest at the feeder and increased animal welfare.
    - Providing enrichment cubes to pigs post-weaning reduced the percentage of pigs that lost weight after weaning (3.8% vs 15.5%).
- Pellet size and mat feeding.
    - Feeding large pellet creep feed in lactation improved nursery pig growth and decreased fallout rates compared to creep feeding sow lactation feed and numerically improve both compared to no creep and standard creep pellet.
    - Mat feeding reduced mortality and removals (9.3 vs 8.0%) compared to no mat feeding.
- Sensory attractants.
    - Providing sensory attractant powder to pigs before and after weaning reduced the percentage of pigs that lost weight in the first 3 d after weaning by approximately 20 percentage points.
- Dietary essential fatty acids.
    - The linoleic:linolenic acid ratio can impact gilt growth and the use of lower energy diets does appear to reduce joint inflammation.

Strategies that do not reduce wean to finish mortality:

- Liquid sensory attractant applied pre and post weaning had limited effects.
- Feeding a 4:1 linoleic:linolenic acid ratio does not appear to alter joint inflammation in swine.
- Increasing mat feeding frequency from 2 to 4 times per day did not reduce nursery mortality.
- An oral glucose drench to fallback pigs increased blood glucose but did not reduce mortality.
- Antibiotic treatment regimens showed no differences between mass injection, spot treatment, mass water medication or mass water medication plus spot treatment on percent mortality in naturally occurring multi-etiologic respiratory challenges in commercial nursery pigs.