Development of an automated model to capture and analyze whole-herd parameters associated with wean-to-finish mortality

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Key Points:

- An automated model was developed to consolidate multiple data streams from weaning cohorts to their respective closeouts.
- Sow farm productivity and health are highly associated with wean to finish mortality.
- Sow farm-related data explained 74.1% of the variation observed on wean to finish mortality.

Background: A large and continuously growing amount of data is available from multiple data streams, such as performance, management practices, and health status, within a production system; however, they are not stored and analyzed collectively. Because there is an assumed level of important interaction between these streams, the ability to manipulate and analyze the data collectively, based on automated models, has a great potential for benefiting a production system.

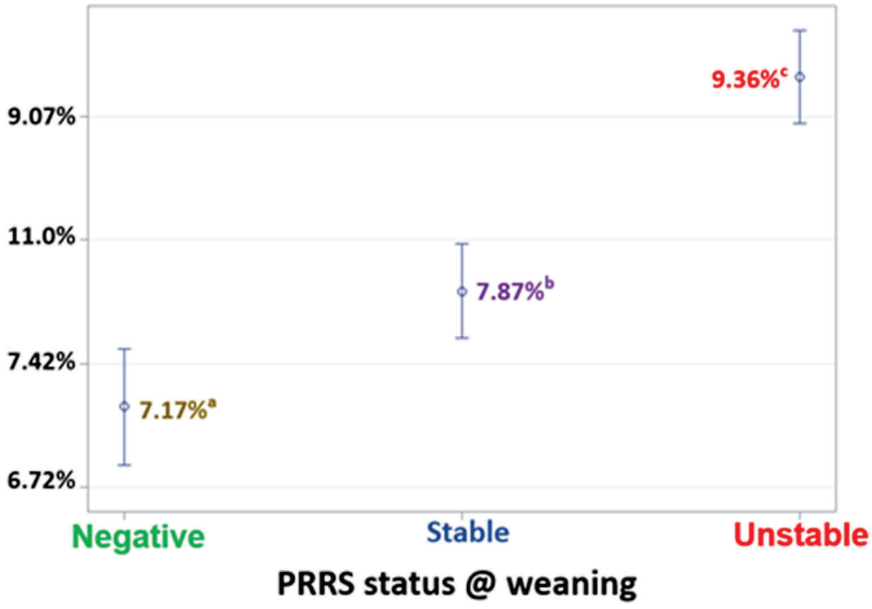
Methods: This study developed an automated model to merge into a consolidated dataset multiple data streams available in a large production system in the Midwestern USA. These data streams included breeding-to-wean (BTW) productivity parameters, closeout data of growing pig lots, BTW and growing pig health status, facilities structure information, and selected management factors.
Furthermore, the study measured the association of specific parameters from the aforementioned characteristics on the final wean-to-finish (W2F) mortality of each cohort marketed. Thereafter, a multiple regression analysis was conducted to explain the overall wean-to-finish mortality of the closeouts.

Results and discussion: Data from 1126 closeouts (Jan to Dec 2018) from 41 sow farms were captured, successfully importing multiple data streams and building the pig flow from pre-weaning until marketing into a consolidated dataset. The analysis was performed separately for each of the 45 variables in the consolidated dataset to measure the magnitude of the association of each of them on W2F mortality. Examples of the interpretation of each univariate analysis include:

- Closeouts originated from sow farms where the average farrowing rate of their respective progeny weaned groups were 78%, 84.3%, 87%, and 90%. The downstream W2F mortality was 10.1%, 8.28%, 8.10%, and 7.05%, respectively, demonstrating that farrowing rate was a great proxy of subsequent W2F mortality.

- The W2F mortality of weaned pigs from sow farms before and after air filters were implemented was respectively 10.37% and 7.69%. For cohorts coming from sow farms where this structure has not been yet applied the average W2F mortality was 8.73%.

- Closeouts originated from PRRS negative, stable and unstable sow farms. The respective average W2F mortality of the cohorts was 7.17%, 7.87% and 9.36%.



The 14 sow farm-related parameters that had the highest association with W2f mortality in the previous step were selected for the multiple regression analysis and they explained 74.1% of the overall W2F mortality.

Conclusions and Implications: This study demonstrates the ability and the value of automating the process of capturing and merging whole-herd data streams, in order to measure risk factors and predict subsequent W2F mortality under field conditions. This ongoing project will assist production systems and veterinary clinics in making data-driven decisions as well as benchmarking whole-herd drivers of mortality.

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- **For more details, please visit**: www.fieldepi.org/disease-forecasting or contact Dr. Linhares at Iowa State University (linhares@iastate.edu).