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Commercial nursery mortality and weaning weight

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Introduction

Most swine producing companies record nursery mortality on a weekly, if not a daily, basis. The reliability of group mortality records is reasonable. Case control studies are easily applied to nursery mortality. It is simple to compare the backgrounds of higher and lower mortality groups, especially if nursery rooms are stocked from single sow farms. Case control work can be challenged, as it is retrospective and biased by unnoticed factors.¹

Pig size has been observed to be related to mortality in repeated case control studies.² Smaller pig size does not *cause* higher mortality, however, smaller pig size is *associated* with higher mortality. Small pigs are more at risk of mortality during the nursery phase than are larger pigs. The effect of pig size on group nursery mortality is related to quantity of small pigs in the group. The larger the quantity of small pigs in a weaning group, the more likely the group will experience higher mortality.

Nursery mortality and weaning weight

The suggested effect of small pig quantity on nursery mortality is plausible. Nursery facilities are designed and equipped to meet the needs of pigs of a given size. Nursery room environmental settings are manipulated to accommodate pigs of a given size. Nursery feeding is also planned to suit pigs of a given size. Pigs that are smaller than intended for the nursery are, therefore, disadvantaged. Even the pigs that are larger than intended are disadvantaged. The difference is that smaller pigs may not cope as successfully with the disadvantage. Small pigs are less likely to endure adversity while maintaining adequate intake. Mortality related to size expresses as smaller pigs fail to consume adequate feed for survival.

The situations faced by smaller weaned pigs can be improved by separating them and offering a more suitable environment. Stocking density can be reduced to limit competition. Mats and a heat source can be added to cull pens. Gruel can be fed. Complex diets can be fed longer. Nursery management interventions can create a more suitable environment for small pigs. A portion of small pigs will respond and thrive. However, another portion of small pigs will fail to consume adequate feed even in an en-

hanced environment. Small pigs often starve to death or are culled in finishing. The quantity of small pigs that respond (or, conversely, fail to respond) is determined by individual pig viability. Health and body condition at weaning are important issues that define an individual pig's viability.

Pig size is often evaluated in production by measuring pig weight at weaning. Swine producing companies usually measure weaning weights of groups during transportation from sow farms. The mean weight of weaned pigs can shift to higher or lower values over time.³ The primary cause of shifts of mean weight is the age of piglets at weaning. A reduction of weaning age at a sow farm is often due to increased quantities of sows available for farrowing. Farrowing crates are weaned more quickly to accommodate the need for more farrowing space. Most early weaning situations affect a noticeable change in mean weaning weight but cause little change to weaning weight variation. Early weaning usually maintains pig viability to a great degree as small pigs can be healthy and possess good body condition. A sample of individual pigs from the nursery group must be weighed at placement to estimate weight variation.

A group of weaned pigs usually has weaning weights that are normally distributed (i.e., along a bell-shaped curve). Most weaning weights of pigs are similar to the average with fewer pigs being lighter or heavier than average. The significance of the distribution curve is that the shape of the curve extrapolates the quantity of small pigs when early weaning occurs.⁴ A one pound shift in mean pig weight can multiply the quantity of small pigs in a nursery group. For example, assume the average weaning weight is about 11 pounds for weekly groups of 1000 pigs from one sow farm. Assume that the nurseries experience problems caring for pigs that are 6.5 pounds or less. This 6.5 pounds is then a constant that defines a small pig for the given nursery situation. Shifting the mean weaning weight to 10 pounds increases the quantity of small pigs from 12 to 40 if weight variation remains at two pounds. The pen space required to allow small pigs enhanced environment is more than three times greater after a mean weaning weight shift of one pound.

Assume the pigs are weaned even earlier and the average weight of a weaning group is reduced by three pounds to

a mean weaning weight of eight pounds. The result is that over 200 underweight pigs would arrive to the nursery. Workload in the nursery would be affected if so many small pigs were to receive an enhanced environment. Personnel could easily spend 50% of their day caring for 20% of the pigs. It is questionable if the task would be attempted or accomplished. An alternative is to convert the entire group management to that of an enhanced environment. The environment would be incorrect for 80% of the group.

Other important causes of mean weight shifts are factors that disrupt the potential of pigs to thrive before weaning. These factors result in lighter weaned pigs without changing weaning age. These factors are disease or management factors that either inhibit the ability of pigs to nurse adequately or reduce the quantity of milk available to pigs. The resulting situation expresses an abnormally high prevalence of unthrifty weaned pigs. The weaning weight distribution of unthrifty groups displays a reduced mean weaning weight, and the unthrifty pigs create a larger weaning weight variation. The weight distribution curve is spread out by the variation, and the peak density around the mean is decreased. The increase of variation is not spread evenly about the curve. Small pig quantities are greater and small pigs are lighter than usual. The distribution curve is skewed with a longer lightweight tail. The long tail places more pigs in the small pig category. The effect of small pig quantity extrapolation may not be as great with an expanded weight distribution curve. Mortality will likely be greater than that expected for early-weaned pigs. The reason is that unthrifty pigs are not as viable since health and body condition have been sacrificed. Weaned pigs from the tail of an expanded and skewed weight distribution are less likely to respond to enhanced environments than are early-weaned pigs.

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