Considerations to Reduce Stress During the Transition Period

Peter Krawczel, PhD, Assistant Professor and UT Extension Dairy Specialist
Department of Animal Science

Stress is an unavoidable part of a cow's transition period. This timeframe is typically defined as the period spanning the 3 weeks before and after calving. The stressors a cow faces may come in many forms.

First, cows face an increased challenge from pathogens. It is estimated that 75 percent of disease occurs within a month following calving.

Second, nutritional are challenges inherent with this stage of lactation. A cow will typically experience multiple changes in diet as she progresses from the far-off dry period to early lactation in an attempt to match her diet with her needs.

Third, there are stressors within the cow's physical environment. For example, the last USDA survey reported close to 70 percent of dairy operations in the western states and 36 percent of operations in the eastern states, primarily housed their dry cows on dry lots, outdoors in multiple-animal areas, or on pasture. It is likely that cows in these operations experienced some level of heat or cold stress during their transition period.

Finally, to facilitate multiple diets, cows typically move through multiple pens, and the frequent changes in their social environment are considered a stressor. This final factor may be the most problematic as it is the most difficult to manage around. The occurrence of social stress also increases the effect of the other potential stressors of the transition period as the effects of stress are thought to be additive. Research from a group of Italian scientists found that cows with a greater stress response, in the form of greater inflammation, during the first month after calving produced less milk (75 vs. 88 pounds per day) and were less fertile (2.7 vs. 1.7 services per pregnancy), relative to cows with a lower stress response. Clearly, managing the total stress experienced during the transition period is key to a successful lactation, and recent research focuses on the social side of stress management.

Potential to minimize pen moves to improve transition

To review, current recommendations for managing the transition of dry cows (or heifers) into their next (or first) lactation would include the following moves and duration of stay:

1. From a lactating group into a far-off dry group (5-6 weeks).
2. From the far-off group to a close-up group (approximately 3 weeks; heifers are often introduced here).
3. From the close-up group to a calving/ maternity pen (approximately 24 hours).
4. From the calving/maternity pen to a fresh group (approximately 3 weeks).
5. From the fresh group to a lactating group.

Data from the Animal Welfare Program at the University of British Columbia demonstrated multiple negative effects on feeding behavior, and potentially rumen health, occur during the 48 hours following regrouping:

aggression at the feed bunk increased two-fold, DMI dropped 10 percent, feeding rate increased 10 percent, and rumination times decreased 10 percent.

There are two strategies that may be implemented to reduce the number of times a dairy cow is moved from one pen to another. First, using a one-group approach to the dry period can eliminate at least one of these moves, while also reducing the number of diets to formulate/mix and the associated labor. However, this approach may work best on farms that are using a shortened dry period (40 days) as long as a consistent supply of low-energy forages is available.

The other, more novel, approach to reducing pen changes during the dry period is the all-in-all-out approach. A behavioral study conducted by the University of Minnesota determined this approach reduced the total number of displacements and the number of displacements per cow during the 5 weeks before calving, relative to conventionally managed dry cows [those following the protocol reviewed previously (i.e., weekly additions)]. A possibly more important result of this study was the total aggression occurring during the final week before calving was lower than the previous 4 weeks, which suggests a calmer environment for calving. A companion study from the University of Minnesota and Texas Tech University found that the reduction in social stress did not translate into improved health or innate immune function following calving. Therefore, with the currently available data, the merits of the all-in-all-out approach are debatable.

If pen moves are unavoidable, how can they be managed?

Regardless of the management strategy, loosely housed dairy cows will experience a need to change pens to some extent, which cows should be able to handle with proper stocking density and management of the transition housing. Some practices may help reduce the impact and increase the likelihood of a successful transition period. First, data from Purdue University and the University of British Columbia indicate that moving cows later in the day and avoiding feeding times may be beneficial. Avoiding the time around feeding will minimize the reduction of dry matter intake of resident cows, as most of this will occur during the 2 hours after delivery of fresh feed. In addition, introduced cows will enter a pen where minimal activity is occurring (since most of the feeding behavior and activity of resident cows will coincide with fresh feed delivery), which allows them the greatest opportunity to feed without interference and find other resources (resting space, water, grooming brush, etc.) with little aggression. A Danish study observed an easier adaption to a new housing pen for first lactation cows when introduced in pairs rather than individuals as evident in greater lying times. Most importantly, no pen moves should occur within 1 week of calving (other than to a calving pen), and, if possible, moves in the last 14 to 21 days should be avoided. Finally, to avoid prolonging the final stages of calving, research from UBC and Arahus University suggests moving dairy cows into a calving pen at least 5 hours before calving. While this may not always be possible, it does highlight the importance of routine checks on a close-up group to observe for signs of the onset of labor.

More on managing the close-up pen

The recommendation for trying to maximize the length of stay in the close-up pen (assuming the use of a close-up pens fits within the overall management strategy) comes from two different lines of evidence. First, cows spending less than 7 days in a close-up pen had a greater incidence of milk fever, retained placenta and uterine infection than those cows spending at least 8 to 14 days. Increasing the length of stay beyond 14

days continued to reduce the incidence of disease. The benefits of a longer stay within the close-up period are not limited to the transition period. Instead, cows and heifers housed in this pen for at least 5 days produced more milk over the next lactation. This response was greatest for heifers entering their first lactation. Remaining in the close-up pen for at least 5 days resulted in 3,300 pounds more milk over their first lactation. Increasing the stay in the close-up pen to at least 9 days increased production over the first lactation by an additional 2,200 pounds of milk. The same trend, but to a less extent, was evident in cows entering their second or greater lactation.

Take-home message …

Stress during the transition period will never be eliminated. However, it can be managed to minimize its impact on the cow.

While there may be some merit to alternative management strategies for this period (one group or all-in-all-out housing), there is limited evidence to support the large-scale adoption of these practices unless they readily fit into existing facilities or overall farm management strategy (shorten dry period would be a prime example). Instead, the emphasis should be placed on minimizing the additive effect of stress by targeting the correct times for the movement of cows, moving heifers in pairs at a minimum, avoiding moving animals in the late stages of calving (unless required to assist with a difficult calving), and timing pen moves to ensure at least 5 days of residence in the close-up pen. While all of these will require time to manage correctly, the payoff of reduced incidence of disease and improved performance should be worth the effort required.

INSTITUTE OF AGRICULTURE
THE UNIVERSITY OF TENNESSEE

AG.TENNESSEE.EDU

W 379 11/16 17-0050 Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.