

Transition Management Checklist

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Many dairy herds today are frustrated by transition management challenges that affect early lactation performance for cows in herds of all sizes. The transition period, which extends from approximately three weeks prior to calving until approximately 3 weeks post-calving, is a high-risk time in a cow's life. Based on data collected by the authors, cows on many dairies experience a high risk for early lactation herd removal (typically, approximately 10-11% of all cows leave the herd within the first 60 days of calving through culling, death or to a much smaller degree, by sale to other herds for dairy purposes). This risk of removal is similar to the risk reported by Stewart and Godden from a large Minnesota record review.

The transition period is a critical time in cows' lactations with long lasting carry-over effects that extend far beyond a high risk of early lactation culling. There is a well documented depression in the immune function during this six week period. Dry matter intake may drop by 30% or more and the presence of various environmental, social, or feed related stressors may further compound the compromised DMI and immunity. Early lactation milk production, risk for contracting infectious diseases and subsequent antibiotic treatment, return to positive energy balance, and reproductive efficiency are all related to the success of the transition period.

Veterinarians, nutritionists and other dairy consultants are often asked to investigate, correct, or otherwise deal with the resulting problems caused by transition failures. For example, herds that struggle with poor reproductive efficiency may implement massive changes in the breeding program including the firing of commercial or on-farm inseminators. Nutritionists may be called regarding poor fresh cow milk production or poor peak performance. Often, these production and reproduction problems are the result of mismanagement that occurred at least 3-6 weeks previously. Examples of management issues that may lead to production problems include overcrowded close-up dry and fresh cow pens, inadequate heat stress abatement, and rations that somehow were not delivered as per the nutritionist's recommendations or were sorted by the cows. Unfortunately, key herd advisors at times may resort to finger pointing and playing the "blame game". However, each member of the herd management team has specific roles. Complete buy-in and cooperation from all members of the management team, as well as a concerted management effort targeted at prevention of periparturient problems is necessary to ensure the financial success of these large dairy enterprises.

The following checklist was designed to offer some guidelines to help veterinarians, consultants and owners/managers improve the management of transition cows with an eye on improved early lactation performance, decreased risk of premature culling, and improved reproductive success. It is not meant to be an exhaustive list of all possible transition issues, but merely to serve as an aid in the investigation of problems and in improving the day-to-day management. At the end of the paper is a list of reference/ suggested reading for those that would like additional information.

Grouping & Pen Movement

- ❑ Goal: The goal is to reduce the social, environmental and metabolic stressors by minimizing the number of pen changes a cow is forced to make. Keep it simple - avoid unnecessary pen changes as each pen move is likely to result in a drop in feed intake and elevated cortisol levels, both of which may negatively impact immune function and overall health and productivity.
- ❑ When moves are necessary, decrease the impact of pen changes by moving animals once weekly and move in groups of 10 or more animals if possible.
- ❑ Avoid moving cows into new pens during the last 10 days prior to calving. Cows should spend at least 14 days in the close-up pen.
 - Due to the inevitable variation around calving dates, in order to have at least 90% of cows spend at least 10 days in close-up, the average days in close-up should be 23-24.
 - When moving cows from far dry to close-up on a weekly basis, set up the report to list cows that are 21 – 27 days prior to expected calving.
 - If possible, target slightly longer days in the close-up pen for cows known to be carrying twins or cows that are dry during summer heat stress conditions as they are expected to experience shorter gestation periods.
 - In these high risk animals, set the report specifications to move cows at 28 – 34 days prior to expected calving.
 - In the West, many herds house close-up cows in dirt lots with covered shade structures. In this situation, cows usually calve in the same lot, negating the need for a maternity pen unless dystocia is suspected.
 - One alternative that is gaining in popularity is the system of bedded packs for close-up and maternity cows. Cows do not move to a maternity pen, but instead calve in the same pen in which they are housed throughout the close-up period. The advantage is fewer pen changes and less need for an hourly walk-through. However, space per animal is important (~100 ft² per cow) as is attention to bedding maintenance.
 - If maternity pens are used, strive to move only at impending parturition, i.e., feet showing or other obvious signs of active labor. Moving cows during early parts of stage 1 labor may result in an increased risk of stillbirth. Animals should spend less than 12 hours in a calving pen.
 - In order to make this plan work, close-up pens must be closely monitored around the clock. A maternity worker should walk the pens approximately once every hour and move cows displaying signs of active labor. Facilities should be designed to allow a single worker to calmly move an animal from close-up to maternity without additional help and without undue stress of the animal or her pen mates.

- Waiting until active parturition to move cows from a freestall dry cow pen into a maternity pen usually will result in some cows calving in the freestalls. Cows vary in duration of active labor and some cows, especially older cows, spend very little time in active labor. Inevitably, even with very experienced workers, walking pens every hour will result in missed animals. As a consequence, expect about 10% of calvings to occur outside of the maternity pen (i.e., in the freestalls) and workers should be prepared to properly and promptly assist these calves.
- Separate heifers & older cows if possible.
 - Heifers have been shown to have longer resting times and higher DMI when separated from mature cows.
 - Some researchers feel that heifers need higher levels of protein during the close-up period (>15%) as compared to mature dry cows.
 - Feeding DCAD diets to springing heifers is not required since they are not susceptible to clinical hypocalcemia and are less affected by subclinical hypocalcemia than mature cows.
- Maintain the stocking density at less than 100%, based on feed bunk space.
 - Provide ~30” of bunk space per animal or, in pens with lock-ups spaced at 24”, populate the pen at 80-85% of the number of lock-ups.
 - Producers often hear conflicting information regarding the pros and cons of using self-locking stanchions in transition cows.
 - Pros:
 - Lockups at the feedbunk provide more defined feeding areas and may reduce feed wastage from behaviors such as feed tossing.
 - Increasing evidence that there is a reduction in displacement of subordinate cows by dominant cows from the feed bunk when stanchions are in place as compared to post and rail feeding systems.
 - Lockups can dramatically improve labor efficiency, but make sure to remain aware of the cows’ time budgets and the damage that may be done as a consequence of prolonged lock-up times.
 - Cons:
 - Cost is probably the biggest drawback.
 - A handful of cows may not comfortably use stanchions and may need to be sold to another dairy or moved to a pen that has open feeding areas.
 - Set realistic lockup expectations (large, wide-bodied dry cows will not use all of the slots when stanchions are 24 inches wide, i.e, 5-in-10 stanchions).
 - Instead of relying on a count of lockups, strive to always provide 30-36 inches of feed bunk access per cow in the close-up and fresh cow pens.
 - The easiest way to accomplish the desired stocking density is to count cows vs. bunk space on the day of move into the close-up pen. If there are 28-30 inches of useable bunk space per cow on the day of the move, as cows calve and move to other pens, the feed space per cow will only increase throughout the week.
 - Due to seasonal changes and normal variation in calving patterns, herds should plan to provide bunk space above and beyond the average number of

cows present at a given time in the close-up and fresh pens. For example, based on an evaluation of both southeastern and western herds, if the close-up pen was sized for 125% of the average pen size, the pens would exceed the desired 85% stocking density about a third of the time. If the pen was sized based on 150% of the average pen size, density would exceed 85% about 15% of the time, but would result in less than 24 inches of bunk space per cow less than 2-3% of the time, based on the herds evaluated.

- Maintain a clean, dry environment
 - Mud and heat stress increases metabolic needs but decreases feeding intake
 - Wet, mucky conditions also increase the risk of mastitis that may not appear until well in the fresh pen
 - Cows calving in wet conditions may experience higher risks of metritis
 - Maternity pens should be bedded with clean, dry material and changed frequently
 - Frequency of rebedding will depend on a variety of issues such as stocking density, bedding type, weather conditions, etc. Strive to maintain an area which results in cows maintaining good hygiene scores.
- Following calving, cows should be housed in a colostrum pen, instead of a hospital pen, if possible, until milk is free of dry cow antibiotic residues and legal for sale.
- Minimize distance walked in these tired and sore fresh cows by placing the pre- and post-fresh pens close to the parlor if possible.
- Design move lanes and coordinate cattle movement to eliminate lock out time away from feed

Nutrition & Feed Delivery

- Goal: The primary feeding management goal during the prepartum period is to minimize the inevitable drop in dry matter intake that occurs prior to calving. Feed intake, energy balance, and the magnitude of change in both are associated with changes in immune function, risk of developing retained placenta and metritis, and with postpartum feed intake.
- Close-up cows:
 - Energy and protein requirements during the last week of gestation are estimated to be approximately 15 Mcals NE_L and 1100 grams of metabolizable protein per day, respectively.
 - It is beyond the scope of this paper to adequately describe the various strategies and guideline for balancing rations, but there are a few basics worth mentioning:
 - Ensure an adequate level of fiber intake by feeding 7 of 7.5 lbs of forage ADF and make sure cows are actually consuming the ration provided by using a Penn State Particle Separator to evaluate fresh vs. refusals
 - Increase metabolizable protein to approximately 1100 to 1200 g/d (corresponds to a positive balance of 400 to 450 grams of metabolizable in some ration balancing programs)
 - Be careful with fermentable carbohydrate levels – keep total NFC to less than 30 to 32% and starch at approximately 14-18%

- Monitor feed intake - this is one of the simplest monitors of change in performance (and predictors of future performance) but yet is most often overlooked.
 - Weigh feed delivered to close-up and fresh cow pens daily
 - Weigh feed refusals from close-up and fresh pens daily
 - Target a 5% refusal (or more) on a daily basis, but ensure that the ration is not easily sortable by grinding hays to less than 3 inches in length and adding water if necessary
 - Based on a typical 21-24 average days in close-up, shoot for a dry matter intake of greater than 26 lbs for mature Holsteins (> 18 lbs for mature Jerseys) and greater than 23 lbs for Holstein heifers (> 14 lbs for Jersey heifers) in close-up pen
- If using DCAD diets for close-up cows:
 - Select forages, grains and grain by-products with that are low in potassium to minimize the amount of anionic salts needed
 - Monitor urine pH's once weekly from ~ 10 cows while feeding a DCAD diet. The goal is to have all cows at 6.0 to 6.9 following at least 48 hours on the diet. Many people monitor the average pH but the average can be very misleading, especially in situations where cows are sorting the ration and some animals have a high pH while others are too low. Over-acidification (urine pH < 5.8) may result in depressed feed intake and perhaps compromised immune function while inadequate acidification (urine pH > 7.2) can lead to severe, non-responsive downer animals following calving. Either scenario can also result in an increase in retained placentas.
- Feed additional vitamin E to close-up and fresh cows. Vitamin E has been shown to improve immune function and decrease the risk of retained placenta, metritis and mastitis in fresh cows. Specific levels to feed depend upon type of diet and feed ingredients but many consultants recommend levels of 1800 to 3000 IU/ day in these high risk cows.
- Fresh cows:
 - Energy and protein requirements during early lactation change dramatically as milk production increases. After the prescribed withdrawal time, move cows from the colostrum pen to a fresh cow pen for ~ 10-21 days. Duration of time in fresh pen is dependent upon preferred feeding strategy, ability to feed a special fresh cow ration, and calving pressure. Once again, it is beyond the scope of this paper to adequately describe the various strategies and guideline for balancing rations, but there are a few basics depending on the management/ feeding option chosen:
 - Option 1 – short duration in fresh pen (10 to 14 days) with more aggressive protein feeding followed by move to normal high cow ration at 10 to 14 days in milk.
 - Ensure an adequate level of fiber intake by feeding approximately 7 lbs of forage ADF and total NDF levels at approximately 32%
 - Increase metabolizable protein balance to a positive 500 to 600 grams
 - Maintain correct blend of carbohydrates to drive propionate production but keep total NFC at 35-38%
 - Option 2 – move cows onto regular high cow ration

- Ensure an adequate level of fiber intake by feeding 7 to 7.5 lbs of forage ADF and total NDF levels at approximately 30 to 33%
 - Shoot for metabolizable protein balance of positive 250 to 400 grams through first 100 days in milk
 - Feed balanced carbohydrate blend of approximately 23-24% starch, 4.5 to 5% sugars, and 9.5 to 10% soluble fiber
 - In both scenarios, the goal is to ensure an adequate level of fiber intake to maintain rumen health while still providing the proper mix of fermentable substrate and nitrogenous sources (protein) to increase microbial numbers and propionate, the driver behind glucose/ lactose production and subsequently, milk production.
- Monitor feed intake
 - Weigh feed delivered and leftover daily as both a monitor and predictor of fresh cow performance.
 - Dry matter intake of >38 lbs for Holsteins (> 27 lbs for Jerseys) in mixed parity fresh pens (2-21 DIM)
 - Holsteins grouped by parity: 35 lbs for lact = 1 and 43 for lact > 1
- Continue feeding higher levels of vitamin E as described above if possible.
- Fat cows (≥ 4.0 BCS) are at increased risk of ketosis and often benefit from oral drenching – consider 8–10 oz propylene glycol drench/ cow/ day or 1-1.5#’s calcium propionate/ cow/ day at calving and again in 24 hours, at calving and again in 24 hours
- General principles:
 - Ensure uniform feed intake by all animals
 - Monitor particle size using a particle separator
 - Maintain a moisture content of ration 48-55% to help reduce sorting & increase palatability (may need to add water to some rations)
 - Monitor manure for fiber length, grain particles & gas bubbles.
 - Pre-batch mix/ chop hays to control length to no larger than 2-3 inches (i.e., less than the width of a cow’s muzzle)
 - Use high quality, highly palatable hays free of mold & mycotoxins.
 - Use high quality, highly palatable silages free of clostridial or butyric acid fermentation problems. Do not feed silage from top & sides of silo to transition animals. Limit silages to no more than ~ 40 to 50% of forage needs in prefresh cows
 - Clean out feed bunks daily for both close-up and fresh cows to minimize risk of feed intake depression from moldy or heated feeds
 - Avoid overcrowding-Maintain the stocking density at less than 100%, based on feed bunk space. (provide ~30” of bunk space per animal or in pens with lock-ups spaced at 24”, populate the pen @80-85% of the number of lock-ups.)

Facilities & Cow Comfort

- Goal: Maximize cow comfort to promote more lying time and to minimize additional metabolic needs associated with excessive standing and or walking.

- Fresh cows are at increased risk of lameness/ laminitis due to the influence of periparturient hormonal changes that may negatively impact foot and leg tissues and due to pen, ration and feed intake changes.
- Clean, dry & comfortable beds, lots or corrals.
 - Space requirements:
 - ~ 100 sq ft/ cow in bedded packs
 - ~ 500 to 600 sq ft/ cow of loafing area and 50-75 sq ft shade area/ cow in open corrals
 - A minimum of 1 properly bedded and maintained freestall / cow if using freestall housing is ideal
- Heat stress abatement is critical in both prefresh and fresh cows – Provide soaker lines on lockups during heat stress conditions that cycle once every 15 min. from 70-79°, once every 10 min. from 80-88° & once every 5 min. above 88°F with 0.33 gal.of water/cow/cycle.
- Minimize additional stressors by minimizing pen changes, maintaining low pen densities, separating heifers and cows, and by providing adequate water, bedding, nutrition, etc.
 - Provide a minimum of 3 linear inches of water trough access per cow divided into at least 2 locations with the pen
 - Separate cows from heifers during prefresh and postfresh periods to minimize antagonistic behavior toward heifers, promote better feed intake, and to promote improved resting times
 - Eliminate dead ends – temporary gates placed across freestall pens prevent cows from making an “escape” from larger boss cows and will often negatively impact both feed intake and resting opportunities
- Acclimate heifers to lockups/ stanchions and concrete feeding aprons if possible prior to entering the close-up pen.

General Items and Monitoring

- All lactating cows are expected to lose some weight post-calving. Normal weight loss during first 30 DIM should be ≤ 0.75 BCS or ~90 lbs (1 BCS ~ 120 lbs of fat and protein)
 - First service conception risk may be reduced by 50% when BCS decreases by more than 1.0 score during the first 60 DIM
 - Risk of anovulatory condition (failure to cycle) increases in animals whose BCS falls below 2.75 or who lose excessive condition during the early postparturient period
- Use some form of a fresh cow monitoring and treatment program custom designed with your veterinarian to fit each farm’s needs.
 - No one program fits all herds, but most herds benefit from some sort of evaluation program to assess appetite, attitude, and appearance of every cow in the fresh pen every day. Depending on the amount of labor available, as well as the quality of the labor, some herds need a rigorous fresh cow monitoring program to prevent cows from “falling through the cracks”. If some form of a 10-day monitoring program is utilized, careful attention should be paid to ensure that fresh cows are not locked for more than 30-45 minutes per day.
 - Other herds that have very high quality herdsmen and fewer fresh cow issues may actually perform better with a prompted assessment approach instead of individually examining every fresh cow every day for the first 10 days of lactation.

- Record major, consistently defined fresh cow events such as milk fever, DA's, RP's, mastitis, metritis, lame, died, and sold in addition to freshenings.
 - Some events such as ketosis may be too subjective or prone to detection biases and are usually not as valuable to record. However, if recorded, monthly ketosis incidence can be used to evaluate employee performance.
 - Retained placenta risk, calculated on a weekly or monthly basis, can be a very good monitor of both preparturient feed intake as well as a predictor of future metritis risk.
 - Monthly risk of displaced abomasum (# of DA's divided by number of fresh cows at risk) can also be helpful to indicate transition problems but this metric suffers from more lag than RP risk.
 - In general, the following fresh cow event risks are achievable goals for most operations:
 - Milk fever – less than 3-5% of mature cow calvings
 - Displaced abomasum – less than 3-5% of all calvings
 - Retained placenta – less than 8% of all calvings
- Close-up urine pH and overall feed intake are two of the best predictors of future fresh cow problems.
- Many herd owners and consultants like to monitor fresh cow culling/ death risk. Following calving, less than 6% sold and 2% dead during first 60 DIM (expressed as total sold or died/ total calved) are achievable targets but this metric also suffers from lag to a greater degree and occurs too late to take action for affected cows. Also, some herds tend to play games to make this number look good by waiting until the next 30 day window to cull poor doing animals.
- When animals fail to peak—check total dry matter intake and ration protein levels – fresh cows need to rapidly increase feed intake and need adequate levels of high quality protein (more specifically amino acids) in order to achieve high peaks
 - In general, heifers should peak at ~ 75-80% of mature cow peaks.
 - Based on monthly test data, mature cows will typically peak at 50 – 75 DIM but heifers will peak later (90 – 120 DIM). In general, as milk production increases, DIM at peak increases slightly. Also, herds using rBST will also peak later, especially first lactation animals.
- When animals fail to persist—check body condition changes, dry matter intake and total ration energy levels – persistency is usually related to total energy intake
 - First lactation animals should have higher persistency than mature cows – 94-96% persistency (or 4-6% decline per month) as compared to mature cows with 90-93% persistency (or 7-10% decline per month)
- Heat stress conditions narrow the margin for error:
 - Total feed intake decreases, but maintenance requirements for energy are increased
 - Cow spend more time standing (higher risk for lameness)
 - Shorter gestation lengths
 - Higher risk for RP's and much higher risk for more severe metritis
- Fat cow problems should be addressed by strategic management of ketosis risk (propylene glycol or calcium propionate drenching), reducing weight swings in transition period, and improving breeding management to reduce long days open – not by the use of a “reducing diet” in late lactation or far-off dry period
- Minimize lockup times in stanchions – ideally, cows will be locked for no more than 30-45 minutes/ day for monitoring, breeding, vaccinations, urine pH's, etc

- Early lactation milk production (first test milk or week 4 milk production estimates) are better monitors of transition performance than waiting for peak milk
 - First test milk is the earliest production data that can be used to evaluate early lactation performance and impact of transition programs. The lag for this approach is 1-3 months shorter than relying on peak milk and allows for the inclusion of cows that may be culled prior to reaching true peak milk. However, this approach is subject to the impact of days in milk at the first test. To correct for this confounding, in large herds, first test milk can be limited to only evaluating animals that experience first test between 20-30 DIM (or some comparable range).
 - A useful approach that has gained in popularity is the use of week 4 milk. In DC305, an estimate of milk production during the fourth week can be calculated using item type 122 (weekly average milk on week “X” where “X” equals 4). This estimate will include data from more cows than only evaluating first test for cows that tested between 20-30 DIM and can be used to illustrate the impact of seasonal changes in early lactation performance as well as showing the impact of management changes.
- In herds with daily milk meters, changes in milk production can also be a good monitor but results should be interpreted with caution. In general,
 - Cows should increase in milk flow by ~ 10%/ day for first 14 days
 - Heifers should increase in milk flow by ~ 6 to 8%/ day for first 14 days
- Milk components can also be used at the herd level to indicate potential transition issues. Fresh cows that mobilize excessive body fat will often demonstrate higher than normal levels of butterfat. On an individual cow basis, the use of either first test fat percentage or fat:protein ratio is not very sensitive for identifying cows at increased risk of subclinical or clinical ketosis. However, at the herd level, examining the fat:protein ratio at first test can provide valuable information.
 - Calculate fat:protein ratio for cows with DIM at first test of 10-40. If 40% or more of this population has a fat:protein ratio ≥ 1.4 , further investigation is warranted.
 - Another approach is to look at first test fat percentage alone. In this case, if > 10% has an excessively high first test fat %, further investigation may be warranted. Cutpoints used by the authors for quick screening: 5.0 for Holsteins and 6.0 for Jerseys.

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