Challenging the Norm: Herd check…for calves?

Brandon J. Debbink, DVM

Dairy Doctors Veterinary Services, Plymouth, WI 53073

Abstract

Replacement heifers represent the future investment of any dairy to continue to introduce new, younger animals to the herd to be able to cull older, genetically inferior, reproductively spent, sick or dead cows. Although management of dairy calves varies heavily from region-to-region and farm-to-farm, veterinarians should and do play a very important role in the decisions made on dairy operations regarding several critical control points, such as: number of replacement animals to generate and/or keep, newborn processing and management, nutrition, disease detection and mitigation, and inter- or intra-farm benchmarking and goal setting.

Veterinarians can work with producers to establish "calf health programs" that allow regular, scheduled visits to the farm by the veterinarian to focus on calf health and disease mitigation/detection. Understanding five key points regarding calf health and performance and how the MOAT approach (measure, observe, aim and tracking) can be implemented at each of those points is important to generate discussion and change, and to improve calf health.

These five points are:

- Colostrum
- Cleanliness
- Comfort
- Calories
- Consistency

Thoracic ultrasound (TUS) of pre-weaned calves is the foundation of "calf health programs," and is an important calf-side disease diagnostic that can be performed regularly to help the veterinarian identify violations in the implementation of those five key points.

Key words: health, dairy calves, pneumonia, thoracic

Why calf health programs matter

The current dairy economic climate has drastically encouraged progressive producers to raise fewer replacement animals and generate beef-dairy cross calves to capitalize on the current market highs beef-cross calves are bringing. This strategy is two-fold as well; by generating more beef-dairy cross calves and raising fewer (or only the necessary number) heifer calves, dairy enterprises can not only generate greater revenue off a necessarily created pregnancy, but also decrease cash outflow in the form of heifer rearing cost. Because of these factors, focus on calf health has become increasingly important since producers have fewer heifers to cull, making the ones they do have more valuable to the operation. Many dairies are implementing these breeding strategies to optimize cash-flow. Currently, the United States national dairy heifer inventory is at a twenty-year low,[1] meaning that the supply-demand principles of open markets is favoring high replacement costs if a dairy operation would need to buy additional replacements.

Calf health programs allow regular monitoring, detection, involvement and consultation by the veterinarian on dairies raising their own calves to make the most out of the dairies' investment on the female dairy calves they decided to keep as replacements. Veterinarians need to be cognizant that many of their clients may be seeking services they can provide but haven't asked for. By being proactive instead of acting reactively (such as when a producer presents a problem with calf health to the veterinarian), many discussions, changes, and monitoring that the veterinarian can assist with can be dealt with before an issue arises. Veterinarians often take on a reactive role in communication with clients,[2] whereas a proactive approach benefits all parties involved.

MOAT approach and the "five Cs"

The MOAT approach can be implemented when addressing any number of health parameters of herd medicine. The acronym represents measure, observe, aim and tracking. Its utility in calf health consultation can help generate discussion and change within a calf program.

Measure: generating numerical data

Observe: visual inspection

Aim: goal setting

Tracking: data change over time

This approach, when used in conjunction with the "five Cs" of calf rearing, can create consultation points for the veterinarian by identifying violations in these five points. For example, measuring, aiming and tracking the amount of total milk solids fed to pre-weaned calves can identify weak points, in the number of calories offered and the consistency of the milk ration. Another example would be to simply observe a dairy employee using an esophageal feeder to administer colostrum to a newborn calf to ensure it is being performed to the standard that is set by the dairy and the veterinarian.

Colostrum

Current Dairy Calf and Heifer Association recommendations are to feed 10% of the calf's body weight of > 22% Brix, with a standard plate count of < 50,000 CFU/mL and < 5,000 CFU/mL coliforms.[3] Measuring and tracking these benchmarks on a regular basis along with educating farm staff of their significance in calf health are important to decrease disease incidence. Setting goals (aim) to attain serum total proteins above specific levels can help monitor the efficacy in which employees are getting clean, quality colostrum into calves on time. Additionally, tracking these data over time will identify weak points in the logistics of timely, clean colostrum administration, or identify farm staff needing education on the importance of colostrum on calf health.

Cleanliness

Several MOAT points can be utilized in maintaining cleanliness in calf feeding equipment, colostrum collection equipment, and calf environment, but observation is by far the most important. Understanding the critical control points regarding what can become dirty with continued use is a great starting point for identifying what needs to be cleaned and disinfected. Everything from colostrum collection equipment and storage to the environment that the calf will spend her pre-weaned time in all has to be evaluated and monitored. Measuring hygiene of colostrum and milk feeding equipment can be done using a digital luminometer. Tracking these values over time after proper cleaning and disinfecting or even to spot check when there are no calf health issues present are good practices to ensure calves are not exposed to oral pathogens that will alter calf health. If, for example, an esophageal feeder is observed to be visually dirty, there is hardly any benefit to using a luminometer to measure the relative luminescence units reported. Simple, regular observation can identify many hygiene issues in a calf program by examining where farm employees may overlook. Spot checking with a luminometer unannounced to the calf team can identify weaknesses or lapses in hygiene since most people will perform their jobs correctly when they know they are being watched to do so.

Comfort

Although there are a few objective strategies to evaluate how comfortable calves are in their environment, the predominant one would be observation, which can be highly subjective. Nesting scores help to quantify the amount of bedding, especially in cold environments, but observing on the day the calves are being bedded, can reveal some shortfalls in bedding frequency or amount of aerosolized particulate matter when bedding. Objective measures to assess calf comfort are utilization of temperature data loggers to measure the microenvironment of the calf, anemometers to assess air flow within calf barns, and tracking of data such as disease treatment rates or TUS scores in times of thermal stress. Overall assessment of the calf environment should assess the humidity of calf barns, moisture of the bedding, shelter from the elements, air quality and ventilation, and overall fly pressure.

Calories

Probably the most debated topic over the last three to four decades regarding calf care is calories offered in the fluid ration. How many are enough and how many are too many that it may inhibit solid feed intake and therefore inhibit the development of the calf's gastrointestinal system to transition to solid feed? Average daily gain (ADG) is a common metric used to assess if calves are receiving adequate calories to achieve desired growth. Several studies[4,5,6,7] have evaluated the amount of milk or milk replacer fed to calves to assess its impact on future milk production or health of the pre-weaned calf. With some conflicting findings on ADG and future performance, these studies all suggest that a higher nutritional plane benefits calf health and therefore future performance. Veterinarians should voice in favor of adequate nutrition to increase the overall wellbeing and health of pre-weaned calves.

Several MOAT points can be used to assess calf nutrition. For example, calculating the number of calories currently offered to calves can be measured against what the daily caloric requirements of pre-weaned calves are at different ages to determine that calves can mount an appropriate immune response in the presence of disease challenge. Additionally, pairing TUS scores or treatment data can monitor lower ambient temperature and its effect on the ultrasound scores. If the calves exhibit a greater proportion or severity of TUS scores in lower temperatures, this will possibly indicate that calves are not receiving adequate nutrition to maintain core body temperature and respond to disease challenge at the same time.

Consistency

The most suitable parameter for measurement, aiming and tracking is consistency. This includes but is not limited to consistency of timing of feeding, volume and temperature of fluid ration fed, total solids, cleanliness and osmolality of the fluid ration. Regular monitoring of these parameters will either reveal pitfalls in consistency, or at a minimum, rule out that consistency could be the issue when calf problems present. Either evaluating social or physiological stress that calves may encounter, designing a calf program that upholds consistency will minimize stress. Milk replacer or pasteurized milk with an added balancer can pose a challenge regarding osmolality if the solid product is not being added consistently or is of poor quality. For example, fluid rations that are hyperosmolar (> 450 mOsm/kg) present a threat to gastrointestinal permeability,[8] and therefore a detriment to calf health. Working with farm staff to establish goals of total solids fed and consistency parameters in all aspects of the fluid ration is important to minimize social and physiological stress on calves.

Thoracic ultrasound as a building block of calf health

The utility of TUS as a tool to identify calves with subclinical pneumonia can be as simple as that, a detection tool. When TUS is implemented on farm in conjunction with awareness of the "five Cs," it helps the veterinarian identify issues that can or have impacted calf health in a negative way. Metaphorically speaking, clinical treatment rates of calfhood pneumonia is only the tip of the iceberg of the underlying issue. For example, if the subclinical rate is high, but treatment rate is very low, conversations should first be focused on pneumonia detection by farm employees, considering some of the subclinical infections probably manifested clinically at some point in time. Additionally, this same scenario may indicate that calf health is being altered earlier in life such as high rates of scours, sepsis, navel infections or failure of passive transfer. TUS allows the veterinarian to deeper assess a calf program in multiple ways and sets the precedent of routine, regular visits by the veterinarian. By establishing regular visits to detect subclinical pneumonia, the foundation of consistent dialogue, monitoring, and consultation is set. Focus then shifts from simple detection and intervention, to measuring, observing, aiming and tracking of these and other data generated to help improve calf health overall.

Conclusions

Veterinarians should always advocate for improving animal health, and further involvement with calf programs aided by TUS allow for identification or avoiding issues that pose a threat to calf health. Many veterinarians can assess a calf program by utilizing the MOAT approach to aid in prevention and troubleshooting issues with calf health but fail to achieve consistent consulting opportunities without the aid of TUS. By combining

TUS, the MOAT approach applied to the "five Cs," and data analysis, veterinarians can be an integral part of the calf care team on dairies by generating useful data to garner change, develop relationships, and progress calf health in diary calves.

References

1. United States Department of Agriculture – National Agricultural Statistics Service. Last modified January 31, 2024. Accessed August 17, 2024. **https://usda.library.cornell.edu/concern/publications/h702q636h?locale=en**.

2. Lam TJGM, Jansen J, van den Borne BHP, Renes RJ, Hogeveen H. What veterinarians need to know about communication to optimize their role as advisors on udder health in dairy herds. *New Zeal Vet J*. 2011;59(1):8-15. **https://doi:10.1080/00480169.2011.547163**

3. Berringer S, Farrugio R, Feine M, et al. *Dairy Calf and Heifer Association Gold Standards*. 3rd Edition, 2019.

4. Soberon F, Raffrenato E, Everett RW, Van Amburgh ME. Preweaning milk replacer intake and effects on long-term productivity of dairy calves. *J Dairy Sci*. 2012;95(2):783-93. **https://doi:10.3168/jds.2011-4391**. PMID: 22281343

5. Gelsinger SL, Heinrichs AJ, Jones CM. A meta-analysis of the effects of preweaned calf nutrition and growth on first-lactation performance. *J Dairy Sci*. 2016;99(8):6206-6214. **https://doi:10.3168/jds.2015-10744**. Epub 2016; May 18. PMID: 27209128.

6. Ollivett TL, Nydam DV, Linden TC, Bowman DD, Van Amburgh ME. Effect of nutritional plane on health and performance in dairy calves after experimental infection with *Cryptosporidium parvum*. *J Am Vet Med Assoc*. 2012; 241(11):1514-20. **https://doi: 10.2460/javma.241.11.1514**. PMID: 23176246.

7. Buczinski S, Achard D, Timsit E. Effects of calfhood respiratory disease on health and performance of dairy cattle: A systematic review and meta-analysis. *J Dairy Sci*. 2021;104(7):8214-8227. **https://doi: 10.3168/jds.2020-19941**. Epub 2021 Apr 23. PMID: 33896639

8. Wilms J, Berends H, Martín-Tereso J. Hypertonic milk replacers increase gastrointestinal permeability in healthy dairy calves. *J Dairy Sci*. 2019;102(2):1237-1246. **https://doi: 10.3168/jds.2018-15265**. Epub 2018 Nov 22. PMID: 30471909

