

# Preconditioning pays: Developing successful preconditioning protocols

Catherine J. Maguire, DVM

Beef Technical Services, Zoetis, Parsippany, NJ 07054

## Abstract

The principle of preconditioning has circulated through the cow-calf, backgrounding, and cattle marketing avenues for decades and has simultaneously gained traction. The inherent level of variability in preconditioning protocols and execution of such leads producers to look to veterinary practitioners for guidance. This session will focus on defining, justifying, and implementing preconditioning programs in beef herds to provide practitioners with a substantial framework to expand upon, per specific producer objectives.

**Key words:** preconditioning, beef, feeder cattle, weaning

## Introduction

Since their inception in the 1960s, preconditioning practices have been subject to both incredulity and applause.<sup>6</sup> More recently, the benefits of preconditioning the weaning-age beef calf seem to generally be accepted, as demonstrated in the robust Superior Livestock Auction dataset accounting for several million head of cattle sold from 1995-2005.<sup>7</sup> The percentage of calves receiving at least 1 viral vaccination prior to shipment increased from 55% to 95% over the time frame of the study. While not a proxy for assuming other associated management practices, this does demonstrate the traction basic preconditioning has gained.<sup>7</sup>

However, as a veterinarian, precedents must be set when engaging in preconditioning discussions with producers. Primarily, the inherent unpredictability in beef cattle and commodity markets must be respected. While the value of healthy, immunocompetent calves entering backgrounding or feedlot operations may seem intuitive and unquestionable, inputs may not always financially balance outputs year to year. There is a myriad of economic reasons responsible for this and they are beyond the scope of this review.

Similarly, the value of preconditioning beef calves is optimally realized when various inputs are harmonized. Inputs may include labor, equipment, animal health products, ration components, supplements, and ideally professional services such as veterinary consultation. Research conducted in 2011 suggests that producer success in preconditioning the beef calf is maximized when emphasis is placed on elements of the protocol that *can* be controlled, such as health, genetics, nutrition, environment, and marketing modality as opposed to factors such as sale price and premiums that are under more volatile influences.<sup>6</sup>

It is crucial to keep the 2 aforementioned precedents in mind when initiating preconditioning conversations with producers and clients in order to maintain transparency, set realistic expectations, and ultimately build confidence amongst clientele.

## Components of Preconditioning Programs

Preconditioning programs range from set guidelines verified by video marketing groups and cattle marketing platforms to more informal recommendations by animal health organizations or local veterinary groups. Practitioners, producers, and industry professionals may carry different ideas of gold standard preconditioning practices based on regional variations in the cattle industry and the vast variations in the ways cattle are marketed at weaning. The United States Department of Agriculture's National Animal Health Monitoring System (USDA NAHMS) defines preconditioning as "preparation of 6 to 8-month-old range-reared beef calves for entry into a feedlot and intensive fattening program."<sup>11</sup> However, the goal for this session is to create a dynamic framework for preconditioning that may be applied to beef operations spanning the cow-calf segment as producers market calves annually. This functional baseline definition will allow for consideration of logistical impediments and for practitioners to ultimately arrive at realistic preconditioning approaches for individual operations. Consider the following keystones when developing or refining preconditioning programs:

- Increase value of calves marketed
- Decrease disease in subsequent production phases
- Enhance producer reputation over time

## Benefits of Preconditioning

A critical component of selling producers on any veterinary consultative service is justifying the utility and profitability of the service. Regarding preconditioning, this justification comes in the form of returns on investments. Many of these returns can be measured and, better yet, evaluated annually if adequate records are maintained. This session will discuss 3 advantages that producers may capture when preconditioning programs are implemented in beef operations. Management practices implemented before and around weaning time that add value, not limited to: vaccination, deworming, implanting, dehorning, castration, weaning, and bunk training, provide the first opportunity to capture the value in preconditioning. Targeting protocols to optimize

both immune and nutritional status of calves is the second way veterinarians can help clientele as they prepare calves for subsequent production phases. Finally, veterinarians can help enhance producer reputation over time by helping them provide predictable, adaptable cattle to feedlots annually.

Value-based marketing is the first principle of capturing preconditioning value. It has increasingly drawn interest from beef producers nationwide as stakeholders in all segments recognize how preconditioning practices have successfully increased performance and profitability downstream. Data collected over an 11-year time frame that included over 3 million head of beef cattle marketed via video auction provided many insights regarding factors that add value. Of the elements that were found to consistently and significantly have a positive influence on the sale price of weaning-age calves, 2 specifically stand out that provide opportunities for veterinarians:<sup>7</sup>

- Certified health programs
  - Vaccinations
  - 45-day weaning period
- Dehorning calves

Premiums increased year to year for calves that were enrolled in viral vaccination programs. Incorporation of a viral vaccination regimen into preconditioning animal health programs has nearly become the gold standard, if one evaluates the 11-year period of sale prices through video auction. Only 3.9% of the lots marketed were spared administration of viral vaccination.<sup>7</sup> Additionally, a significant positive difference in sale price also evolved between calves weaned 45 days compared to those weaned for a shorter period of time.<sup>7,9,10</sup> The consistent capability of *at least* a 45-day certified program to add value to calves cannot be overstated. At the peak of the premiums noted over the 11 years of the study, producers would have captured an additional \$3,559 USD per load of 500 lb (227 kg) calves when a 45-day protocol was implemented.<sup>7</sup> This history lesson of sorts gives veterinarians incredible leverage when becoming involved with developing or modifying a producer's animal health protocol for weaned calves. In addition, this serves as a basis for implementing such a protocol and the associated value of professional consultation. By establishing health protocols that meet operation-specific objectives, as well as qualifications for certified health programs for cattle marketing, retrospective research would suggest that calves will consistently bring added value.<sup>7</sup>

In addition to health programs, dehorned calves consistently sell at higher prices compared to those with horns.<sup>7</sup> Veterinarians serving beef herds which have genetic influence from horned breeds have a unique opportunity to provide procedural (anesthetic and analgesic) or consultative services to producers seeking to dehorn their cattle and capture the associated documented premiums.

The limitation of determining added value and premiums is that they are strictly defined at the sale price level – true return to the producer comes when they can capture

some of that increased value as profit. Interestingly, in an 11-year study of a Midwest beef herd, the variable that most consistently influenced profit was economic gain. The most effective way to achieve economic gain is to increase dollars per head on sale day. Our genetics, resources and knowledge today allow a producer to put 2.5 to 3.0 lb (1.2 to 1.4 kg) of daily gain on weaned beef calves at an affordable cost, without making them overly “fleshy”. This is often a more dependable method to increase the value of calves than trying to garner a higher price at the time of sale to increase revenue.<sup>6</sup> In other words, more pounds to sell on sale day consistently pays, providing cost of gain is affordably achieved. Naturally, a heavier calf will bring less cents per pound, but a positive profit margin per head is also typically realized when heavier cattle are marketed in uniform lots and in larger quantities.<sup>7</sup> Keep in mind that economic gain may be enhanced if proven practices such as focused deworming, implanting cattle at branding and/or pre-weaning, and coccidiosis control are implemented.

A second keystone of the value of preconditioning lies in the disease protection provided when animal health protocols are successfully implemented. Research has documented, as many practitioners and backgrounders/ feedlot operators would anecdotally agree, that 91% of bovine respiratory disease (BRD) in feedlot calves occurs in the first 27 days-on-feed.<sup>2</sup> Thus, management efforts preceding the stocker or feedlot phase of cattle production must be geared towards minimizing respiratory disease and associated economic losses during the feeding period while also enhancing cattle well-being.

While prescribed protocols may be debated and critiqued based on regional differences and varying ideologies, there seems to be agreement that vaccination against viral respiratory diseases, clostridial diseases, and possibly bacterial respiratory diseases is of high importance. This is echoed in the consistent premiums offered for viral-vaccinated calves under a 45-day certified health program.<sup>7</sup> Many certified health programs also operate under the expectation that the viral vaccinations are to be modified-live in nature, which research supports. Work published on 743 head of Midwest-origin calves spanning a 134-day backgrounding period demonstrated significantly reduced BRD morbidity in calves vaccinated with modified live vaccines (MLV) prior to arrival compared to calves on a killed vaccine protocol prior to arrival.<sup>13</sup> Moreover, metrics from that study were extrapolated to a hypothetical 3,000 head of backgrounded cattle, showing 375 fewer calves would require treatment for BRD if vaccinated with MLV vs killed respiratory viral vaccine at pre-weaning.<sup>13</sup> If BRD can be limited by vaccination programs and management practices working in concert, economic implications can be substantial for backgrounders and feedlots. For example, in a study conducted at Oklahoma State University, high-risk sale barn heifers not requiring any BRD treatments during a 63-day backgrounding phase realized \$111.12/ head greater net returns compared to heifers

ultimately classified as respiratory chronics.<sup>1</sup> Vaccination plays a large role in the success and value of preconditioning programs, but attention to the type and timing of respiratory vaccination is imperative.

Also, critically important in justifying the value of preconditioning to the buyer is consideration of the economic impact of bovine respiratory disease; cost of gain fundamentally increases with increased BRD treatment costs, particularly in the background space. Treatment and labor costs aside, BRD can have substantial impacts on performance metrics of feeder calves, potentially reducing gain by 3% as demonstrated in the Texas Ranch-to-Rail study.<sup>5</sup> Finally, significant negative effects have been reported in regard to cost of gain, feed efficiency, and even yield grade if feeder cattle require one or more treatments for BRD.<sup>1</sup> Average daily gain (ADG), in fact, has the greatest effect on net returns in the backgrounding phase, thus emphasizing the importance of maximizing and maintaining cattle health early in the post-weaning period.<sup>1,4</sup> The impact of preconditioning cattle to achieve the lowest possible disease incidence has implications beyond the cost of the treatment itself, and can heavily affect profitability at the lot level.

The third and final keystone of capturing the value of preconditioning lies in the reputation a producer can gain over time for offering predictable, adaptable, low-health-risk cattle to growyards or feedlots. Buyers and feedlot operators alike are able to assume much less financial risk when procuring successfully immunized calves compared to those of unknown vaccination status, even if they come at a premium.<sup>9</sup> The decreased morbidity, mortality, and treatment costs, as well as the increased performance parameters in program cattle, confirm that 45-day animal health protocols account for the premiums paid for this class of cattle.<sup>9</sup> However, communicating the calf health history to buyers and translating the profit potential associated with low-risk preconditioned calves can be a cumbersome challenge that producers face. A 2011 NAHMS survey revealed that feedlot operators largely believed that various preconditioning management practices were extremely or very effective in limiting morbidity and mortality, but also disclosed that they frequently do not receive that information upon calves' arrival.<sup>12</sup> This information gap provides a unique opportunity for veterinarians to serve in a third-party verification role for the rancher. Veterinarians providing verification of preconditioning practices can allow feedlots to make more informed management decisions and set more predictable expectations for cattle with known vaccination history. In turn, cow-calf producer reputations would be bolstered, and perhaps rewarded, with premiums in future years.

### **Timing of Preconditioning**

In addition to specific protocols such as vaccinating and deworming, prerequisites for certified animal health programs also tend to include time frames in which the

management interventions must be completed. Retrospective evaluations of the timing of preconditioning practices relative to potential stressor introductions and disease challenges document the importance of timing. The risk of clinical BRD significantly increased if initial and booster viral vaccinations were given less than 14 days apart.<sup>14</sup> Calves revaccinated with an interval greater than 14 days experienced at least a 17.5% reduction in mortality, despite all calves in the study being weaned at least 30 days prior to shipment to the backgrounding yard. Isolating the effect of the days between initial and booster vaccinations may give insight into the metabolic requirements of a calf's immune system following vaccine administration. While an initial interferon gamma immune response from a multivalent MLV viral vaccination may be appreciable as early as 5 days post-vaccination, substantial increases in antibody titers often take at least 14 days to develop.<sup>15</sup> For that reason, care must be taken when aiding producers in building preconditioning protocols to assess not only what practices need to be incorporated but also the most effective vaccination timeline. In order for vaccinations to meet expectations of disease mitigation, they must be administered sufficiently prior to anticipated disease challenge.<sup>3</sup> Fulton et al reinforced this principle upon evaluation of over 400 calves from 24 sources; morbidity at a feedlot was compared relative to on-farm vaccination schedules. Animals exhibiting the greatest levels of morbidity from arrival through harvest were found to have either received a single killed viral vaccination or had received their second killed viral vaccination immediately prior to shipment. Conversely, the animals exhibiting the lower end of mortality rates throughout the feeding period received their last viral respiratory vaccination no less than 3 weeks prior to arrival at the feedlot.<sup>4</sup> It is clear that timing vaccine administration relative to anticipated challenges is crucial to disease mitigation in subsequent production phases, not discounting the limitations of humoral immunity development.

Furthermore, timing of vaccination not only influences animal health but also feedlot performance parameters—most notably ADG. Calves enrolled in a two-dose MLV regimen that received the first dose 15 days before weaning and the second dose 15 days before feedlot entry exhibited significantly greater ADG for the first 75 days of the feeding period as compared to animals on regimens administered either day of weaning and feedlot entry or 15 days postweaning and 15 days post-feedlot arrival.<sup>8</sup> Therefore, the timing of vaccinations in the preconditioning phase not only has a positive impact on health, but can also be used as a management tool with potential to maximize cattle gain if used appropriately.

### **Conclusion**

The multitude of certified health programs and ideologies for preconditioning weaning-age beef calves offers an unlimited number of options for creating functional protocols. Defining individualized producer goals for preconditioning

and using them as a guide to inform management decisions that both improve the bottom line and maximize cattle health are truly the keys to successful preconditioning. Preconditioning can reliably bring a producer significant value. Success lies in the concerted effort between timing, protocol selection, and overall cattle management, but is truly maximized when information is effectively shared through the phases of cattle production. Veterinarians can play a pivotal role in all aspects of preconditioning, from insight on protocols to logistical suggestions to verification of practices, but a baseline knowledge of how to capitalize on the value of preconditioning is an imperative starting point. This may be facilitated by increased utilization of electronic identification and source verification. This could likely result in even greater value for calves enrolled in documented, verifiable, and reliable preconditioning programs.

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