



Preparing For Weaning

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Lesson 6

Introduction

To this point in this Beef Home Study Course, lessons have focused on topics such as calving, biosecurity, and keeping the breeding herd healthy. All of these areas are extremely important, and all the work directed toward them can be wasted if calf weaning is not given proper attention and planning. Because of an under developed immune system, weaned calves are highly susceptible to respiratory and other diseases. Although it will not completely diminish the incidence of sickness in newly weaned calves, a well-planned and executed weaning management program can go a long way in keeping calves healthy during this stressful time. When you consider all that may be affected by weaning management, such as cow breeding efficiency, cow and calf feed utilization, calf health and subsequent feedlot performance and carcass merit, and overall profitability of the cow/calf enterprise, there is no doubt that calf weaning is a critical management practice. Many different weaning strategies and calf health programs are available, and this lesson will focus on these different strategies and other practices that will help in preparing for calf weaning.

Getting Started With Pre-Weaning

When determining when, where, and how to prepare calves for weaning, think of the goal of any weaning program: To maximize immunity before calves are faced with a challenge. Pre-weaning could begin as early as two months of age or as late as a couple weeks prior to weaning. At this time, calves should be vaccinated with 4-way virals (IBR, BVD, PI-3, and BRSV). Each of these viruses can be very dangerous to calf health, and they often work together to cause damage to lung tissue which will decrease a calf's ability to grow. This will result in poor performance in replacement breeding animals and poor growth and carcass performance in calves destined for a feedlot.

Vaccination against bacterial respiratory pathogens *Pasteurella*, *Mannheimia*, and *Histophilus* may also be administered at the same time as the viral vaccines particularly if cattle are destined to go to a feedlot. Vaccinations against clostridial organisms such as tetanus, blackleg, botulism, overeating disease, or redwater may also be given at this time and should provide life-long protection unless you live in an area or region with known clostridial problems. In these cases, a booster at or before weaning may be necessary.

Many cow/calf producers are currently taking advantage of vaccination programs such as the VAC 24, VAC 34, or VAC 45 programs (Table 1). The VAC 24 and 34 programs

recommend a 7-way clostridial vaccination, a 4-way respiratory viral vaccine, and a *Mannheimia* vaccine at either 2-4 months of age (VAC 24) or 3-4 weeks pre-weaning (VAC 34). The VAC 45 program is a more intensive vaccination program that requires a 7-way clostridial vaccination, a 4-way respiratory viral vaccination, and a *Mannheimia* vaccination 2-4 weeks pre-weaning, with a booster or revaccination of the 4-way and *Mannheimia* at weaning. An alternative to revaccination at weaning would be to revaccinate prior to weaning (2-4 weeks after the initial vaccination) to allow immunity to develop before the high-risk event of weaning. This, however, will add labor and an extra trip through the chute for the calves, and may not be worth the added effort for many producers. An added requirement for the VAC 45 program is a 45-day (or more) post-weaning backgrounding program.

Castration and dehorning should occur well ahead of weaning, preferably at three months of age or earlier. If this is not possible, these practices can be performed at the same time as the initial vaccination. These practices should definitely not be performed at weaning. As for deworming for internal and external parasites, this should occur in early to mid-July for spring-born calves and at the beginning of grazing for fall-born calves.

Table 1. VAC 24, 34, and 45 vaccination programs and requirements.

Program Type	Program Name	Vaccination Requirements and Timing			
		Clostridial 7-Way	4-Way Respiratory Viral Vaccine	<i>Mannheimia (Pasteurella)</i> Vaccine	Other Requirements
Pre-conditioning programs	VAC 24	2 to 4 months of age	2 to 4 months of age	2 to 4 months of age	
	VAC 34	At branding or 2 to 4 weeks pre-shipping	2 to 4 weeks pre-shipping	2 to 4 weeks pre-shipping	
Weaned calf programs	VAC 45 Option 1	At branding or 2 to 4 weeks pre-weaning	1) 2 to 4 weeks pre-weaning 2) Revaccinate at weaning	1) 2 to 4 weeks pre-weaning 2) Revaccinate at weaning	Weaned at least 45 days prior to shipping (beginning at weaning)
	VAC 45 Option 2	At branding or weaning	1) Vaccinate at weaning 2) Revaccinate according to label instructions	1) Vaccinate at weaning 2) Revaccinate according to label instructions	

Selecting a Weaning Strategy

Regardless of what strategy cow/calf producers choose for weaning calves, a certain amount of stress is involved. The key, therefore, is to select and plan a weaning strategy that will minimize the stress on the cow, the calf, and the producer. There are many options available for weaning calves, but not all of these options will be available to all producers. The choice of weaning strategy will depend on many factors, including facilities, available feedstuffs, pasture condition, cow condition, and marketing strategy. Some weaning strategies will be further discussed here and in Table 2.

Traditional Weaning. The traditional strategy of weaning calves at 6-8 months, or approximately 200 days of age, is still very common and can be used effectively. In many cases these calves will be weaned off of a pasture and into a drylot. When this occurs, the stress brought on by weaning coupled with the adaptation to a new environment and the potential for dust from dry pens and dry feedstuffs can lead to an increase in respiratory disease incidence in newly weaned calves. To avoid this, drylot pens should be clean, well-drained pens with plenty of water trough space. Because newly weaned calves may not be accustomed to water troughs or feed bunks, bunks should be placed perpendicular to perimeter fences so calves find them as they are walking the perimeter of the pen. For at least the first night after weaning, water troughs should be allowed to run over to draw the attention of calves to the trough. Calves should be allowed 18-24 inches of bunk space/head, and enough bunk space should be available so all calves can eat at the same time. Water troughs and feed bunks should be at a height where they can be easily accessed by all calves; generally this will be a height of about 18 inches or less. To decrease the amount of dust created by excessive fence walking that may occur with newly weaned calves you can either water down pens daily or limit the number of calves in the pen to 50-60 head/pen and about 100 square feet/calf for the first week after weaning.

Pasture Weaning. Pasture weaning involves allowing calves to remain on a familiar pasture while moving their dams to a different pasture. This method is lower stress than weaning in a drylot, and can work extremely well if calves are destined to enter a grazing-based backgrounding program. The primary advantage to this system compared with a drylot weaning system is the benefit on calf health. Weight gains in this system will likely be less than a drylot weaning system and depending on the size and facilities available near the pasture, identifying and treating sick calves may also be more difficult. To improve weight gains with this system, creep or bunk feeding on pasture may be utilized with this system. Another disadvantage is the additional pasture space that is needed.

Researchers from New Mexico State University (Mathis et al., 2007) recently compared drylot (traditional) weaning and pasture weaning for 45 days post-weaning. Both sets of calves were weaned at the same time, with one group placed on native range pasture and the other in a drylot where they were offered 10 lbs/head daily of a pellet containing 15.8% crude protein (CP) and 0.50 Mcal/lb. net energy for gain (NEg), and also were offered no more than 2.5 lbs/head of alfalfa hay. Both groups of cattle received identical

mineral supplementation and vaccination programs. For the first three weeks after weaning, calves on pasture had greater average daily gain (ADG) than drylot calves. This was attributed to pasture weaning being a lower-stress method than traditional weaning, and also to time (approximately 13 days) that was taken to get drylot calves to consume the full allotment of pellet and hay. Over the final 3 weeks of the backgrounding phase, drylot calves gained 1.85 lbs/day compared with 0.66 lbs/day for the pasture calves. For the total 45 day backgrounding period, ADG was greater for the drylot calves (1.41 lbs/day) than for pasture calves (1.10 lbs/day) and drylot calves were also 13 pounds heavier (580 and 567 lbs for drylot and pasture calves, respectively).

After the 45 day backgrounding phase, calves were placed in a feedlot and fed a common, high-concentrate diet. Calves that were weaned on pasture initially gained more weight than drylot weaned calves, most likely due to compensatory gain that will often occur with newly arrived feedlot calves that have not previously been on a high plane of nutrition. At the end of the feeding period, however, ADG was not different between the two groups. Looking at the health data of these two sets of calves did show some differences, however. No steers in the pasture weaned treatment died while in the feedlot, while 7.6% of those weaned in the drylot died, primarily due to respiratory disease. Also, 47.6% of drylot-weaned steers were treated for sickness during the feedlot phase, while 34.3% of the pasture-weaned calves were treated. Primarily because of the increased feed costs during backgrounding and increased death loss associated with the drylot-weaned calves during finishing, pasture weaning was more profitable during both phases.

Fenceline Weaning. Fenceline weaning is a variation on pasture weaning in which cows and calves are separated but are still allowed to see, hear, and smell one another. Physical contact may also be possible depending on the type of fencing used. This method reduces stress related to transport, change in environment, and separation from the dam. It also may reduce labor costs associated with traditional calf weaning. The disadvantages again are the requirement for adequate pasture and fencing.

A study at the University of California (Price et al., 2003) found that fenceline weaning resulted in a greater percentage of calves eating feed within the first week post-weaning than either drylot weaning or pasture weaning. This resulted in increased weight gains initially post-weaning compared with traditional and pasture weaning systems, and these gains were still evident ten weeks post-weaning.

Wright and Pruitt (2005) provided a number of suggestions that can assist in fenceline weaning calves. Among their suggestions:

- Fencing should be substantial enough to prevent calves from nursing and keep the pair separated. It is likely during this time that some of the cows or calves will attempt to break through the fence, and therefore either woven wire or electric fence may be necessary. Gerrish (1998) recommends that at least 3 strands of electric fence be used for cows and calves that have been previously introduced to electric fence and five strands for those that have not. Traditional barbed wire (4-5 strands) along with a single electric wire may also be adequate.
- Pasture the cows and calves together in the pasture where the calves will remain after weaning. Calves should spend at least one week in the pasture prior to weaning to become accustomed to fences, water sources, etc.

Forage quality and quantity is very important in this system. Producers should either graze a pasture early in the season to provide for adequate regrowth prior to weaning; harvest hay and then graze the regrowth at weaning; or plant an annual forage to provide additional high-quality forage at weaning.

Early Weaning. Early weaning has gained a great deal of attention over the last few years due to the drought conditions that have affected many areas of the United States. This system generally refers to weaning calves at 3 to 5 months of age rather than the more traditional 6 to 8 months. A recent article by Larson (2007) identified a number of advantages to early weaning:

- Reduced stress on pastures. When calves are weaned and cows cease milk production, forage consumption decreases. This is especially important during dry conditions, as weaning a calf can decrease forage consumption by as much as 50%.
- Improved cow reproduction. By removing a calf from its dam, the nutritional requirements for a cow are decreased and more energy and nutrients can be directed toward gaining condition and preparing for breeding and calving. If a calf is weaned at 60 days of age, the daily energy requirement for the dam is reduced by 37%, while weaning at six months will reduce the daily energy requirement for the dam by 18% (Mathis and Encinias, 2006). Research from the USDA's Fort Keogh Research Lab indicates that pregnancy rates averaged 63% in cows whose calves had been weaned at 80 days compared with 54% in cows whose calves were weaned at 215 days. In addition, the cows whose calves were early weaned conceived, on average, 7 days earlier than cows whose calves were traditionally weaned. Cows in the early weaned group were also 122 pounds heavier than cows in the traditionally weaned group at the 215 day weaning date. This can be especially beneficial if a producer is planning on moving to an earlier calving date.

- Calves weaned early are still benefitting from passive immunity from their dam, while traditionally weaned calves are likely beyond passive immunity but have a still undeveloped immune system. This can result in early weaned calves actually being healthier than traditionally weaned calves. Calves weaned at about 150 days of age tend to have fewer BRD problems than those weaned at 205 days or later (Apley and Hilton, 2003).
- Early weaned calves may also have an advantage over traditionally weaned calves in subsequent feedlot performance. Calves generally become less efficient as they age, so by weaning calves early and feeding calves a moderate energy diet, you are taking advantage of the highly efficient gains that can be realized at this time. In addition, early weaned calves may have higher quality grades than traditionally weaned calves.

Some disadvantages of early weaning are increased requirements for space, and added management of young calves. It may also add costs due to the additional feed required for these calves. These costs, however, may be recovered in the improvements in pasture recovery, cow reproduction, and calf feedlot performance.

Table 2. Advantages and disadvantages of selected weaning systems.

Weaning System	Advantages	Disadvantages
Traditional (drylot)	High post-weaning gains Easy observation of calves Flexibility in marketing	Facility requirements Increased BRD incidence Increased feed required
Pasture Weaning	Reduced stress Reduced sickness	Lower post-weaning gains Pasture required Difficulty in observing calves
Fenceline Weaning	Low stress Reduced sickness	Added fencing Pasture required
Early Weaning	Reduced pasture stress Improved cow reproduction Potential feedlot improvements	Increased management Increased feed costs Facility requirements

Weaned Calf Nutrition

Young, recently weaned calves are in perhaps the most efficient stage of their lives. It is at this time that highly efficient weight gains can be put on these calves, however, if attention is not given to properly starting calves on feed, all the work put into keeping these calves healthy pre-weaning may go to waste. It generally will take a couple weeks for calves to adjust to dry feed after being weaned from milk and it is at this time that the nutrition of the calf must be observed very closely. It is important to start calves out on a feed that they are accustomed to. Creep fed calves can be started on a ration higher in energy than calves that were not creep-fed. Also, at weaning many calves are already consuming some grass, therefore palatable long-stem hay should be fed for at least the first 3-7 days post-weaning.

Because the rumen of newly weaned calves is not prepared to handle large amounts of starch, high-starch containing feeds such as corn and barley should be added to the ration slowly. Some moderate to high energy alternative feeds that may be useful at this time are corn gluten feed, distillers grains, soy hulls, and wheat midds. Corn silage can also be used for starting calves, but calves may need to be adapted to this feedstuff over a period of approximately two weeks. Combining energy feedstuffs with roughages in a total mixed ration (TMR) is beneficial at this time.

Calves should be offered long stem hay at 2% of their body weight on weaning day. For a 500 lb. calf, this would be about 10 lbs of long stem hay/head. On the second day, a TMR should be fed at a rate of 1% (DM basis) of the calf's body weight, or about 5 lbs of dry matter for a 500 lb calf, with free choice long-stem hay also being available. From this point forward, feed intake should be increased by about 1 pound every 2-3 days, and the free choice long-stemmed hay should be phased out so that it is gone by day 7 post-weaning. By the third week on feed, calves should be consuming about 2.5 to 3% of their body weight (DM basis). This equates to about 10-15 lbs of dry matter intake/head daily for a 500 lb calf.

The amount of energy included in the starting ration will depend on the age and size of the weaned calf. Because feed intake will likely be lower in early-weaned, high-stress, or high-risk calves, these calves will require a more nutrient-dense ration than older, healthier calves. Table 3 provides general recommendations for crude protein, energy, and concentrate inclusion for calves in various weight ranges. Because the rumen of newly weaned calves is not fully developed they will not be able to utilize urea efficiently, therefore use of natural protein sources such as corn gluten meal, cottonseed meal, linseed meal, or soybean meal is recommended. Supplements with highly undegradable protein, or feedstuffs such as distillers grains and treated soybean meal may also be useful in starter rations. Vitamin and mineral needs should also be met through a balanced calf starter package.

Because weaning and eventual shipping to an auction or feedlot are both very stressful events in a calf's life the duration between the two is very important. Separating these stressors may improve the chances of calves remaining healthy through both. Many

protocols, such as the VAC 45 program mentioned earlier, suggest that calves be weaned at least 45 days prior to shipment. Three years of Texas Ranch to Rail data measuring the number of days post-weaning prior to shipping show that 9% of calves that were weaned 45 days or more were treated for sickness, while 23% of calves weaned 31-45 days were treated. For calves weaned 14 days or less, 27% were treated. This added treatment for calves results in added medication costs, and could have lifelong impacts on performance and further impacts on carcass quality.

Table 3. Basic nutrient recommendations for weaning rations.

	Calf Weight (lbs)		
	300-400	400-500	500-600
Crude Protein, %	15-16	14-15	13-14
NEg, Mcal/lb	53-55	50-52	48-50
Concentrate, %	70-80	60-70	50-60

Why Do Some Vaccinated Calves Still Get Sick?

It is not unusual that cow/calf producers follow proper vaccination protocols, weaning strategies, and provide proper post-weaning nutrition, yet calves still get sick. Why does this happen? According to Dr. John Wenzel of New Mexico State University (Wenzel, 2007) the most common reasons for vaccinated animals getting sick are stress, improper vaccine type, timing or route of administration, or improper handling of the vaccine. Modified live vaccines, in particular, need to be handled very carefully and kept out of sunlight. All vaccines must be kept cool, even while in use. Even when everything is done correctly, calves may not respond to vaccine, but following proper techniques will certainly increase a calf's response to vaccinations.

Summary

Cow/calf producers go to great lengths to get a calf to weaning. Therefore, to realize the benefits of all of this work, it is important to complete the job and do what needs to be done to wean a healthy calf. When determining what protocols to follow for weaning, remember the goal: To maximize immunity before calves are faced with a challenge. Vaccination is the best method available to respond or prevent a disease challenge, but there is more to keeping calves healthy than just vaccinations. Attention needs to be given to low-stress weaning and post-weaning nutrition as well. When determining what strategy to utilize, consult your veterinarian to determine what is available and what will fit best into your specific situation.

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Notes

7. In a traditional drylot weaning system, what can be done to reduce dust in pens?

8. **True or False.** When weaning on pasture, calves should be moved while cows should remain on the same pasture.

9. List four potential advantages of early weaning compared with traditional weaning.

10. List three reasons why vaccinated calves may still become sick.

PLEASE SEND QUIZ TO YOUR ASSIGNED GRADER UPON COMPLETION

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