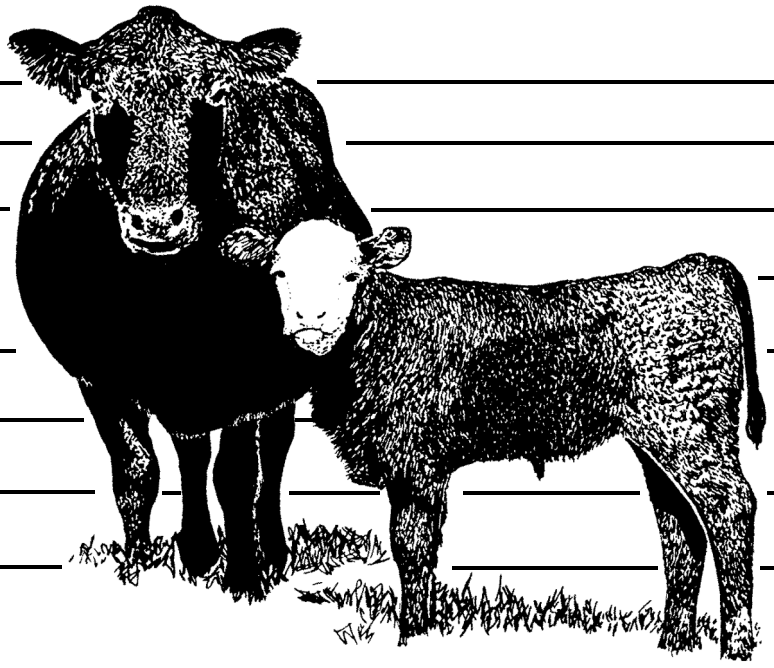
Cooperative Extension Service
The University of Georgia College of Agricultural and Environmental Sciences
The University of Georgia College of Veterinary Medicine

Preconditioning and Receiving Calves



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Introduction

Feeder cattle preconditioning is a management alternative growing in popularity among cow-calf producers. Research has shown that medicine costs and death loss are the most important animal performance measures after feed cost in determining cattle feeding profitability.

For instance, a Texas feed out program shows that healthy preconditioned calves are worth $12 more per hundred weight than calves that get sick. Calves that do not get sick have been shown to gain faster, convert feed more efficiently, and have higher quality grades than calves that become sick at the feedlot (Table 1). The program also found that steers without lung lesions return about $74 more than steers with lesions and active lymph nodes.

Table 1. Effects of sickness on performance, carcass characteristics and net return.

Item	Healthy Calves	Sick Calves
Treatment cost, $/head	0.00	27.03
Daily gain, lb	2.99	2.67
Net return, $/head	67.32	-20.28
Choice or higher, %	39.6	27.5

Source: Texas A&M Ranch to Rail

Because healthy calves are worth more to buyers, many are willing to pay more for healthy calves or pay less for cattle about which little is known. In recent years, preconditioned feeder cattle marketed in truck load lots have consistently brought $3 to $10/Cwt more than the Georgia weekly average auction price for that particular week. As this trend continues, it is very possible that cattlemen will eventually have to precondition their calves if they want to market them without being subject to substantial discounts.

Preconditioning and Receiving Programs

Preconditioning Defined

Although many people consider a preconditioning and a receiving program for weaned calves to be the same, the two are actually different. Both programs involve many of the same recommendations, but preconditioning means the preparation of calves to reduce stress during the initial receiving period at a feedlot or backgrounding lot. Receiving refers to the handling of calves to overcome shipping and other stress and allow them to adapt quickly to a new feeding program. Cow-calf producers would use a preconditioning program, and a stocker or feedlot operator that purchases cattle would use a receiving program. Obviously, a combination of the two programs produces the best results.

Preconditioning Spreads Stress

All calves are exposed to stress during weaning and shipping prior to entering the feedlot or backgrounding lot. Calves are exposed to many stress factors during this process. These stress factors may be physical stress like weaning, diet changes, water source changes, castration, dehorning, vaccination and deworming. There are also emotional/psychological stress factors like the absence of mother, commingling with unfamiliar animals and new environment. During their lives, most calves must go through all of these stress factors.

The goal of preconditioning is to make sure all of the stress factors do not occur at the same time. Any time a calf is stressed, either physically or psychologically, it releases cortisol as a response to the stress. Cortisol reduces the calf's ability to fight disease by making its white blood cells less active. Once released, the cortisol remains in the calf's body for several days. This makes calves more likely to get sick with pneumonia or other diseases. Each of the stress factors cause a release of cortisol, and this release is additive. In other words,

calves would have twice the level of cortisol (and twice the reduced ability to fight disease) if weaned and castrated the same day. Adding other stress factors such as vaccination, feed and water adjustment, and dehorning will increase cortisol even more and further reduce the ability to fight disease.

The principle of preconditioning is to take all of the stress factors and spread them out so the level of cortisol release is never too high at any one time. Castrate and dehorn before 60 to 90 days of age and wait until 2 to 6 weeks before weaning to vaccinate. This will give the calf time to reduce the cortisol level to normal before weaning. The calf is boostered and dewormed at weaning. Then the calf is weaned and started on feed for 45 days before it is shipped. The calf has had all of the "normal stress," but the stress was spread out, reducing the buildup of high cortisol levels at any one time. Additionally, the calf is well vaccinated, de-wormed and protected from disease when it enters the feedlot or backgrounding lot. These preconditioned calves are more likely to quickly go on feed with a mini-mum of sickness and treatment costs.

Preconditioning Home Raised Calves

A great deal can be done to avoid the losses that can occur when calves are sold and transported the day they are weaned. Preconditioned home raised calves describes calves that are weaned 45 days or more, immunized, dewormed, dehorned, castrated, and adapted to eating feed from a bunk and water from a trough before they leave the farm where they were born. The cost of doing these procedures must be offset by higher sale price of the calf. Research has shown that 45 days are needed for calves to gain enough weight to cover the costs of feed and pharmaceutical products. This should allow sufficient time for calves to recover from the stresses of weaning, which will greatly decrease sickness and death loss after shipment. Preconditioning can be beneficial due to increased weight gain, reduced shrink when shipped, improved feedlot performance and reduced feedlot sickness and death loss (morbidity and mortality), and improved sale price.

Castration and dehorning are mandatory and should be done as early as possible in the life of the calf. Do not wait until calves are weaned to do these procedures. Calves were shown to gain 0.5 lbs less per day during the preconditioning period when castrated at weaning versus prior to weaning. It is mandatory that calves be taught to eat concentrate feed from a bunk. This can range from two pounds of a protein supplement per day to feeding a complete diet in a drylot situation. Costs of available feed resources and desired performance will dictate the feeding program. Feeding programs are discussed in detail in the feeding section. Weaned calves need about 10 to 14 days to return to initial weights at weaning. Calves should be gaining weight the remainder of the preconditioning period.

Weaning Methods

Any management practice that reduces stress after weaning should reduce sickness risks and improve calf weight gain. If a drylot is used, smaller pens are preferable to reduce walking. It is best to either leave calves and cows in close contact, or far enough apart where they cannot hear each other bawling. The least desirable alternative is to leave them far enough apart to see and hear each other, but not have close contact. Place feed troughs perpendicular to the fence to discourage walking and keep calves in close contact to feed to encourage consumption.

Fence line weaning is another method that has become more popular in recent years. This involves leaving cows and calves in adjacent pastures and separating them by an electric fence on each side of a barbed wire permanent fence. Cows and calves will usually quit bawling after three days. The advantage of this system is that cows and calves are in close contact to one another and calves are weaned in a familiar, clean environment.

Another method is to clip a plastic anti-nursing device in the nose of the calf to prevent nursing. The device does not inhibit the ability to graze, eat feed from a bunk, or drink. Calves should wear the anti-nursing device for four to ten days prior to weaning. The device will virtually eliminate post weaning bawl-ing and will greatly reduce the distance calves walk each day. In addition, calves fitted with the anti-nursing devices spent 30 percent more time eating than tradi-tionally weaned calves. The one disadvantage is that calves must be handled a few days prior to weaning to place the device in the nose of the calf.

Receiving Programs for Purchased Calves

Cattle should be delivered to the receiving facility as quickly as possible from the purchase point. Buy only the number of cattle within a week or less that can be handled at one time. Do not buy more calves than can be worked in one day. Consider cattle bought in one week's time as a group, pen them separately, and maintain them as a separate group. Make sure working facilities are adequate and ready for receiving calves. Place calves in a small area to minimize the amount of

time calves spend walking fence lines. Allow calves time to rest prior to processing. Calves should be processed in the morning following the day they are received to allow time to rest and to avoid heat stress.

Newly weaned calves typically have not been fed any grain and have never eaten feed from a bunk. Feed intake of these calves is often very low, and the dietary components must be concentrated in the diet to offset low feed intake. Intakes may average about 1.5 percent of body weight during the first two weeks after arrival of lightweight feeder cattle. Low nutrient intake leads to greater risk of respiratory disease. In most situations, feeding low energy feeds or bulky feeds increases feed intake until physical capacity becomes limiting. In a stressed calf, this intake pattern is reversed. Intake of low energy high roughage diets is less than that of high energy grain based diets. Because of this eating pattern, calves often perform better when fed a higher concentrate (>60 percent concentrate) receiving ration.

Adequate feed mixing and milling facilities are needed to implement the use of high concentrate complete receiving diets. An excellent alternative is whole shelled corn plus a protein/mineral supplement and hay. For smaller producers, corn and supplement can be mixed by hand in the bunk and hay spread on top of the grain. Research has shown this option to be as effective as a completely milled feed.

Feeding Light-Weight Calves

Calves in this category typically weigh less than 400 pounds. These are usually young calves or calves that have had poor nutrition and are highly stressed. Calves in this weight group need a nutrient dense diet. Young calves cannot eat enough of a high roughage diet to meet their energy needs, and must be fed a concentrate based diet at receiving. These diets will contain from 60 to 80 percent concentrate and approximately 16 percent crude protein. Use natural sources of protein such as soybean meal and cottonseed meal and avoid using urea as a protein source. The diets must include adequate amounts of protein, energy, roughage, minerals, and vitamins. The diets listed in Tables 2 and 3 can be used. The diets in Table 2 are designed to be fed in a self feeder. The diets in Table 3 are designed to be fed each day at approximately 2.4 percent of body weight.

Table 2. Preconditioning diets for free choice feeding.

Ingredient	Percent of diet (As-fed)			
Corn	31.0	55.0	22.0	32.5
Cottonseed hulls	30.0	25.0	20.0	25.0
Cottonseed meal	14.0	14.5	8.0	7.0
Soybean hulls			25.0	
Corn gluten feed				30.0
Wheat middlings			25.0	
Oats	20.0			
Molasses	4.0	4.0	3.5	4.0
Limestone	0.5	1.0	1.0	1.0
Trace mineral salt	0.5	0.5	0.5	0.5
Vitamin A, IU/lb	3500	3500	3500	3500

A commercial mineral supplement containing salt, minerals, vitamins and ionophore may be provided free-choice if individual ingredients cannot be mixed on the farm.

Table 3. Preconditioning diets for limit feeding[a]

Ingredient	Percent of diet (As-fed)			
Corn	57.9	55	28.4	40
Cottonseed hulls	15	15	15	15
Cottonseed meal		16	15	15.2
Soybean hulls			40	
Corn gluten feed	25			
Whole cottonseed		12		
Oats				28
Limestone	1.5	1.4	1	1.2
Trace mineral salt	0.6	0.6	0.6	0.6
Vitamin A, IU/lb	4500	4500	4500	4500

[a]Feed the diets at approximately 2.4% of body weight per day to achieve daily gains of 2.0 to 2.5 lbs. A commercial mineral supplement containing salt, minerals and vitamins may be provided free-choice if individual ingredients cannot be mixed on the farm.

Mineral and Vitamin Nutrition

Mineral deficiencies and imbalances can cause suppressed immune function and reduced calf performance. Diagnosing mineral deficiencies is difficult, and most calves that are deficient will not show obvious clinical signs. Copper, zinc and selenium are the most important minerals affecting immune function.

Supplementation of all these minerals has effectively decreased respiratory disease of newly weaned calves, but the results have been inconsistent. Forages in Georgia are often deficient in both selenium and copper. Mineral deficiencies, however, are often very localized, and each farm may have a different mineral deficiency. Feed calves increased levels of these minerals if they are known to have a deficiency. However, increasing levels beyond compensation for known deficiencies is not recommended. In addition, forages, supplements and water that have high concentrations of sulfur or iron can interfere with copper absorption and have a nega-tive effect on the immune system. Higher concentrations of copper and feeding grain supplements low in sulfur content may be warranted. Forage and water must be tested prior to making any dietary changes to account for a copper deficiency.

Increasing concentrations of minerals and vitamins may be effective when feeding highly stressed calves. Potassium is recommended at 1.2 to 1.4 percent of diet dry matter in highly stressed calves. Zinc has been shown to be beneficial at 75 ppm and copper at 15 ppm of diet dry matter. Selenium can be effective when fed at 0.3 ppm of the diet if cattle originate from a selenium deficient area. Vitamin E has been shown to reduce sickness when fed at 400 to 1200 IU per head per day. The primary problem with mineral and vitamin deficiencies with newly weaned calves is low feed intake. Therefore, increase concentrations of all minerals and vitamins to compensate for low feed intake. Feeding beyond this level has not shown a consistent positive response on health and performance.

Some studies have shown positive responses to trace mineral supplementation when calves were supplemented prior to weaning as well as after weaning. If deficiency of a particular mineral is known, then feeding increased levels of the mineral prior to weaning is advisable. Feeding the mineral before the stress begins should reduce post weaning morbidity.

Management Practices to Increase Uniformity and Add Value

Duration of Calving Season

Implementing a defined calving season (90 days or fewer) will enable all calves to be weaned at the same time. This will produce a more uniform calf crop, improve timely cattle management, greatly reduce labor costs, allow the purchase of feed in larger cheaper lots, and increase marketing options.

Castration and Dehorning

Castration should be done as early in the life of the calf as possible. It is a good idea to castrate and implant the calf soon after birth. Calves castrated at weaning have been shown to have 0.5 pounds per day lower gains than calves castrated before weaning.

Dehorn calves at least four weeks prior to weaning to allow time to heal. Dehorning is important in reduc-ing the amount of bruising that occurs in the feedlot. Castration and dehorning are added stressors that must be avoided during the weaning and preconditioning process.

Implanting

Implanting will usually produce a positive return on the investment unless a premium market exists for non-implanted calves. Calves can be implanted as early as birth and it should be done at castration regardless of age. It is advisable not to implant heifers that will be retained as replacements. Never implant a non-castrated bull calf. Calves can be implanted at birth or soon after. A second implant can be given about 90 to 100 days before calves are marketed. Do not wait until weaning to implant calves. The latest this should be done is at the time pre-weaning shots are given, two to six weeks prior to weaning. Be sure to follow implant label direc-tions.

Feeding Considerations

Creep Feeding

Creep feeding introduces the calf to eating grain from a feeder. Calves will begin eating feed more quickly after weaning, and weaning stress will be reduced. Consider creep feeding cost versus added gain before adopting this practice. Consider less stress and sickness during the preconditioning period an added benefit. Do not, however, creep feed heifers that will be retained as replacement heifers; creep feeding will reduce future milk production and the added weight due to creep feeding may not be retained at breeding time.

Choosing a Feeding Program

Gains during the preconditioning period will depend upon how quickly calves begin to eat, amount of feed consumed, diet energy level, body condition and health of calves. The feeding program chosen will be dependent upon feed costs and availability, cattle age and weight, and plans for the cattle. The nutrition program

will make up 60 to 70 percent of the preconditioning budget and will greatly influence the preconditioning program's economics. The nutrition program will be influenced by cattle source, feedstuff cost and desired growth rate. The goal should be to produce added weight gain at a low cost and maintain healthy calves. If calves are properly managed, their gain during the preconditioning period should pay for the preconditioning cost.

Water

Provide clean fresh water at all times. If calves are not familiar with water troughs, use a drip system so the calves can hear the water, which may entice them to drink. Use small troughs if calves are weaned in hot weather. Small troughs will have to be refilled more often and the water will stay fresher and cooler. Also, it is important to provide adequate shade during hot weather.

Bunk Management

Research has shown that using a bunk management system can reduce waste and dramatically improve daily gains and feed efficiency when calves are fed a feedlot type (80 to 100 percent grain) ration. Calves need a minimum of 14 inches of feed bunk per calf and a minimum of 200 square feet of feedlot space per calf.

Following two simple rules should keep cattle eating a consistent amount each day. The first rule is to not increase feed until two consecutive days pass where no feed is left in the bunk. Also, do not decrease feed unless 25 percent or more of the feed is remaining. The second rule is to never increase or decrease the feeding amount by more than 10 percent at one time. Observe the bunks at the same time each day.

In addition, feed must be accurately weighed to determine how much feed to offer the calves each day. Bunk management is equally important whether using self feeders or hand feeding a few pounds each day, as delivering a balanced diet and minimizing waste is a component of bunk management. Knowing how much feed the cattle are consuming on a daily basis is key to making feed deliveries the next day. Record this information every day and use it to adjust feeding amounts. Obviously, accurately weighing the feed each day is critical to a bunk management system.

Many of the bunk management principles apply to self feeders. They cannot be filled with feed and then forgotten. Check feeders on a daily basis. Check to see if fines are building up in the bottom of the trough. Fines are a major cause of bloat and are not palatable to cattle. Make sure feed is flowing in the feeders, and never let cattle run out of feed. Cattle will overeat when the feeders are refilled, and this can lead to acidosis. Make sure to clean out any spoiled feed, which is especially important in wet weather. Do not let stale feed build up in the bunks over time. When this feed is cleaned out and fresh feed is available, cattle may engorge themselves, leading to severe digestive problems.

Feed calves at approximately the same time every day. Calves should be hungry at this time each day, and sickness can be detected when calves do not come up to eat or are very slow coming to the bunk. Calves can usually be fed once per day, but they may need twice per day feeding in rainy weather. Clean bunks each day and remove feed that is stale, spoiled and/or wet, and remove any fines or trash.

Feed Form

Calves will not eat dry dusty feed with a lot of fines in it. Provide coarsely ground or whole grain and hay that is not ground. Cottonseed hulls are an excellent roughage for newly weaned calves and will stimulate intake. Unpalatable feed will decrease intake and lead to lower than desired gains. Adding a molasses supplement to dry, dusty feed will reduce fines and increase palatability.

Weight Gain

Calves will usually lose weight the first week after weaning. Calves begin to gain their second week and will generally regain to their weaning weight 10 to 14 days after weaning. Weight gain is very difficult to predict for preconditioning calves. Some of the major factors affecting weight gain are:

1) Health — Healthy calves will eat more and gain faster than sick calves.
2) Previous level of nutrition — Calves that are in fleshy condition will gain less after weaning than a calf that is in thin to moderate flesh condition. Calves raised by heavy milking cows and grazing high quality pasture will be fleshier at weaning.
3) Forage nutrient content — Both pasture and hay varies greatly in nutrient content. Increasing quality of forage will lead to increased intake and greater gains.
4) Feed additives and implants —Using an implant and ionophore during the preconditioning period will improve daily gains and feed efficiency.
5) Diet energy level — Higher energy diets will produce greater gains.

Low Gains (less than 1.5 pounds per day)

Low gains will be desirable if calves are going to be stockered on pasture following preconditioning. Target gains for theses calves at 1 to 1.5 lb per day. Hay or pasture plus a 0.5 to 1 percent body weight of supplement will be the choice of most producers. Average quality hay or poor quality pasture will not support gains of more than 1 pound per day. Feeding average quality hay plus 2 to 3 pounds of a high protein (20 to 30 percent) grain supplement will promote gains of 1.0 to 1.5 pound per day. The total diet should contain at least 13 to 16 percent crude protein. Higher crude protein levels are needed immediately after weaning when feed intake is low. Once calves begin to eat, the protein level can be decreased. Test hay for nutrient content to accurately balance the diet for protein. The level of supplemental feeding will greatly depend upon forage quality.

Moderate Gains (gains of 1.5 to 2.5 pounds per day)

Most producers preconditioning calves for sale within 60 days after weaning will choose a feeding program that targets gain around two pounds per day. For gains of 1.5 to 2.5 pounds per day, a grain based diet or high quality pasture/hay plus supplement will need to be fed. Hay plus concentrate will be the choice of most producers.

At weaning, begin feeding a dry concentrate feed at 0.5 percent of body weight. Once calves are eating this amount of feed, slowly increase the feed amount by 0.5 to 1 lb per head every day plus free choice hay or high quality pasture. If calves are eating all the supplement in a few hours, increase the feeding amount by 1 lb per day. If the calves take most of the day to eat all of the feed, then increase at 0.5 lb/day. If feed is left in the bunk the next day, do not increase the feeding amount. If most of the feed is dusty and fine textured, however, poor palatability may be limiting intake. Clean this feed out and adjust diet by adding an agent such as molasses to reduce dustiness and increase feed consumption.

When all calves are consuming grain, the hay feeding amount can be reduced. It is a good idea to keep feeding 0.5 percent of body weight of good quality hay to prevent over-consumption of grain and help curb any digestive problems. All preconditioning diets must be palatable because low feed intake is a primary concern.

Excellent quality hay plus a protein/energy supplement (20 percent protein) fed at 1 percent of body weight will provide adequate gains that can exceed 2 lbs per day. Hay must be tested for nutritional content before being labeled as excellent. Assume hay is low quality if a nutrient analyses is not completed.

When feeding supplemental grain at levels greater than 0.75 percent of body weight, consider using by-product feedstuffs. Feeding by-products such as soybean hulls, corn gluten feed and wheat middlings will have less of a negative effect on forage digestion when compared to corn or wheat. However, limit corn gluten feed to 35 percent of the diet to avoid decreases in daily gains. Soybean hulls usually provide the most desirable gains when fed at high (greater than 1.25 percent of body weight) levels.

High Gains (greater than 2.5 pounds per day)

Gains of greater than 2.5 pounds per day will usually require a grain based diet. Gains may be possible with very high quality hay fed at 50 percent or less of the diet. However, gains of greater than 2.5 pounds per day will usually be accomplished with high grain, low roughage diets. Several example diets are listed in tables 2 and 3 (page 5. The diets in Table 2 are designed to be fed in a self feeder. The roughage level must be increased to prevent digestive disorders and also to limit the amount of grain calves are consuming each day. Consumption of these diets should level off at 3 to 3.3 percent of body weight. Expect gains of 2.0 to 3.0 pounds per day on the following diets. The diets in Table 3 are designed to be fed each day at approximately 2.5 percent of body weight to achieve gains of approximately 2.5 pounds per day.

You must use good bunk management practices to avoid severe digestive disorders such as bloat and acidosis when feeding the diets in Table 3 to achieve maximum intake. If diet ingredients are homegrown or can be purchased in truck load lots, costs can be lower than more traditional hay supplement weaning diets. Obviously, feed storage and a means of mixing the ingredients will be required.

Silage Based Diets

Silage may be an option for some farms with the available land and equipment to produce silage. The majority of silage harvested is either corn or sorghum silage.

Corn silage is high enough in energy to support gains of 2 to 2.5 lbs per day with only a protein and mineral supplement. A feed analysis is essential to determine the amount of supplemental protein required.

Forage and grain type sorghum is 10 to 20 percent lower in energy than corn silage, respectively. Addi-

tional energy supplementation with grain is needed to achieve gains similar to corn silage diets. Diets consisting of 80 percent sorghum silage, 15 percent grain and 5 percent protein supplement are usually recommended. It is critical to determine dry matter and protein concentration of silage prior to balancing a diet using these feeds.

Feed Additives

Feed additives used in preconditioning rations commonly include ionophores, coccidiostats and antibiotics. Antibiotics are usually recommended in receiving diets for purchased calves but are usually not necessary for home raised calves. Calves may be fed an antibiotic or coccidiostat for the first two weeks after weaning and then fed an ionophore the remainder of the preconditioning period.

Additives do not replace good management. Feed additives are required in very small quantities and should be mixed into the feed by a professional feed mill. Read feeding instructions carefully to ensure adequate amounts of the antibiotics are fed to achieve desired effects. In addition, feed additives are not always cleared to be fed together.

Health Program

Introduction

A sound health program is the central component of a preconditioning program. The major cause of sickness and death in stocker and feeder calves is feedlot pneumonia, often referred to as *bovine respiratory disease*. Bovine respiratory disease (BRD) is caused by a combination of factors that cause pneumonia. First, cattle are stressed and the stress causes a release of cortisol. If the level of cortisol becomes too high, the immune sys-tem of the calf is depressed. When this occurs at a time when the calves are exposed to new viruses, the calf becomes infected with the virus.

Viruses have the ability to further destroy the calves' ability to resist infection; then bacteria, that may normally be in the calf's upper respiratory tract, can get into the lung and cause severe pneumonia (BRD). The process that leads to BRD involves a depressed immune system caused by stress and exposure to viruses and bacteria that the calf has no immunity against. So a good health program involves stress reduction through preconditioning, increased immunity through vaccination, and decreased exposure to new viruses and bacteria. Managing cattle to reduce stress at shipping and during the first few weeks in the feedlot are critical to avoiding sickness and death loss. Preconditioning spreads out stress so calves do not have too much stress at any one time, particularly at the critical time of entry into the feedlot. Commingling or crowding of cattle at the wrong time may cause stresses that decrease immunity and expose cattle to new viruses and bacteria.

Management at Calving

Managing cattle to reduce disease for the stocker and feedlot phase begins before the calf is weaned. At birth, passive immunity occurs through transfer of immunoglobulins in the colostrum. This must occur within the first few hours after birth. For calves to consume adequate amounts of good quality colostrum, the cows must be in a good nutritional state as indicated by their body condition. Then the calf must consume adequate amounts of colostrum. Calves that are chilled or calves that must be pulled are less likely to consume or absorb adequate amounts of colostrum, and force feeding colostrum may be beneficial to these calves.

This poor start in life is long-lasting, and calves that have inadequate amounts of immunoglobulins from colostrum in their blood at 24 hours of age are three times more likely to be treated for respiratory diseases during the feedlot period.

Nutrition and Environment

Nutrition plays a major role in proper herd management procedures to control disease. The major feed constituents of proteins and carbohydrates are needed to build immunity in cattle. Micro-nutrients like copper, selenium, zinc and vitamin E are necessary to produce an immune response.

Worms contribute to poor nutrition and cause decreased immunity. When worms drain the nutrition from cattle, cattle are more susceptible to disease.

Heat stress is another major factor in disease resistance. Cattle vaccinated during extremely hot weather will not respond to vaccinations as well. Heat stress causes the release of cortisol in cattle that suppresses the ability of the immune system to respond to disease. In addition, certain infections will cause a decrease in the resistance of cattle. Bovine Virus Diarrhea (BVD) is "immuno suppressive" and makes cattle more likely to get other infections. We can enhance the natural resistance of cattle through management procedures that minimize stress and crowding, proper nutrition and biosecurity.

Immunization

Disease resistance can also be developed in cattle through active immunization. This is when cattle are exposed to a specific virus or bacteria and they develop their individual immune response (resistance) against that specific virus or bacteria. Through this process, cattle develop antibodies to specific bacteria or viruses. It is important to emphasize that cattle are protected by vaccination only to those viruses or bacteria that are in the vaccination program. Immunity to a specific disease can be affected by a vaccination only if the total program is effective. In order for immunity to protect cattle, the necessary viruses or bacteria must be effect-ively vaccinated against. A suggested list of vaccina-tions and a schedule of vaccination times is listed below.

Vaccination Schedule

Calf preconditioning management and vaccination schedule suggestions: (These are suggested procedures. The local veterinarian may be able to give more specific recommendations. Also, check with market personnel, as these procedures may vary because of specific marketing arrangements and product label.)

1) At Calving — ID, record cow ID and birth date, dehorn (paste or heat), castrate and implant bull calves; if the herd has a Blackleg problem – 7-way Clostridial and Pasteurella.
2) Breeding Season — Turn bulls in with cows for a limited breeding season of 60 to 90 days. Two to six weeks before weaning (calves 4+ months old), re-implant all calves except heifers to be saved for replacement, vaccinate for IBR, PI3, BVD, BRSV with a Modified live product approved for use in calves nursing pregnant cows, a 7 way Clostridial and Pasteurella.
3) At Weaning (calves 6 to 8 months old) — Calves revaccinate IBR, PI3, BVD, BRSV with a Modified live product and Pasteurella, pour for lice, deworm, re-implant calves that will be kept for 45 days or more, except replacement heifers. Wean calves 45 or more days before they are marketed.

Handling and Storage of Vaccines

Proper vaccine handling is important to assure effectiveness. Vaccines that have not been stored at the proper temperature become ineffective. A bottle of vaccine left in the sun for a short period of time will ruin. Detergents and disinfectants used to wash the syringes will kill the modified live vaccines and reduce the effectiveness of the killed vaccines. Even small residual amounts of antibiotics or other vaccines left in a syringe will kill modified live vaccines and reduce the effectiveness of most killed vaccines. Use syringes that are clean but have no residual amounts of other vaccines, antibiotics, vitamins, detergents or disinfectants left in the syringe.

Treating Sick Calves

No matter how good the preconditioning or receiving program, some calves are likely to get sick. A successful program for treating sick calves must be simple and systematic. Treatment of sick calves starts at processing and continues until the calves are sold. Most problems with sickness will be eliminated by the end of the receiving period. A minimum of stress and sickness should be experienced from that point forward.

Detecting Sickness

Visible Signs: The best time to observe cattle for visible signs of sickness is at the morning feeding. Cattle on limited feed should immediately come to the feed bunk. Closely observe those cattle that are slow to come up to the bunk or refuse feed for visible signs of sickness. All cattle with definite visible signs of illness should be considered sick regardless of temperature. Visible signs might include depression, severe runny nose, droopy ears, dull eyes, labored breathing, deep coughing, off feed or bloody diarrhea.

Temperature: The best time to check temperature is early in the morning. Do not check temperatures immediately upon delivery because the calves are likely heated from the stress of shipping, and the reading will not be accurate. Cattle with a rectal temperature of 104 degrees F or greater should be considered sick regardless of visible signs.

Isolation of all sick calves as soon they are identified, will reduce the spread of disease to the remaining healthy calves. Grouping visibly sick animals together will also make them easier to observe and will eliminate competition for feed by healthy animals.

Treatment Protocols

The correct diagnosis of the problem is vital to the successful treatment of sick cattle. The local veterinarian is the best source of information about diagnosis of disease, treatment methods and products.

Preconditioning Economic Considerations

Introduction

There are numerous ways that preconditioning can be profitable for producers. For producers who choose to market their calf crop as stocker or feeder cattle, preconditioning can reduce shrink, thus increasing net pounds marketed when compared to calves sold straight off the cow. Preconditioned calves also often bring price premiums as well as giving producers additional pounds to market. Finally, preconditioning calves provides cattlemen the opportunity to retain ownership through the finishing phase if they so desire.

Costs and Returns

As with any value added program, the additional revenue generated by preconditioning must cover not only the cost of preconditioning but also cover the initial value of the calf before the preconditioning program. Thus, the first step in examining the econo-mics of preconditioning is to develop a preconditioning budget. At a minimum, the budget should include the cost of feed, vaccinations and implants, order buying, death loss, and interest. If the cattle are to be sold fol-lowing the preconditioning program, then the calf value before entering the program should be included. An example budget using a moderate rate of gain ration (2.0 lbs. ADG) is presented in Figure 1.

Properly merchandised preconditioned calves can bring premiums of $3/Cwt to $10/Cwt when compared to non preconditioned calves of the same type and weight. Depending on the length of the preconditioning program, these calves may weigh considerably more than they did at weaning. As a result, their overall price per pound may be the same or lower than the price they could have been sold for as weaned calves. Thus, it is important for producers to look at the change in total value not the change in price from preconditioning.

Aside from increases in calf value, the biggest factors affecting preconditioning profits are cost of the program and average daily gain. Because it is impossible to look at all of the factors at one time, several sensitivity tables are presented on the following pages that show the impacts of each of these factors on profits or breakeven prices.

In Table 4 (page 12), the impacts of price differences and program costs on profits are shown. The numbers in the table show the net returns after accounting for program costs and changes in value. For instance, a producer who preconditioned calves for 45 days at a cost of $55 per head would net $21.50 per head if receiving the same price per pound after preconditioning as at weaning. If the price is $3.00/Cwt more, the producer would make $39.20. Even if the price were $3.00/Cwt less the producer would still net almost $4.00 per head more.

Figure 1. Example Preconditioning Budget, Moderate Rate of Gain, 2 lbs/day

Number of Calves = 30

Item	Units	Number of units	$/Unit	Cost/Head	Total Cost
Calf value	Cwt.	5.00	$90.00	$450.00	$13,500.00
Order buying	Head	1.00	9.00	9.00	270.00
Hay	Tons	0.06	55.00	3.09	92.81
Feed	Tons	0.17	112.28	18.95	568.42
Vaccines + implant	Head	1.00	6.54	6.54	196.08
Labor cost	Hours	1.50	9.00	13.50	405.00
Death loss	Percent	0.01	450.00	4.50	135.00
Interest	Percent	0.08	505.58	4.99	149.60
Total Cost of Preconditioning, not including calf value				$56.13	$1,683.81
Total Cost of Preconditioning				$510.56	$15,316.91

Table 4. Effects of price premiums and program cost on returns to preconditioning.

Cost of preconditioning ($/head)	Price change from Weaning Price, $Cwt			
	-$3.00	$0.00	$3.00	$5.00
$25.00	$33.80	$51.50	$69.20	$81.00
$35.00	$23.80	$41.50	$59.20	$71.00
$45.00	$13.80	$31.50	$49.20	$61.00
$55.00	$3.80	$21.50	$39.20	$51.00
$65.00	$(6.20)	$11.50	$29.20	$41.00

Assumes a 45-day preconditioning period and 2.0 lbs average daily gain.

In Table 5, the impacts of average daily gain and cost of preconditioning on profits are shown. For instance, if calves only gain 1.0 pound per day and it costs $45 to precondition them, the producer can expect to lose almost $7 per head during the preconditioning period. However, if costs are $55 and the calves gain 2.50 pounds per day, the producer is looking at net pro-fits of almost $41 per head.

Table 5. Impacts of preconditioning cost and average daily gain on net returns.

Cost of preconditioning ($/head)	Average Daily Gain, lbs			
	1.00	1.50	2.00	2.50
$25.00	$13.25	$32.38	$51.50	$70.63
$35.00	$3.25	$22.38	$41.50	$60.63
$45.00	$(6.75)	$12.38	$31.50	$50.63
$55.00	$(16.75)	$2.38	$21.50	$40.63
$65.00	$(26.75)	$(7.63)	$11.50	$30.63

Assumes $0/Cwt. price difference from weaning to selling after preconditioning program.

Marketing Preconditioned Calves

Most producers can do a reasonable job of preconditioning their calves. However, very few do a good job marketing these calves. In the past, many cattlemen gave up preconditioning their calves because they did not receive enough premiums to cover the additional cost of preconditioning. Often this was caused by poor merchandising on the part of the producer. If cattlemen are to receive top dollar for the preconditioning effort they should:

1. Make sure buyers know the cattle have been preconditioned.
2. Let the buyers know what type of vaccines and implants have been administered to the calves as well as their feeding program.
3. Make sure the cattle are marketed in a matter where there is at least a semi truck load of preconditioned cattle for sale.

The first two points involve doing more than taking the cattle to the local auction market and letting the buyers know "This group of calves have had all of their shots!" If producers are marketing through a weekly auction, they should provide written documentation of the preconditioning program. This information should include:

- ❏ Producers name and address.
- ❏ Beef Quality Assurance (BQA) number.
- ❏ Treatments (clostridial, IBR/BVD/BRSV, internal/external parasites, implants, antibiotics, feeding program, etc.).
- ❏ Treatment dates.
- ❏ Products used.
- ❏ Lot numbers of vaccines.
- ❏ Vaccine manufacturer.
- ❏ Dosages or feeding rates.
- ❏ Route of vaccine administration (IM or SQ).
- ❏ Booster date.

An example form used by the Southwest Georgia Feeder Cattle Marketing Association is shown in Figure 2 at the top of page 13. There is also a blank form at the end of this publication for producers to copy and use.

Producers desiring to sell through local auction markets should inform the market operator that they will be delivering preconditioned calves for sale that day as well as finding out if other producers are planning on selling preconditioned calves on the same day. It is also a good idea for producers with less than truckload lots to try to work with other producers in the area to coordinate sales time so as many preconditioned cattle as possible can be marketed at the same time. Doing so will typically increase premiums. In addition to local auction markets, producers have the opportunity to market preconditioned cattle through numerous feeder cattle marketing associations across the state as well as using satellite or teleauctions. For more information on these marketing alternatives, contact the local county extension office.

Figure 2. Number of Calves Placed =

Item (A)	Units (B)	Number of Units (C)	$/Unit (D)	Cost/Head (E)=(CxD)	Total Cost (E x Number Placed)
(1) Calf value	Cwt.				
(2) Order buying (including shipping)	Head				
(3) Hay	Tons				
(4) Feed	Tons				
(5) Vaccines + Implant	Head				
(6) Labor cost	Hours				
(7) Death loss	Percent				
(8) Interest on calf	Percent				
(9) Interest on other expenses	Percent				
(A) Total Cost of Preconditioning Not Including Calf Value (Lines 2+3+4+5+6+7+9)					
(TCOP) Total Cost of Preconditioning (Lines 1+2+3+4+5+6+7+8+9)					
(10) Value of calf after preconditioning (weight times price)					
(11) Profits from preconditioning (10-TCOP)					

Table 6. Example economic analysis from preconditioning

Item	Unit	Number of Units	$/Unit	Total/Head
Initial calf value	Cwt.	5.00	$85.00	$425.00
Ending calf value	Cwt.	5.00	$85.00*	$501.50
Increase in Value				$76.50
Minus cost of preconditioning				$55.75
Total Returns to preconditioning per head				$20.75
Total Returns to preconditioning for a group of 30				$622.50

*Assumes a $3/Cwt. premium for 550-600 pound steers.

"GA-VAC" Georgia Value Added Calf Program

Calf Health Record & Processing

Name:_____

Address:_____

City:_____ State:_____ Zip:_____

Phone:_____

Injection site should always be in the neck area.
Consult with your veterinarian about which treatments are needed for your cattle.

Date	Treatment	Product	Lot #	Company	Dose	Route of Admin	Booster Date	Processor Initials
1.	Clostridial (black leg +)							
2.	Brucella						N/A	
3.	Coccidiostat						N/A	
4.	Pasteurella (leukotoxoid)							
5.	IBR/P13/BVD							
6.	BRSV							
7.	H. somnus							
8.	Leptospirosis							
9.	Internal parasites							
10.	External parasites							
11.	Implant							
12.	Antibiotics							
13.	Creep Feed Bunk Broke						N/A	
14.	Micronutrients						N/A	
15.	Medicated Feed						N/A	

Sex: Steers_____ Bulls_____ Heifers_____ Total No. of Animals_____

Castration Method_____Date(s)_____ Dehorned Yes____ No____
Date(s)_____

Description/Comments:_____
BQA#:_____

Signed:_____ Date:_____

Veterinarian:_____ Phone:_____

This form is adapted from the NCBA-IRM Calf Health Record.

Summary

Preconditioning calves prior to sale has been documented to reduce respiratory disease, improve performance, and improve carcass quality grade. Buyers are increasingly becoming aware of these benefits and preconditioned calves are selling for a premium, especially when marketed in truck load lots. Calves will need to be fed a grain based diet or a combination of high quality pasture/hay plus supplemental grain to achieve acceptable performance. Any preconditioning program must include a protocol for vaccination and parasite control, which is carefully followed. Preconditioning should begin long before the calf is weaned through immunization and proper nutrition. Producers considering implementation of a preconditioning program should develop a preconditioning budget and evaluate the economics of the program.

In addition, source verification is increasingly important due to the impending national identification program and increasing food safety concerns. Demand is increasing for calves that are source verified and have documented birth, health, and feeding records. The demand for preconditioned calves will only increase in the future.

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Josef M. Broder, Interim Dean and Director