Identifying quality control points in cow-calf and stocker operations

Eliminating the possibility of food safety risks by management of critical control points has already been outlined in detail. The same thought and management processes need to be employed in quality management. The points in your operation where management can influence health, performance, and carcass merit are called “Quality Control Points.”

Many common points exist for all operations. In addition to the common points listed below, each producer should identify and manage other quality control points unique to a particular operation.

Genetic decisions are the first step in quality control.
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Management approaches for quality control points

Quality concerns fall under these five areas:

1. **Genetic management**
   (a) Progeny evaluation
   (b) Breeding system considerations
   (c) Breeding stock selection
      i. Sire selection
      ii. Replacement females

2. **Utilization of animal health products and practices**
   (a) Injection site management
   (b) Vaccine handling and administration
   (c) Implant utilization and recommendations
   (d) Parasite management

3. **Processing/cattle handling**
   (b) Calf management practices
   (c) Branding
   (d) Cattle behavior and facility design

4. **Nutrition**
   (a) Immune system
   (b) General health
   (c) Weaning nutritional management
   (d) Nutritional stress

5. **Culling management**
   (a) Cancer eye
   (b) Horns
   (c) Branding
   (d) Lameness
   (e) Inadequate muscling/excessive fat
   (f) Bruising
   (g) Body condition
<table>
<thead>
<tr>
<th>CONTROL POINTS</th>
<th>Health</th>
<th>Uniformity</th>
<th>Growth/Efficiency</th>
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X - indicates there is likely an interaction between the corresponding Process and Quality Concern
Genetic Management

Progeny evaluation

Before developing a breeding program, it’s first necessary to understand the expectations of the beef industry for growth, health, carcass merit, and eating quality. Progeny evaluation is then used to determine the current status of an operation’s genetic management plan.

Most selection and breeding programs lack information about the performance and carcass traits of their calves and stocker cattle after they leave the ranch. Many breeding decisions are made without knowledge of what changes, if any, are needed or are the most beneficial to the operation. To effectively measure change, benchmarks must be established. Benchmarking is accomplished by collecting performance and carcass information on calves and stocker cattle after they leave the ranch. Information can be obtained in various ways.

Networking with calf buyers, stocker operators and feedyards that purchase your calves and feeder cattle is another way to find out how your cattle perform past the ranch gate. In recent years, carcass traits have been the focus of many information feedback programs. However, performance characteristics, such as daily weight gain, feed efficiency and health are also “quality” factors that should be included in your portfolio of information.

For example, price discrimination is increasing for Yield Grade 4 and 5 carcasses as the industry continues to emphasize red meat yield. Also, cattle producing carcasses that are too large or too small cause problems with retail portion sizes, so they are also discounted. And, obviously, carcasses

<table>
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<tr>
<th>Fed Cattle Targets</th>
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<th>Undesirable</th>
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<tr>
<td>Carcass weight (lbs.)</td>
<td>650-850</td>
<td>&lt;600 or &gt;950</td>
</tr>
<tr>
<td>Quality Grade:</td>
<td>Select or Higher</td>
<td>Standard</td>
</tr>
<tr>
<td>Yield Grade</td>
<td>1s and 2s</td>
<td>4s and 5s</td>
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<tr>
<td>Ribeye area</td>
<td>11-16 sq. in.</td>
<td>&lt;10 or &gt;17</td>
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that grade Standard are discounted.

**Genetics vs. management**

Carcass traits are moderately to highly heritable. Higher heritability implies that predictable and permanent genetic change can result from selection for improved carcass traits. However, “management” influences the expression of genetic potential. And, although selection can alter the genetic potential for carcass traits, management can influence expression of these traits as the calf moves from the ranch through finishing and harvest.

For instance, the genetic potential for carcass weight, red meat yield and marbling are set at conception. However, the age and weight when a beef animal is placed in a finishing program and the growth promotants used during that time can affect carcass weight. Similarly, cattle can be fed to different degrees of fatness, which affects red meat yield from the carcass.

Marbling is influenced by growth promotants, days on feed prior to harvest, health, genetics and other factors. So, cow-calf producers determine genetic potential with their selection and breeding programs. Management of the calf from birth to harvest then influences the expression of genetic potential; but, it’s difficult, and in most cases impossible, to enhance desirable traits through management if cattle lack the genetic potential to do it.

**Selecting breeding stock**

*Sire selection*

With the industry’s focus on carcass quality, it’s easy to forget the most important characteristic of the cow herd – reproductive and production efficiency.

With the current emphasis on carcass traits, it’s easy to forget that cows must match their production environment.

Emphasis should be given to sire selection because of the bull’s ability to produce multiple offspring in one year. Sire selection should be based on the operation’s breeding system. In a continuous system where replacement heifers are put back in the herd, balanced trait selection is

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**All cattle do not have to hit one specific target.**

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important. In a terminal system (where replacement females are not saved from the herd), sires should be selected to emphasize growth and carcass characteristics. Females for terminal systems should emphasize maternal traits.

Selection emphasis for specific traits should be based upon progeny data collected by producers and the market for which cattle are targeted. If carcass traits need to be changed, information is available to help select suitable herd sires. For example, most breeds are collecting EPDs (Expected Progeny Differences) for carcass traits, such as carcass weight, marbling, ribeye area and fat thickness.

Replacement female considerations

Although most carcass merit improvement results from sire selection, female selection and management also contribute significantly to uniformity and carcass traits in your calf crop.

Uniformity in a calf crop becomes increasingly important when you can market your calves in multiple-head lots and take advantage of higher prices that are generally paid for load lots.

Narrowing the breeding season, culling extremes in cow size and breed type, and selecting for a consistent color pattern can improve your calf-crop uniformity.
Breeding system considerations

All breeds have relative strengths and weaknesses. More rapid genetic change can be made by choosing a breed type that generally excels in traits of importance to an operation, as opposed to selection within a breed for the same traits. For instance, if you desire to increase the marbling ability of your calves, utilize sires from a high-marbling breed instead of searching for high-marbling sires in a breed that’s not noted for marbling.

As a general rule, the following (documented) breed type characteristics allow producers to combine breeds to best suit their operation. British breeds, on average, will produce calves with a greater propensity to marble. Brahman-influenced breeds are more heat tolerant and have greater longevity. Continental breeds produce leaner carcasses.

In much of Texas, a calf that is produced by a combination of two or three of these breed types can hit carcass and production targets. The most appropriate combinations of breed type vary across the state.

As a general rule, logical breed combinations for market calves would include a minimum of 1/4 British, maximum 1/2 Continental, no more than 1/4 Brahman-influenced and no more than 1/4 Dairy. Calves with these breed specifications provide an acceptable mix of growth, muscling and marbling. These proportions can be varied for different beef markets.
**How To Hit an Example Target**

- Ribeye area: 14 sq in
- Carcass wt.: 775 lb
- Live Wt.: 1225 lb
- Fat thickness: 0.4 in
- Yield Grade: 2.0
- Quality Grade: Ch

14 in² REA/1.8 in² per cwt carcass = 778 lb
778 lb carcass/63.5 (Dressing Percent) = 1225 lb live wt.

<table>
<thead>
<tr>
<th>FRAME SCORE</th>
<th>MATURE WEIGHT&lt;sub&gt;1&lt;/sub&gt;</th>
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<tr>
<td>4</td>
<td>45”</td>
<td>1110</td>
<td>1775</td>
</tr>
<tr>
<td>5</td>
<td>47”</td>
<td>1200</td>
<td>1920</td>
</tr>
<tr>
<td>6</td>
<td>49”</td>
<td>1295</td>
<td>2070</td>
</tr>
<tr>
<td>7</td>
<td>51”</td>
<td>1400</td>
<td>2240</td>
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1- Estimated @ BCS of 5. Bulls = 160% of cow weight
2- Determined by 0.5 in. backfat.
Numbers to right of frame score are hip height (in.) for heifers @ 12 mos. of age
Injection site management

The administration of practically all injectable animal health products can cause tissue irritation and result in an injection site lesion. Lesion types include active fluid-filled, woody callous and discoloration.

Although the scar tissue looks like fat and can be removed by trimming, research has documented that tenderness of the surrounding muscle tissue is reduced significantly.

While the actual lesion may be small, tenderness will be affected in a 3-4 inch radius around the lesion. A single injection can negatively affect the tenderness of several retail portions. Concerns with injection site lesions are not limited to fed cattle; lesions are also a significant problem in cull bulls and cows. Annual health management programs for breeding animals expose them to numerous injections. However, proper injection site location can eliminate lesions in areas other than the neck.

Vaccine handling and administration

Sickness requires treatment and increases the probability of poor performance, injection site lesions, residues and death loss. Proper handling and administration of vaccines is an integral part of a preventative herd health program. Improper storage, exposure to heat, sunlight, or freezing temperature, or improper reconstitution can compromise efficacy of the vaccine. Maintaining a high level of efficacy is critical to establishing immunity in a majority of vaccinated cattle. The success of a vaccination program also depends on having an animal capable of responding to the vaccine. Plane of nutrition, stress level, current health status, and timing of vaccination all impact an animal’s immune response.

Vaccine protection

Refrigerate vaccine and protect it from ultraviolet (UV) light until administered to an animal. Use cold packs during transport and chuteside storage of vaccine.
A lesion can impact tenderness up to 4 inches away from the injection site.

Series of woody or callous lesions

Active fluid filled lesions

Discoloration lesion
Never reconstitute vaccine before it is needed because mixed vaccine begins to lose effectiveness in a relatively short period of time. Reconstitute only the amount of vaccine that can be administered in less than 1 hour. On small operations, it’s advisable to purchase vaccines in smaller containers (5- to 10- dose bottles) and mix as needed. Although larger-dose bottles are generally less expensive per dose, their use often results in leftover product. Partially used bottles should not be saved.

Always cool syringes before the initial draw of vaccine. Transporting syringes in the cooler while going to the working facilities will allow sufficient time for the syringe to cool. Do not leave syringes on top of working tables, barrels or tailgates while performing other processing chores at the chute. Figure 2 illustrates one method to keep syringes cool and out of direct sunlight while maintaining easy access to them. A cooler, as shown, keeps syringes from prolonged exposure to UV light throughout processing. If any delay occurs in processing, place syringes back in a cooler immediately.

Do NOT clean/disinfect syringes or needles with disinfectants. Many of these products will kill MLV vaccines and cause damage to Killed vaccines. Do NOT use products like alcohol, soap, Lysol®, Betadine®, Nolvasan® or Chlorox® to clean or disinfect the syringe.

Any disinfectant other than boiling water can leave a residue in the syringe, altering the effectiveness of the vaccine. Although this contamination predominately affects the first draw, it could impact the immunization of several animals.

Disinfect syringe components in boiling water. Multiple-dose syringes need to be completely disassembled and cleaned after each working. After cleaning, reassemble syringes and store in a clean, dry environment until needed. If not, clean prior to next use.

**Syringe selection, utilization and cleaning**

Selecting the appropriate syringe is very important to developing a sound vaccination program. Multiple-dose syringes, such as shown in Figure 3, or sterile, disposable syringes, are appropriate for administering vaccines.
To help prevent contamination of the remaining vaccine in your working bottle, never enter a bottle with a used needle. The needles should be changed each time the syringe is refilled.

Plastic syringes are a very accurate single-dose delivery system. It is best to utilize a syringe size that closely matches the dose, and draw a single dose for each individual animal. Disposable syringes should not be used for multiple-dose delivery because this practice can result in inaccurate dose delivery.

**Lubricate with first vaccine draw** (No petroleum-based products)

Use the first draw of vaccine to lubricate the syringe. Do not lubricate syringes with silicone, mineral oil, Vaseline® or any other lubricant. All of these lubricants may impact vaccine efficacy. If the plunger and stopper are difficult to move without lubricant, replace the syringe, or at least the stopper.

**Inspect and maintain equipment**

Always inspect syringes prior to processing. Check the barrels for chips or cracks that would lead to leakage and under-dosing. Check calibration and dosage setting prior to – and continuously throughout – the process. Some multi-dose syringes are not accurate enough for low-dose products.

Even slight changes in working components change dose rates. Dosage gauges on some multi-dose syringes can accidentally change volume settings, leading to under- or over-dosing. Adjust the tension on the plunger to prevent leakage. Always keep spare parts available in case something happens to the working syringe. Keep a supply of extra disposable syringes as a backup delivery system.

**Adopt the practice of changing needles before filling a syringe to keep needles sharp and prevent contamination of the vaccine.**
Mixing and drawing vaccines

Use a clean transfer needle when reconstituting vaccines. Transfer needles can be cleaned and reused. If a transfer needle is not available, use a clean syringe to draw the diluent out of the plastic bottle and then place it in the vial with the dry material.

When using a transfer needle, always place the transfer needle in the stopper of the plastic bottle first, then invert the needle and diluent as the other end of the transfer needle is placed in the stopper of the glass vial containing the freeze-dried fraction. After proper mixing, vaccine can be drawn from the glass vial into the dosing gun.

Label syringes and the cooler box prior to processing to prevent accidental mixing of vaccine when refilling syringes. Accidental mixing will result in under-dosing and may render one or both of the vaccines ineffective. Mixing MLV product with a Killed product destroys the MLV product immediately.

Never use one syringe to administer antibiotics or dewormers one time, and then MLV, CA or Killed products the next time. Any residue can potentially affect the product.

Read labels

Always read label and dosing instructions prior to processing to ensure proper product administration.

Revaccinate (boost) vaccines as outlined on the label. If a booster is required, one initial dose will not achieve immunity; it will only provide a brief increase in resistance. If the initial program is carried out properly, only an annual booster will be required after the first year.

Take time to become familiar with your products. Also, check for side effects and treatment should they occur.
**Best Management Practices – Vaccination**

1. Select the most effective vaccine for the disease(s) of concern.
2. Prevent exposure of vaccine to heat and sunlight.
3. Draw from bottle with sterile needle.
4. Use quality syringes; inspect and maintain all working components.
5. Use proper needle size.
6. Administer proper dose.
7. Administer via the recommended route (IM or SQ).
8. Administer in recommended site (neck region).
9. Change needles often.
10. Revaccinate according to label directions.

**Implant utilization and recommendations**

When used properly, growth-stimulating implants have been proven safe and effective through both research and actual use in the beef industry.

Always check label directions for sex, age and weight recommendations for the use of specific implants.

Research has shown that there are no benefits to implanting heifers to be kept as replacements. However, there are no detrimental effects of implanting replacement heifers with a single calfhood implant after 60 days of age and before they are 6 months old.

Implants are placed under the skin on the back of the ear (See Figure 4 [next page] for proper implant placement). The full benefit cannot be realized if the implant is administered improperly.

The implant needle should be disinfected between animals. Sanitation is important for product effectiveness.
Potential causes of implant failures:

- Improper site (in the cartilage)
- Abscess due to poor sanitation
- Missing implant (through the ear)
- Partial implant due to technique or implant gun failure
- Bunched or crushed pellets
- Improper implant storage

Best Management Practices – Implant Use

1. Review all instructions carefully before implanting.
2. Properly restrain the animal. If proper restraint is not possible with head gate, use a halter.
3. Select the proper implant site. Place the implant between the skin and cartilage on the back of the ear.
4. Clean the needle with a disinfectant. Use only sharp needles; burrs increase the chance of tissue trauma and infection.
5. Utilize disinfectant to clean the implant site when the site is contaminated with feces, urine or mud. Contamination increases the chance of abscessed implant sites.
6. When possible, implant all calves in the same ear to minimize confusion. Avoid placing implants in the same ear used for ear tags, tattoos or ear notching.
7. Palpate the ear to determine if the implant was inserted properly.
8. Never sacrifice careful implantation technique for speed.
9. Proper training is essential.
10. Record the date and type (brand name) of implant administered.
Parasite management

Internal parasites, such as stomach worms, can cause extensive damage to the digestive tract of cattle. The damage can result in impaired digestive function and suppressed absorption of nutrients, leading to deficiencies in energy and protein. Nutrient deficiencies can lead to suppression of the immune system, resulting in poor animal performance and health.

Liver flukes are another internal parasite in Texas. Infection is generally limited to cattle produced in areas that commonly have standing water, such as river bottom pastures and alkaline soils. Additionally, the presence of an aquatic snail is necessary to serve as the intermediary host for the liver fluke.

Many of the major river/flood areas in the southeastern United States are habitat for such snails, and pastures adjacent to these waters are sources of potential infection. A large number of the stocker and feeder cattle managed in Texas originate from fluke-infected areas. A liver fluke infection can reduce animal performance and cause liver condemnation in fed cattle, cull cows and bulls.

External parasites, such as the horn fly and heel fly, are pests that can impact performance and hide quality. Horn fly irritation reduces gains in calves and yearlings and body condition in cows. Horn flies are biting insects that not only affect performance, but can also reduce hide quality due to scar tissue on the surface of the skin.

Heel flies also cause annoyance during the spring fly season. Heel fly
eggs laid on lower legs of cattle hatch into larvae that burrow through the skin. Larvae then migrate through the body and ultimately become encapsulated just beneath the hide, along the back.

The larvae cause tissue damage, resulting in trim loss and reduced carcass value. The holes in the hides eventually heal, but the scar tissue devalues the hide. Treating cattle one to two months after heel fly activity ceases can control larvae from heel flies.

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Beef Quality Assurance Is Everyone’s Job

TExAS BEEF QUALITY PRODUCER
Processing involves management decisions when working cows or calves, receiving stocker cattle, weaning calves and shipping cattle. Castration, dehorning, immunization, branding, injections and cattle movement are all control points for management. Management practices performed early in life will reduce the chance of stress-related sickness, carcass damage and carcass devaluation.

**Calf management practices**

Castration and dehorning are management practices that should be performed by cow-calf producers prior to the times calves are marketed. In Texas it is estimated that only 20% of the male calves are castrated prior to being sold off the ranch where they were born.

Intact bull calves are undesirable because their management is difficult, due to aggressive behavior. Furthermore, beef from intact bulls has a coarser texture, lower marbling scores and more variable tenderness. For these reasons they are always castrated prior to grazing or feeding. Intact bull calves may gain faster than non-implanted steers; however, implanted steer calves will gain at the same rate or faster than intact bulls.

All bulls that are not herd sire prospects should be castrated as early in life as possible. Early castration is less stressful on bull calves. Preferably, castration should occur between birth and four months of age. Castration of older, heavier animals causes greater stress and increases the chances for surgical complications and bacterial infections. The additional stress can also suppress immune function and increase susceptibility to other diseases.

There are also economic incentives to castrating bull calves prior to marketing. Analyses of auction sales show that lightweight bull calves (under 400 pounds) are discounted less than heavier bull calves and yearlings.

Research in Texas and Kansas has demonstrated that castration of a 550-pound bull calf reduces weight and increases morbidity (sickness), mortality (death rate) and treatment costs. Based on research, “cutter bulls” should be
discounted $6 to $7 per cwt. as compared to the same weight steers due to lost production efficiency. Heavier (600 pound) or older (yearling) cutter bulls generally receive price discounts of $6 to $12 per cwt.

Dehorning is as stressful as castration. Horn buds should be removed sometime between birth and 4 months of age. Cattle with horns are the cause of a significant amount of bruising in fed and non-fed cattle. Groups of horned cattle have twice as many bruises as groups of non-horned cattle. Bruises from horns are trimmed out, resulting in lost carcass weight, devalued primal cuts and reduced carcass value.

Obviously, the use of polled genetics is the easiest and least stressful way to dehorn cattle. Does that imply all producers should breed polled cattle? No. It means that if calves are born with horns, electric or surgical dehorners should be used to prevent horn growth (before the calves are 4 months old).

The younger the animal is when these procedures are done, the less it’s stressed. Research has shown that dehorning or tipping the horns of older calves and yearlings is one of the most stressful management practices.

It’s also commonly believed that horned cattle do not receive a discount when marketed. Actually, auction market results indicate that horned heifers and steers are discounted $2 to $3 per cwt. As with bull calves, discounts for horns increase with age and weight.

Not only do horns cause substantial bruise damage (that has to be trimmed from the carcass) to other cattle in the pen, they often cause the head to be condemned during inspection by USDA-FSIS, thus resulting in decreased value of the animal.

Early castration is less stressful on bull calves. Preferably, castration should occur between birth and four months of age.
Branding

For centuries, fire branding has been utilized as a method of animal identification. It remains the preferred method of identification to establish proof of ownership. Placement of your brand is important because it affects the value of the hide. Ideally, brand placement (freeze brand or hot iron) should be located high up on the hip, close to the tailhead.

Preferred band locations include forearm, shoulder, high on the hip near the tailhead, or lower rear leg. This allows the brand to be cut away from the hide without a significant loss of the most valuable portions. In many instances, butt-branded hides sell at prices similar to native (non-branded) hides. Rib brands and multiple brands devalue cattle $5 to $25 per head.

Freeze branding can also be used to identify cattle. However, *improper* freeze branding can scar, similar to a hot iron, which lowers the value of the hide. Improper branding procedures can also create beef quality problems. Brands that are too hot or held too long can result in scar tissue that toughens the underlying muscle tissue. In extreme cases, the brand is visible on the muscle tissue below the hide.

If you choose to brand your cattle, it is mandatory that you register your brand with the county clerk in each county where you run cattle. Also, all brands must be re-registered every 10 years (most recently in Aug. 31, 2011 through Feb. 29, 2012). For more information, contact Texas and Southwestern Cattle Raisers Association at (800) 242-7820.
Nutritional Management

Nutrition is a broad category involving management of energy, protein, vitamins, minerals and water. Nutritional status of the cow herd has a direct impact on production efficiency, immunity and carcass characteristics of calves.

General health and immune system function

Proper nutritional management includes utilizing Body Condition Scores (BCS) to monitor nutritional status. Target a BCS 5 or higher at calving for optimum production and for cow and calf health. Cows calving below a BCS 5 produce less volume of colostrum, lower-quality colostrum and decreased milk production.

Additionally, calves born to cows in a BCS less than 5 are slower to stand and nurse and are more susceptible to cold stress. This results in decreased colostrum consumption, reduced antibody absorption and reduced passive immunity. For maximum passive transfer, calves should nurse within four hours. Although some absorption can occur during the first 24 hours, efficiency of antibody absorption decreases after the first two hours.
Lower body condition will affect passive transfer, resulting in lower maternal antibody protection and decreased neonatal calf resistance to disease. Calves born to thin cows have increased susceptibility to calf scours and lower stores of brown adipose tissue, resulting in higher morbidity and mortality during the first two weeks of life. Immunocompromised calves have an increased risk of sickness when exposed to stress and pathogens throughout their life.

Nutritional stress can and will mask the expression of immunity in cattle exposed to infectious pathogens. The most critical nutritional consideration is the protein and energy balance. When adequate protein and energy are available, digestion is enhanced and mineral digestion and absorption is adequate in most instances. Adequate levels of most B vitamins are synthesized when microbial activity is high.

Deficiencies in protein intake affect total forage intake, energy digestion, microbial protein synthesis and vitamin synthesis by rumen microflora. It is important to stress that protein and energy requirements must be met before the impact of minerals or vitamins can be determined.

Minerals are necessary for microbial synthesis of protein and energy, maintenance of forage digestibility and electrolyte fluid balance in the animal. Minerals also play an important role in metabolic pathways and immune system function. Imbalances in mineral intake interfere with the development and function of the immune system, even when adequate levels of protein and energy are supplied.

Trace minerals are known to be involved in immune function. Producers cannot afford to wait until clinical symptoms are expressed before initiating changes in nutritional management.

Vitamins that appear to be the most critical in immune system function are vitamin A (betacarotene) and vitamin E. Selenium and vitamin E function as antioxidants and reduce the accumulation of compounds produced as cells in the immune system response to invasive organisms.

**Weaning nutritional management**

Stress suppresses the immune system. Removal from the cow, introduction to a new environment and commingling with cattle of different origins are stressful events.
This stress is accompanied by reduced feed and water intake and exposure to pathogens. These stressors can result in a high percentage of freshly weaned calves requiring treatment for respiratory disease. These problems can be managed if calves are weaned and held at the ranch for a minimum of 45 days.

Ranch to Rail and other steer feed-out programs have documented that calves requiring treatment not only have higher medical costs, but also reduced performance, increased death loss and decreased carcass quality (See Table 2).

In an effort to enhance immunity, and thereby performance, of stocker and feeder cattle, vaccination and nutritional management programs were designed for weaning programs on the ranch. Preconditioning programs with a 45 day post-weaning period have been accepted by the industry to improve animal performance, health and carcass quality.

*Preconditioning* can mean many different things to different people. It’s important that everyone has the same program in mind as this topic is addressed.

Preconditioning is the process by which calves are weaned and “conditioned” before moving them to grass or a backgrounding yard for growing or sending them straight to a feedyard for finishing. Preconditioning can be done at the ranch or at preconditioning facilities that specialize in managing fresh-weaned calves. We will focus on the preconditioning of weaned calves before they leave the ranch of origin.

The preconditioning process improves the likelihood that a calf can deal with future stressors and exposure to pathogens without health complications. Bridging the management gap from suckling calf to weaned calf is not that difficult when it’s done at the ranch. It involves enhancing and managing the immune system, controlling stress and preventing overexposure to pathogens during this brief period of time.

Calves that have fewer health problems after they leave the ranch will (1) require less medication, which reduces costs but also lowers the potential for injection site lesions and residues; (2) suffer less death loss; (3) perform more efficiently; and (4) potentially have higher-valued carcasses.

So, preconditioning is a value-added management practice. In the past, it’s been difficult for a calf producer to realize the added value in preconditioned calves they’ve sold. There are opportunities through both direct sales

*It’s not uncommon for 25 to 50 percent of non-preconditioned weaned calves to require treatment.*
<table>
<thead>
<tr>
<th>Year</th>
<th>92-93</th>
<th>93-94</th>
<th>94-95</th>
<th>95-96</th>
<th>96-97</th>
<th>97-98</th>
<th>98-99</th>
</tr>
</thead>
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<tr>
<td># head</td>
<td>Sick (n)</td>
<td>Healthy (n)</td>
<td>Sick (n)</td>
<td>Healthy (n)</td>
<td>Sick (n)</td>
<td>Healthy (n)</td>
<td>Sick (n)</td>
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<tr>
<td>1992-93</td>
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<td>1133</td>
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<td>2206</td>
<td>857</td>
</tr>
<tr>
<td>1993-94</td>
<td>2.9%</td>
<td>0.5%</td>
<td>2.2%</td>
<td>0.8%</td>
<td>1.7%</td>
<td>0.5%</td>
<td>3.5%</td>
</tr>
<tr>
<td>1994-95</td>
<td>2.68</td>
<td>2.88</td>
<td>2.69</td>
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<td>1995-96</td>
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<td>1996-97</td>
<td>11</td>
<td>100</td>
<td>8</td>
<td>20</td>
<td>12</td>
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<td>14</td>
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<tr>
<td>1997-98</td>
<td>11</td>
<td>100</td>
<td>8</td>
<td>20</td>
<td>12</td>
<td>20</td>
<td>14</td>
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<tr>
<td>1998-99</td>
<td>11</td>
<td>100</td>
<td>8</td>
<td>20</td>
<td>12</td>
<td>20</td>
<td>14</td>
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<tr>
<td>Value Difference*</td>
<td>$16.00</td>
<td>$15.70</td>
<td>$8.65</td>
<td>$10.33</td>
<td>$19.87</td>
<td>$10.58</td>
<td>$13.42</td>
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<tr>
<td>Avg. Profit/Loss</td>
<td>$155.56</td>
<td>($27.47)</td>
<td>$64.66</td>
<td>($28.32)</td>
<td>$96.28</td>
<td>($54.44)</td>
<td>$71.10</td>
</tr>
</tbody>
</table>

*Difference in net return + medicine divided by initial weight

15,727 calves involved in the TAMU Ranch to Rail program
and auction markets for calf producers to market preconditioned calves. The following are just a few of the things to consider about preconditioning calves.

**Plan ahead**

Locating markets, allocating pasture, shopping for feed and health products, scheduling other farm and ranch activities, and finally the preconditioning process itself, takes time. So allow adequate time to plan, evaluate and implement your program.

**Identify your market**

Producers often fall short with their marketing efforts. A key to realizing the added value is finding the outlets that have buyers seeking preconditioned calves and pursuing those markets. These may be auction venues or direct sales to buyers. This effort must start well in advance of the time calves are weaned.

**What does the market require?**

Once market outlets have been identified, determine the buyers’ expectations in those outlets. These may include specifications for vaccination, parasite control practices, nutritional management, number of days weaned, weight, cattle type and individual animal identification. Know what is expected and plan to deliver.

**Evaluate the economics**

Just because it seems easy to do and it’s beneficial to the calves and the industry, that doesn’t mean preconditioning will automatically be profitable to your ranch. If cattle are being prepared for retained ownership, then
preconditioning should be considered.

However, if cattle are being preconditioned for sale, the economics must be carefully considered. The ranch should be ready and willing to retain ownership in the cattle if they cannot receive adequate compensation for their preconditioning efforts. Likewise, suffering a loss at the end of preconditioning might be the best alternative if retained ownership doesn’t appear to be profitable.

Identify your costs

It’s critical for producers to take time to evaluate the costs of preconditioning. Many producers fail to adequately project the costs of a program and then are disappointed when they don’t recoup their costs at marketing. Buyers’ requirements dictate a portion of the costs. Feed (purchased feed, raised feed and grazing) and opportunity costs account for the larger part of the preconditioning costs.

Be certain to charge interest against the value of the calves the day they are weaned. If you borrow operating money, this interest is the cost of not paying down the loan when the calves were weaned. If you do not borrow operating money, the interest represents income you could have realized by putting the money in savings.

If you graze your own pasture, charge the preconditioning program a reasonable rate for use of the pasture. Some may question this expense; but this ensures that money is being set aside to pay land rent or payments. If your stocking rate has to be lowered to support preconditioning, it will add expense to the enterprise.

If the land is owned and debt-free, this charge represents income for the ranch enterprise. If the preconditioning program breaks even, the ranch still
pocketed some income. Some may prefer to leave this cost in the cow herd expenses. Likewise, account for use of equipment and facilities, fuel, labor, utilities and other costs.

One simple accounting method is to assign a daily yardage charge for each calf in the program. Again, some may question this expense and prefer to allocate the expense to the cow herd. As well, don’t forget to add in marketing costs like commissions, freight and other expenses.

*What will the preconditioned calves be worth?*

In order to evaluate a preconditioning program, it will be necessary to project the weight and sale price of the calves at the end of the preconditioning program. Many producers are concerned with the premiums they will receive for their preconditioned calves. This is a factor to consider, but an equally important consideration is seasonal market fluctuation. Does the market typically go up or down during the period of time the calves are being preconditioned?

The difference between the calf’s value the day it’s weaned and at the end of the preconditioning period is the money available to pay for the preconditioning program and provide some extra income to the ranch. Projecting this margin allows you to determine if the program is feasible.

*Control your costs*

Shop for animal health products. Check with the market outlets to see if they have purchase arrangements for the required products. As mentioned, feed is one of the major costs of preconditioning. So, it’s important to utilize on-site forage and feed resources as much as possible.

This means utilizing excess forage and feed resources to add value to calves. If pastures can be managed to provide good-quality forage to weaned calves, then preconditioning becomes a viable option. Quality can be supplemented, but *quantity* of available feed resources is important to the success of your program.

Although it will vary from region to region, the most economical way to manage calves during the preconditioning period will involve forage and supplement. In some areas, raw feed commodities and by-products are

In order to evaluate a preconditioning program, it will be necessary to project the weight and sale price of the calves at the end of the preconditioning program.
relatively inexpensive and fit well in a preconditioning program.

In other areas, manufactured feeds are the only option and a relatively higher cost. If harvest forage has to be purchased for feeding any time other than the first five days post-weaning, carefully evaluate the profit potential. Minimize feed purchases and scrutinize the cost of these purchases closely.

The objective of preconditioning is not to get cattle on feed; it’s to prepare them for the stresses to come. There are some real economic limitations as to the amount of feed that can be purchased and fed to ranch-weaned calves. Weaning on the ranch is different from preconditioning purchased and stressed calves in a preconditioning yard. If forage resources are managed properly, ranch calves will not need mixed feed to maintain a positive plane of nutrition or to maintain their health.

*Use Best Management Practices and don’t cut corners*

Always follow Beef Quality Assurance guidelines. Don’t cut corners on the nutrition and health programs or the calves may still have problems once they leave the ranch. This will reflect badly on the ranch and the whole concept of preconditioning.

Preconditioning has routinely been done over a period of 14 to 45 days. There are instances where shorter programs may work effectively; but keeping the calves for 45 days offers additional opportunities for weight gain and immune response.

*Don’t expect too much from the calves*

Be realistic in estimating the performance of your calves during preconditioning. Weight change can vary from a loss to more than 2 lbs/day,
depending on feed resources and how the calves respond to weaning. In most preconditioning programs, achieving an average daily gain of 1 to 1.5 pounds per day during the 45 days will be optimum.

This rate of gain can be achieved economically with a wide range of nutritional programs. Higher rates of gain can be achieved but the cost of gain may not be economical. If calves are contracted, calculate the desired rate of gain to meet the target and always make sure the target is realistic.

**Maximize immune response**

Strengthen passive transfer and antibody response in the calf through supplementation of the cow in late gestation and early lactation. Passive transfer can also be enhanced through proper vaccination programs targeted at the cow in late gestation. Develop your heifers, stockers and/or feeders by maintaining a positive plane of nutrition throughout the weaning and growing phases.

Maximum immune response will be achieved when proper vaccinations are administered in conjunction with proper nutritional management. Nutrition is not what makes the immune system work; but deficiencies can prevent the immune system from working properly.
Market Cow and Bull Management

Regardless of herd size, all beef cow operations produce some market animals (i.e. cull cows and bulls). Many times, these are older cows past their prime producing years. Other market cows may result from failure to reproduce in a given breeding season. Market cows and bulls represent 15-20% of a cow-calf producers’ cash flow. With proper management and timely marketing, the value of market cows and bulls can be increased.

Market cows and bulls (non-fed beef and dairy) supply between 15% and 20% (depending on market conditions) of total U.S. beef production. Most producers assume that the major product from market cattle is ground beef merchandised through fast-food restaurants.

While ground beef is a very important product of market cattle, it’s only one of many beef products from market animals. Cow packers utilize tenderloins, ribeyes and strip loins, particularly from younger cows. These cuts are merchandised as lower-priced steaks.

The outside round is often pressed into deli-style meats and inside rounds are routinely used for beef jerky. Many of the individual muscles are utilized for specific manufactured products.

Not all market cows and bulls are suitable for processing into higher-valued products. Some are condemned, resulting in losses to the industry that are ultimately passed back to the producer. Quality defects and sources of condemnation in mature cows and bulls include things like inadequate muscling, excessive fat trim, lightweight or heavyweight carcasses, lameness, “cancer eye”
and “downer” animals.

In 1994, the National Cattlemen’s Association (now NCBA) conducted a study to look at quality shortcomings in market cows and bulls. This study was repeated in 1999 and most recently in 2007.

Table 3 summarizes some of the quality defects and the potential number of cattle that would be affected based on the 2007 slaughter figures. The 2007 Non-Fed Quality Audit revealed that 97% of market cows and bulls have clear eyes; 96% are sound or have only minor structural problems; and 86% of beef cows had a Body Condition Score between 3 and 7.

In general, producers do a fair job of managing and marketing surplus animals. But, the 2007 audit also identified specific areas where the quality of market cows and bulls could be improved. Realizing that some of these defects are impossible to avoid completely, producers should pay close attention to marketing in order to return maximum value from their cull livestock.

**Cancer eye**

Cancer eye can’t always be avoided. But, proper marketing avoids loss of value. The 2007 audit revealed that 1.3% of beef cows and 0.6% of beef bulls had advanced stages of cancer eye. Cows with advanced stages of cancer eye are a primary cause of whole carcass condemnation. As such, packers are unwilling to purchase these cows at times. When cancer eye is detected, the eye should be surgically removed by a veterinarian, or the animal should be marketed as quickly as possible.

**Horns**

Horns were identified as a quality defect in the 2007 audit for two reasons: horns are a major cause of carcass bruising, and horns must be removed prior to the removal of the hide. This leaves the sinus cavities exposed to hair or foreign material contamination. If the inspector suspects contamination of the sinus cavities, the head must be condemned, resulting in a loss of value.

Dehorning at a young age is a good animal husbandry practice that should be routine on all operations.
### Transportation Traits and Quality Defects
#### 2007 National Market Cow and Bull Beef Quality Audit

<table>
<thead>
<tr>
<th>Quality Consideration</th>
<th>Category</th>
<th>Cattle Group</th>
<th>Incidence Rate</th>
<th>Head Affected</th>
</tr>
</thead>
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<td>Transportation</td>
<td>Avg Distance Traveled, Miles</td>
<td>All Loads</td>
<td>289</td>
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<tr>
<td></td>
<td>Maximum Distance Traveled, Miles</td>
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<td>1,250</td>
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<tr>
<td></td>
<td>Mix Grnder Loads not separated, %</td>
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<td>11.60</td>
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<td>Brands</td>
<td>Brands, %</td>
<td>Beef Cows</td>
<td>31.1</td>
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<td></td>
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<td>Beef Bulls</td>
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<td>160,796</td>
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<tr>
<td>Horns</td>
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<td>Cancer Eye</td>
<td>Advanced (3 or greater), %</td>
<td>Beef Cows</td>
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<td>Beef Bulls</td>
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<td>Lameness</td>
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<td>Beef Bulls</td>
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<td>Body Condition Score</td>
<td>Too Thin BCS 1 or 2, %</td>
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<td>Beef Bulls</td>
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<td>Too Fat BCS 8 or 9, %</td>
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<td>Beef Bulls</td>
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<td>Udder</td>
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<td>Bruise</td>
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<td>Beef Bulls</td>
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<td>Carcass Condemnation</td>
<td>Antemortem and Postmortem %</td>
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<td>Dental Defect</td>
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<td>Active lesions</td>
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<td>Sirloin Cap</td>
<td>Woody calus</td>
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<td></td>
<td>Fibrous scar</td>
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<td>2.4</td>
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<td>Injection site lesion defects</td>
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<td>Fibrous scar</td>
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<td>2.3</td>
<td>86,316</td>
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</tbody>
</table>

**Head Affected - According to the USDA-NASS Livestock Slaughter 2009 Summary the following number of Market Cows and Bulls were harvested in 2009**

<table>
<thead>
<tr>
<th>Year</th>
<th>Beef Cows</th>
<th>Dairy Cows</th>
<th>Bulls</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>2009</td>
<td>3,325,000</td>
<td>2,815,300</td>
<td>570,200</td>
<td>6,710,500</td>
</tr>
</tbody>
</table>

In the 2007 Audit approximately 75% of the bulls were beef bulls and 25% of the bulls were dairy bulls

Assume 75% Bulls Beef

| Beef Bulls | 427,650 |
Brands

Brands continue to be a quality concern relating to hide value of market animals. Branding is the only permanent, easily readable means of identification that is currently available. Placement of the brand is an important decision that affects hide value. When considering placement of brands, the optimum place is high up on the hip, close to the tail head.

Lameness

Lame and disabled cattle are a perception problem for the industry. The 2007 audit showed that 30% of all market cows and bulls had signs of lameness; 4% of all cattle received scores of 4 and 5, classifying these cattle as very disabled. Some of these problems are unavoidable, particularly with bulls. However, many problems with lame cattle are easily avoidable if producers will market animals before they age excessively and develop feet and leg problems.

The packer is required to remove all tissue
associated with an arthritic joint. In the 1999 audit, 11% of market cows and bulls had at least one arthritic joint removed; this was improved to 6% in 2007, indicating that producers have done a better job of marketing cattle in a timely manner.

Inadequate muscling/excessive fat

Lean beef products are the principal end products of market cattle. It’s important that market cows and bulls have adequate muscling without excessive amounts of fat. The 2007 audit suggested that 21% of beef cows had inadequate muscling. Poor muscling is often a result of emaciation. As Body Condition Score drops below 5 (on a scale of 1 to 9), losses are comprised of both lean and fat.

The 2007 audit revealed that more than 51.1% of beef cows were at or below a BCS 4, suggesting that some of the “inadequate muscling” was actually due to thin condition. Extremely thin cows (BCS 1 to 2) accounted for 10% of beef cows surveyed. These cows produce a product that is greater than 90% lean, but their lean yield is extremely low, which limits the salvage potential.

Emaciated cows are also more prone to bruising because they have no fat to serve as padding, and they are more likely to be disabled upon arrival at the packing plant. Thin cows will not make a long trip prior to harvest. Consequently, the number of buyers for emaciated cattle is limited.

At the other extreme, excessively fat cows (BCS 8 to 9) are also a problem. These cows often yield cuts that can be salvaged and merchandised for a higher value (strips, ribs, tenderloins), but there is an excessive amount of waste fat. The 2007 audit revealed that 4.2% of beef cows were excessively fat.

The ideal condition to merchandise market cows would be somewhere between BCS 4 and 5. And because these cows have optimal red meat yield, they generally bring the highest price per pound at the auction market.

Bruising

The 2007 audit found fewer carcasses with bruises than in the 1994 and 1999 audits. However, 65.8% of beef cows and 50% of beef bulls exhibited at least one bruise. These bruises must be trimmed from the carcass resulting in millions of pounds of product loss annually.

Unfortunately, the bruises do not just occur on the lower-valued portions of the carcass. The 2007 audit revealed that 14% of bruises were observed in the round and 7% in the loin of beef cow carcasses.

Handling practices at the ranch are very important in minimizing bruises.
An estimated one-third of bruises occur on the ranch, and the other two-thirds occur in transport and marketing. Close scrutiny of handling facilities to eliminate sharp, protruding corners and employee training can help reduce bruising. Producers should also merchandise market cattle before they become emaciated and are more susceptible to bruises.

**Best Management Practices - Culling management**

1. Merchandise market cows and bulls in a timely manner to reduce quality defects.

2. Be certain that ALL animals shipped to market have cleared proper withdrawal times.

3. Do not merchandise market animals that have a terminal condition.

4. Do not send market animals to auction that are disabled.

5. Merchandise market cows and bulls BEFORE they become severely emaciated.

6. Do not merchandise animals with advanced eye lesions.

**Beef quality and consistency begins on the ranch. Everyone involved in the production system — from the producer to the packer — bears a responsibility for ensuring that market bulls and cows are not handled roughly on trucks, at auction markets and in other sales facilities, as well as in packing plant premises.**