

ID-140

# Kentucky Beef Quality Assurance Program

## **Program and Manual Development**

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## **Information contained in this manual is adapted from the following publications:**

Mid-Atlantic Beef Quality Assurance Program Certification Manual, 2006  
Virginia Beef Quality Assurance Chuteside Record  
*and*  
Alabama Beef Quality Assurance Training Manual  
Nebraska Beef Quality Assurance Training Manual  
Ohio Beef Quality Assurance Manual  
Milk and Dairy Beef Quality Assurance Program, Milk and Dairy Beef Residue Prevention Protocol





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# National Beef Quality Assurance Program Guidelines

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## Care and Husbandry Practices

- Follow animal care and well-being guidelines that conform to good veterinary and husbandry practices to avoid bruising, stress, or injury.
- Regularly evaluate and implement biosecurity practices.

## Feedstuffs

- A quality feed control program will be maintained for all incoming feed ingredients.
- Ruminant derived protein sources will not be fed.

## Feed Additives & Medications

- Only FDA-approved medicated feed additives will be used in rations.
- Proper withdrawal time for all additives and pesticide/herbicide use will be observed to avoid violative residues.

## Processing/Treatment & Records

- Extra-label drug use will only be used when prescribed by a veterinarian with a valid veterinarian-client-patient relationship.
- Records will be maintained for all treatments (individual or group) following BQA suggested record keeping guidelines and will be kept for a minimum of two years.
- All processing and treatment records will be transferred with the cattle to the next production level.

## Injectable Animal Health Products

- All injections will be administered in the neck region only. This includes both subcutaneous and intramuscular injections.
- All individual treatments will strictly follow only FDA/USDA/EPA guidelines. Administering products in a method that will cause tissue damage will be avoided.

### **BQA Code of Conduct**

- I received training in BQA and use it on my cattle enterprise because I have a commitment to consumers to produce the safest, highest quality beef in the world.
- I use BQA production practices because maintaining an optimum environment for cattle to produce at their best promotes efficiency and quality at the same time. BQA training has shown me that keeping records of all my production practices is the best way for me to reduce liability, provide quality assurance to my customers, and continue to ensure a safe beef supply through strict adherence to residue avoidance practices.
- BQA has taught me to think about all of my production practices in light of their effect on the quality of the final product.
- BQA is a combination of technology, common sense, a concern for animal well-being, and a consumer oriented production system.

# The Importance of Beef Quality Assurance



**Sample records:**  
See Chapter 11.

**B**eef Quality Assurance (BQA) is a program developed to ensure that beef and dairy cattle are managed in a manner that will result in safe and wholesome beef and milk products for the consumer. This statement is not only the definition but the goal of BQA. Specifically, BQA is designed to enhance carcass quality by preventing drug residues, injection-site blemishes, and bruises. The Kentucky Beef Quality Assurance Program is based on recommended national guidelines and scientific research. This program enables beef and dairy producers to enhance their product, maximize marketability, and strengthen consumer confidence.

**Members of each industry sector should assume responsibility for the role they play in delivering a quality beef product to their respective markets. By working together toward continued improvement of our product and our responsiveness to consumers, we all benefit.**

## Is BQA Necessary?

From gate to plate, BQA is a positive step for producers and consumers.

Concern over food wholesomeness and safety is an important consumer issue. It is of utmost importance that the public knows beef is a safe product. A BQA program will help secure consumer confidence for expanding domestic and export markets. BQA is a good business practice, which can identify potential problem areas to avoid product defects.

All sectors of the industry—from seedstock, cow-calf, heifer growers, and dairy producers to stocker operators, backgrounders, cattle feeders, and points of sale and harvest—must take responsibility for the production of a safe food product through proper animal care, handling, and management practices.

The level of consumer confidence in beef significantly affects consumer eating habits and impacts the future of our industry. Consumer confidence is essential if we are to “steak” our claim in the meat case.

Beyond safety, the economic importance of BQA can be seen when analyzing the top quality challenges in the production of beef. The 2000 National Beef Quality Audit showed that the industry lost an average of \$100 for every fed steer or heifer marketed. Quality challenges include:

- Inconsistent size of meat cuts
- Non-uniform cattle
- Injection-site blemishes
- Branding
- Excessive external fat
- Excessive seam fat
- Inadequate muscling
- Dark cutters

All meat industries face similar concerns. By following BQA guidelines and management practices, beef and dairy producers increase the value of their product in the eyes of the consumers, while enhancing their stewardship of natural and financial resources.



### BQA Objectives

- Set production standards in your operation that can be met or exceeded.
- Establish systems for data retention and record keeping, which will allow validation of management activities and fulfill the program goal.
- Provide hands-on training and education for participants to meet or exceed the guidelines of the BQA program and to realize the benefits of such a program.
- Provide technical assistance through state cattlemen’s associations, state beef councils, BQA certified veterinarians, and BQA certified university Extension agents. These individuals will be available for on-site assistance, if desired by producers.



**All sectors of the industry must take responsibility for the production of a safe food product through proper animal care, handling, and management practices.**

## The History of Beef Quality Assurance

Consumers have always expected safe and wholesome food. In 1980, because of beef safety concerns, beef producers began investigating ways to ensure that their production practices would pass the scrutiny of the consumer.

The Beef Quality Assurance program is not a new idea. In 1982, the United States Department of Agriculture Food Safety Inspection Service (USDA-FSIS) began working with the beef industry in the United States to develop the Pre-Harvest Beef Safety Production Program. The beef industry refers to this as Beef Quality Assurance, or BQA.

Because the majority of beef is raised by small independent producers in a vast variety of environmental climates, the BQA program has been modified and adapted to meet the needs of a range of production and marketing circumstances. Presently, a BQA educational program is active in 47 states.

The Kentucky Beef Quality Assurance Program began in 2000. It is designed to bring best management practices (BMP) to the farm that, along with Hazard Analysis and Critical Control Points (HACCP) principles applied at harvest and processing facilities, will ensure safe, wholesome, uniform, and quality beef products for consumers. It is a cooperative effort among beef and dairy producers, veterinarians, Cooperative Extension agents, and other professionals representing Kentucky Veterinary Medical Association (KVMA), University of Kentucky Cooperative Extension Service, Kentucky Beef Council, Kentucky Cattlemen's Association, Kentucky Dairy Development Council, and the Kentucky Department of Agriculture.

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**Implementing BQA practices provides cattle producers with an important key for avoiding additional government regulation. Producer-driven programs have proven very successful and will continue to allow the industry the flexibility needed to produce safe, wholesome food in an economical manner.**

## Meeting the Industry Quality Challenges

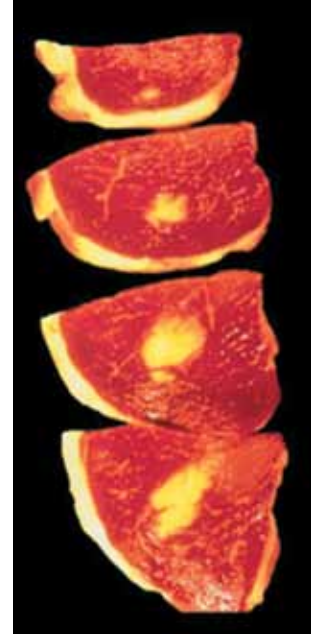
Four national Beef Quality Audits (NBQA) have been conducted between 1991 and 2005. In three of the audits, defects in the hide (from branding and lice) and lack of uniform size of rib eye and other meat cuts were identified. In the 2005 NBQA, inadequate tenderness, excessive external fat, insufficient marbling, and excess carcass/cut weights were identified as the major factors affecting meat quality. For the first time, the 2005 NBQA identified lack of traceability of cattle from feedlots, need for instrument grading, need for clearer market signals, and need for communication among sectors as areas that the industry must address.

Good production practices can reduce, if not eliminate, the occurrence of quality problems. This manual outlines Best Management Practices (BMP) in key areas to help producers meet the industry's beef quality challenges. These include implementing genetic and production management systems that have been shown to reduce beef quality defects, improve beef eating quality characteristics (such as flavor, tenderness, and juiciness), and ensure food safety.

### Potential Value Loss

Today's estimated potential loss in value due to quality defects continues to exceed \$100 for every fed steer and heifer marketed in the United States. The value lost due to management defects can begin to be recovered simply by evaluating and altering the management techniques used in today's beef and dairy production systems. Current problems that producers have control over include injection-site blemishes, hide damage, bruises, and dark cutters.

**BQA practices have almost eliminated the reported injection-site blemishes as a major effect on quality because producers moved injection sites to the neck and away from the rump.**



This injection site lesion was a result of a 2 ml seven-way injection given to a calf at 50 days of age, and was not discovered in the processing of the carcass until the whole muscle was sliced for retail. A retailer would send this back for a refund. Not only does this blemish cause economic losses to the industry, it reflects real damage to customer confidence in the overall quality and reliability of our product.





**Shoulder top blade (flat iron) steak:** cut from the chuck



**Round (sirloin) tip center steak:** cut from the round



**Bottom round (western griller) steak:** cut from the round



**Shoulder center steak (ranch cut):** cut from the chuck

## Capturing Added Value

As the food industry develops new products and packaging processes, correct injection sites and techniques become even more critical to realizing added value. New beef products have been introduced that add value to traditionally under-utilized chuck and round primals. The popular flat iron steak, cut from the chuck, is one example. It lies 3 to 4 inches in front of the shoulder blade, therefore, producers should give intramuscular shots further forward in the shoulder blade to keep from reducing the value of the flat iron. Furthermore, the use of modified atmosphere (MA) packaging processes for case-ready beef can discolor the meat near an injection site—even if the muscle contains no blemishes from the injection.

Animal health companies continue to research and develop products with BQA-friendly routes of administration. Administering animal health products according to label directions, marketing cattle at the optimum end point, reducing stress in cattle handling, and eliminating extremes in size of breeding stock are some of the ways by which quality defects are reduced and the market value of the beef cuts is increased.

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Improved awareness and implementation of BQA practices from 1991 to 2005 have reduced the incidence of injection-site blemishes.



## KY-BQA Certification

It is important to understand that people become BQA certified; operations or production units do not. The people who practice the guidelines and the people who implement the requirements and recommendations impact the end product and value of the animal. All farm personnel who handle cattle should be informed about proper processing techniques and provided with training to understand cattle behavior and recommended BMPs. Therefore, certification is done on an individual basis, not by facility or production unit.

Any person who handles cattle can become eligible for certification by:

- Attending the BQA certification training program
- Passing the post-test
- Completing the training checklist and certification form

Once the appropriate forms and check are received at the Kentucky Cattlemen's Association, they will be processed and the certification card will be provided to the producer or farm personnel.

Certifications must be renewed every three years.

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**BQA certification is a process by which producers accept responsibility for the actions under which cattle on their production unit were managed and produce a safe, wholesome product for the consumer. Any farm personnel who handle cattle should be certified.**

# Vaccine and Drug Practices



**Sample records:**  
See Chapter 11.

**Lesion:** an injection site blemish.



The lesions in this roast beef were not discovered until the fully cooked roast was sliced by a foodservice employee.

Based on the 2000 National Beef Quality Audit, injection-site blemishes (lesions) cost the beef industry \$188 million annually. This means producers lost an average \$7.05 per head per year in the value of the steers and heifers marketed. Research sponsored by NCBA on behalf of the Beef Checkoff uncovered a negative relationship between meat tenderness and injection sites, including those injection sites that had no visible lesions. Findings concluded that all intramuscular (IM) injections, including sterile water, create permanent damage—regardless of the age of the animal at the time the product was given. At the very least, tenderness is reduced in a 3-inch area surrounding the injection site.

Contrary to popular belief, not all beef from market cows is sold as ground beef. For example, rib eye rolls and rounds from market cows and bulls are used as whole muscle cuts in popular consumer products such as Philly Steak and roast beef sandwiches, as well as marinated and tenderized steak products. Thus, BQA practices are just as important throughout the life of cows and bulls.

**SQ (subcutaneous) injections:**

- Needle gauge: 16 to 18  
Length:  $\frac{3}{4}$  to 1 inch;  $\frac{3}{4}$ -inch if tent technique is **not** used.
- No more than 10 cc at a single injection site.
- Separate injection sites by at least 5 inches.

**IM (intramuscular) injections:**

- Needle gauge: 16 to 20  
Length: 1- to 1½-inch long
- No more than 10 cc at an injection site. Too much drug in one area can cause muscle damage.

## Injection Sites and Techniques

To lessen injection-site defects in economically important cuts of beef, the preferred site for all subcutaneous (SQ) or intramuscular (IM) injections is the neck region (See Figures 2-1 and 2-2.) It is particularly important to use the neck region with IM products, because even the shoulder chuck primal contains “value-added” cuts that should be protected.

Whenever possible, choose products formulated and labeled for SQ rather than IM injection. See Table 2-1 for proper needle sizes.

### Subcutaneous Injections

SQ injections are made just under the skin but not into the muscle tissue. The side of the neck is the best area to make injections. To administer, lift the skin with your free hand and insert the needle into the raised fold of skin. This is known as the “tent technique” (Figure 2-2).

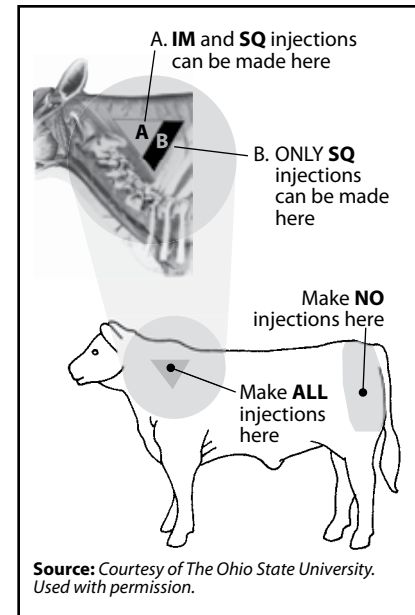
Several animal health products are now approved to be injected into the ear of cattle. This location is excellent from a BQA perspective as ears are removed at harvest and do not enter the food chain. The ear must be clean to avoid infection, and producers should take care to avoid blood vessels. Read product labels carefully. An example of an ear injection technique can be found on the internet at <http://www.excede.com/>.

**Certain antibiotics, vaccines, and implants are approved for the ear injection site. The exact location on the ear depends on the product. For example, liquid or pelleted growth implants are given in the middle third of the ear; whereas some antibiotics and vaccines may be administered in the base of the ear.**

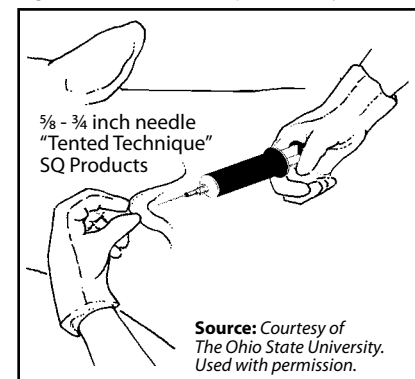
### Intramuscular Injections

IM injections are made directly into muscle tissue of the neck. Absorption of the drug is more rapid in the muscle than under the skin because of the good blood supply to muscle tissue. After the injection site is chosen, distract the animal by slapping the injection site firmly. Immediately insert the needle with a quick thrust.

**Figure 2-1.** Proper injection sites.



**Figure 2-2.** “Tent” technique for SQ injection.



**Do not straighten and reuse a bent needle.**

**Table 2-1.** Determining proper needle gauge based on the route of administration, animal size, and viscosity<sup>1</sup> of fluid.

Fluid Viscosity <sup>1</sup>	SQ Injection ( $\frac{3}{4}$ to 1 inch long needle)			IM Injection (1 to 1½ inch long needle)			IV Injection (1½ inch long needle)		
	Animal Size (lb)			Animal Size (lb)			Animal Size (lb)		
	<300	300-700	>700	<300	300-700	>700	<300	300-700	>700
	Needle Gauge			Needle Gauge			Needle Gauge		
Thin	18	18-16	16	20-18	18-16	18-16	18-16	16	16-14
Thick	18-16	16	16	18	16	16	16	16-14	16-14

Select the needle to fit the cattle size (the smallest practical size without bending).

<sup>1</sup> An example of a thin viscosity fluid: saline; thick: oxytetracycline



Using proper restraints when injecting cattle can help to avoid accidents.

**MA (modified atmosphere) packaging is a process that exposes meat to a mix of oxygen and carbon dioxide. It can cause green discoloration of the meat close to an injection site, even when no blemish or lesion has occurred. The practice allows packers to more easily identify lesions at the plant level so that they do not end up on a consumer's plate inadvertently.**

## Needle Use and Handling

### General Guidelines

- Select a clean injection site.
- Single-use needles are preferred.
- Keep the contents of the vaccine bottle sterile; do not store a syringe and needle in the top of a bottle.
- Do not put a needle back into the vaccine bottle once it has been used for anything else.
- Keep transfer needles in a closed container when at chute-side and after use, boil and place in a clean container (see Figure 2-4 for instructions).

### Selecting the Proper Needle Gauge

Primary considerations in needle selection include route of administration, size of the animal, and site of the injection. Secondary considerations include viscosity of the fluid and volume injected. The needle size used should never be larger than necessary to adequately perform the injection (Table 2-1).

### Changing Needles

- Change needles every 10 to 15 head, or with every automatic dosing syringe refill.
- Change any needle that is bent, or becomes contaminated (manure, dirt, or chemicals), or if the needle point becomes burred.
- To prevent the spread of known blood-borne infectious diseases, use a new needle for each animal.

**Note:** A broken needle is an emergency; it will migrate farther into the tissues. Under no circumstances should animals with broken needles be sold or sent to a packer.



**Figure 2-3.** Examples of needle tips. When needles become burred they should be replaced.

**Viscosity:** A measure of how thick and tenacious a fluid is. High viscosity fluids (like oxytetracycline) are thicker and more sluggish; low viscosity fluids (like saline) are thinner and flow more freely.

Figure 2-4.



**Improper sterilization** can reduce the effectiveness of future injections and result in infection at the injection site.

**To sterilize:**

1. Bring a container of water to a rolling boil.
2. Place equipment in the boiling water.
3. Cover the container.
4. Bring the water back up to a boil.
5. Continue boiling for three to five minutes.

Source: Center for Disease Control and Prevention

Disinfectants (like rubbing alcohol) can decrease or even eliminate the effectiveness of modified live virus products.

## Cleaning Needles

- Use disposable needles and syringes.
- Heat-sterilize reusable equipment by boiling.
- Do not contaminate modified live virus products with disinfectants (such as rubbing alcohol).

## Proper Disposal of Sharps for Producers

- Place in a thick plastic container with a secure lid. A sharps container is best, but a liquid detergent bottle can also work.
- Place sharps container in a rigid container lined with plastic.
- Dispose of as solid waste.

Injecting into a wet or muddy site increases the risk for spreading disease as well as increasing the number of injection-site lesions.

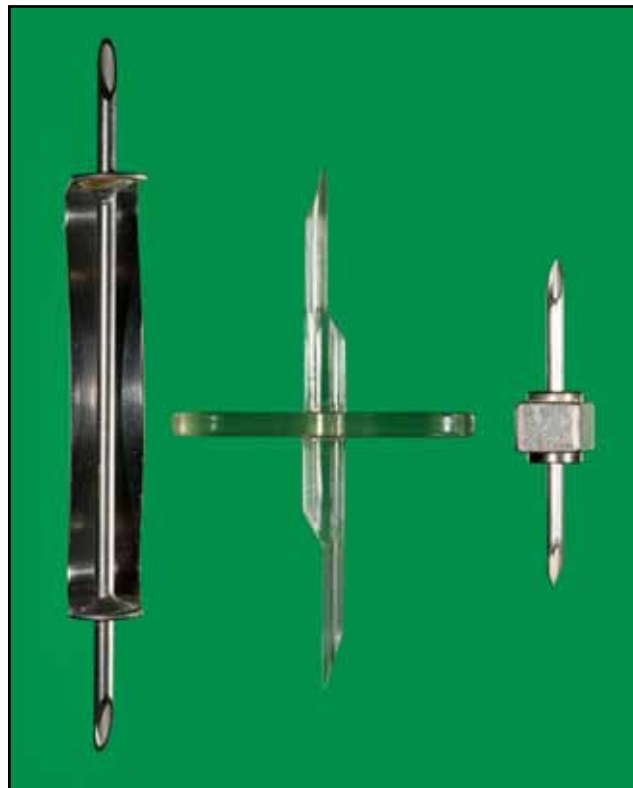


Figure 2-5. Transfer needles: SMTN (Springer Magrath Transfer Needle), disposable plastic needle, short metal needle.

To reconstitute a vaccine, place one end of the transfer needle into the sterile liquid and the other into the bottle containing the freeze-dried cake of vaccine. The vacuum should pull the liquid down.



## Drug Management

Open and consistent communication between a dairy/livestock producer and a veterinarian is needed to assure quality control, animal welfare, and prevention of drug and chemical residues. Using animal health products exactly as they are labeled or prescribed by a veterinarian with whom the producer has a valid veterinarian-client-patient relationship (VCPR) is a requirement of a BQA program. Information about establishing a valid VCPR is contained later in this chapter.

## Storage

Animal health products usually have specific storage requirements. Some require refrigeration. All should be stored in a clean place where they cannot become dirty or contaminated. Observe and obey the manufacturer's recommended storage instructions for each product.

Where refrigeration is needed, be sure the refrigerator is kept clean and located in a safe place that is not likely to be overheated or contaminated by dirt or manure. Do not keep refrigerated drugs in door shelves because of the temperature fluctuation.

Drugs for lactating dairy cows must be stored separately from those used for nonlactating cattle. This helps prevent lactating animals from receiving drugs intended for nonlactating animals, which could cause an illegal residue in milk and meat. This restriction applies to drugs stored both at room temperature and under refrigeration.

## Handling Precautions

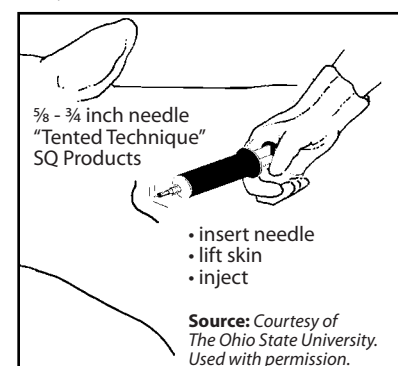
- Always read and **follow label instructions** and supply them in Spanish or other languages if needed.
- Post the local **poison control** center number by all phones.
- Use **proper restraints** when injecting cattle.
- With medication known to be toxic to humans, use the **one-handed SQ tent technique** (Figure 2-6). Use extreme caution if using automatic syringes for these medications.



Use separate syringes for each product. Even a trace amount of killed product can harm the effectiveness of the modified live product.

**Don't mix too much vaccine at one time. Modified live vaccines (MLV) begin to degrade after about an hour in the heat and sunlight.**

**Figure 2-6.** One-handed "tent" technique for SQ injection.





**Don't store partially used containers of vaccines. This can lead to infections at injection sites and result in ineffectiveness of the vaccine.**

## Ensuring Drug Effectiveness

### Preparation

- Use only fresh products.
- Keep in a cooler from purchase until refrigerated or administered.
- Purchase appropriate dosage sizes for the task.
- Use transfer needles to reconstitute vaccines.

### Mixing

- Rock bottle(s) back and forth, but do not shake.
- Do not mix too much at one time.
- After mixing, gently rock bottle(s) periodically.
- Use only approved combinations.

### Administering

- Label syringes before processing.
- Use separate syringes for each product.

### Storage

- Do not store partially used containers.
- Clearly label all products before storage.

## Residue Avoidance

Drug residue in livestock products must be avoided. Consumers are concerned about the drugs used in dairy and livestock production and how they affect the food they eat. The industry can address these concerns by assuring consumers that the necessary steps are taken to prevent drug residues. Consumers expect zero tolerance.

Residue violations and condemnations can be avoided by implementing and following control systems that incorporate the following practices:

- Maintain proper individual animal identification.
- Maintain complete medical records on animals for at least two years (see sample records in Chapter 11).
- Properly store, label, and account for all medication.
- Use animal health products according to the label.
- Maintain a valid VCPR.
- Educate all employees and family members about your control systems, and emphasize the importance of keeping drug residues out of the human food chain.



Cooler with automatic pistol-gripped syringes loaded with modified live vaccine.

Photo courtesy of Ron Gill, Texas A&M University.

**Don't combine products unless their combined use is approved: Mixing unlike products can destroy effectiveness.**



## Drug Classifications

The Food and Drug Administration (FDA) has the responsibility for determining the market status of animal drugs, based in part upon whether it is possible to prepare “adequate directions for use” under which a layperson can use the drugs safely and effectively. The two basic classes of drugs available to livestock producers are discussed below:

### Over-the-counter Drugs

Over-the-counter (OTC) drugs can be purchased from multiple sources and must be used as directed on the label (Figure 2-7). For example, most procaine penicillin G products are labeled for use at 1 cc/cwt and are given IM. So, a 600-pound calf would get 6 cc IM. Producers are not allowed to change the dose or give the drug by any other route, such as SQ.

### Prescription Drugs

A drug that has significant potential for toxicity (or other harmful effects) in humans or animals that may have a unique method of use or which requires other special considerations for its use is usually labeled as a prescription (Rx) drug. Such products can be used or dispensed only by or on the order of a licensed veterinarian, and the label must contain the legend: “Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian” (Figure 2-8).

**Measurements:**  
1 cc = 1 ml

Figure 2-7. Sample over-the-counter label.

<i>Name of Drug</i>	→ <b>COWBIOTIC</b>
<i>Active Ingredients</i>	→ (hydrocillin and streptazolidin in aqueous suspension)
<i>Instructions for Use</i>	→ Directions for Use: See package insert.
<i>Withdrawal Times</i>	→ <b>Warning:</b> The use of this drug must be discontinued for 30 days before treated animals are slaughtered for food. Exceeding the highest recommended dosage level may result in antibiotic residues in meat or milk beyond the withdrawal time.
<i>Quantity of Contents</i>	→ Net contents: 100 ml
<i>Name of Distributor</i>	→ Distributed by: Animal Health

**Note:** Over-the-counter drugs must be used as directed on the label.

Figure 2-8. Sample prescription label.

<i>Name of Drug</i>	→ <b>BULLMYCIN 300</b>
<i>Active Ingredients</i>	→ (Wondercine HCl)
<i>Instructions for Use</i>	→ Directions for Use: See package insert.
<i>Prescription Legend</i>	→ <b>Caution:</b> Federal law restricts this drug to be used by or on the order of a licensed veterinarian.
<i>Withholding Times</i>	→ <b>Warning:</b> The use of this drug must be discontinued for 28 days before treated animals are slaughtered for food. Exceeding recommended dose, or number of days treatment, or 10 ml per injection site may result in antibiotic residues beyond the withdrawal period.
<i>Quantity of Contents</i>	→ Net contents: 100 ml
<i>Name of Distributor</i>	→ Distributed by: Animal Health

## Extra-Label Use of Drugs

Extra-label use is defined as the “actual or intended use of a drug in a manner that is not in accordance with the label.” Under the provisions of the Animal Medicinal Drug Use Clarification Act of 1994, the FDA recognizes the professional judgment of veterinarians and allows the extra-label use of drugs (either OTC or Rx) by veterinarians under certain conditions. Extra-label use is limited to situations where a failure to treat an animal would:

- Threaten the health or life of an animal
- Cause undue suffering

**Veterinarians may only consider using drugs in an extra-label manner under the following conditions:**

1. There is no approved drug that is labeled for such use and that contains the same active ingredient in the required dosage form and concentration.
2. A currently approved and labeled drug is clinically ineffective for its intended use (e.g., drug resistant bacterial infections).

**Extra-label use:** the actual or intended use of a drug in a manner that is not in accordance with the label.

## Veterinarian-Client-Patient Relationship (VCPR)

Extra-label treatments may only be administered by a licensed veterinarian or under the supervision of a licensed veterinarian, and within the scope of a valid VCPR. A valid VCPR exists when:

- The veterinarian has assumed the responsibility for making clinical judgments regarding the health of the animal(s) and the need for medical treatment, and the client (owner or caretaker) has agreed to follow the veterinarian’s instructions.
- The veterinarian has sufficient knowledge of the animal(s) to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s), or by medically appropriate and timely visits to the premises where the animal(s) are kept.
- The veterinarian is readily available or has arranged for emergency coverage for follow-up evaluation in the event of adverse reactions or failure of the treatment regimen.

## Precautions

Prior to using or dispensing a drug in an extra-label manner, the veterinarian should take the following precautions:

- Make a careful diagnosis and evaluation of the conditions for which the drug is to be used.
- Establish a substantially extended withdrawal period prior to marketing of milk, meat, or other edible products.
- Institute procedures to assure that the identity of the treated animal(s) is carefully maintained.
- Take appropriate measures to assure that the assigned withdrawal times are met and that no illegal drug residues occur in any food-producing animal subjected to extra-label treatment.

Penicillin accounts for more than 20 percent of all antibiotic residue violations in beef. It is the most commonly used drug and is routinely purchased over the counter. Gentamicin and streptomycin run a close second in the number of residue violations attributed to these antibiotics.

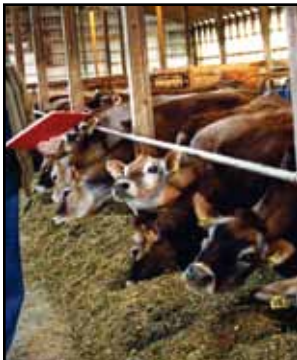
## Labeling

Drugs intended for extra-label use must have additional labeling (Figure 2-9), including at least the following information:

- The name and address of the prescribing veterinarian (not just the clinic)
- The name of the active ingredient(s)
- Directions for use, including identity of the animal being treated, dosage, frequency and duration of treatment, and route of administration
- Any cautionary statements specified by the veterinarian
- The veterinarian's specified withdrawal time for meat and/or milk

**A common mistake: improperly administering a drug—e.g., a large dose is given all in one site instead of smaller doses in multiple sites.**

**Figure 2-9.** Label provided by veterinarian for "extra-label" use.



<i>Name and Address of Veterinarian</i>	• Veterinarian _____ Phone _____
	Address _____ Date _____
	Expiration of drug _____
	Owner/Farm _____
<i>Cautionary Statements</i>	• Active Ingredients _____
	• Indications _____
<i>Instructions for Use</i>	• Directions:
	Give _____ cc's/bolus/oz
	_____ times each day for _____ days.
	• Prescribed meat withholding time _____
<i>Prescribed Withholding Times</i>	Hours of milk withhold _____
	Send samples: Y / N
	Days slaughter withhold _____
	Appropriate drug tag

**VCPR (veterinarian-client-patient relationship):** Open and consistent communication between a producer and veterinarian helps to assure quality control, animal welfare, and prevention of drug and chemical residues.

## Limitations

**The extra-label use of drugs is not permitted in or on animal feeds.** A veterinarian cannot use or prescribe drugs for use in feed in any manner except for the approved use and at the approved dosage. Extra-label use of drugs in treating food-producing animals for improving rate of weight gain, feed efficiency, or other production purposes is also prohibited. Some specific drugs are completely prohibited for extra-label use in food-producing animals, including:

- Chloramphenicol
- Clenbuterol
- Diethylstilbestrol
- Dimetridazole
- Iprnidazole
- Other nitroimidazoles
- Furazolidone (Furacin topical powder)
- Nitrofurazone
- Fluoroquinolones (except for approved use for beef cattle)
- Glycopeptides

## Drug Withdrawal Times

A withdrawal time should be indicated on the label of medications. This is the period of time that must pass between the last treatment and the time the animal will be harvested or milk can be sold. For example, if a medication with a 14-day meat withdrawal period was last given on August 1, the withdrawal would be completed on August 15, and that would be the earliest the animal could be harvested for human consumption. Often there are separate withdrawals for milk and meat, and meat withdrawals are always longer.

It is important that you follow withdrawal time directions on the label or as prescribed by your veterinarian. From the day you acquire your animals until the day they leave your care, you should maintain feed and treatment records. This is important for the day-to-day care of your animal and for whoever may later purchase your animal.

Observe label instructions and withdrawal times carefully. When using drugs by extra label, work closely with the veterinarian on dosages and withdrawal times. Never use an approved veterinary drug in an extra-label manner without consulting the veterinarian. Treating animals in an extra-label manner without direction by a licensed veterinarian is illegal.

Unacceptable levels of drug residues detected in edible tissues collected at harvest will result in traceback, quarantine, and potential fines or jail time. Substantial economic losses may result for the individual producer as well as negative publicity for the entire beef industry.

**Producers are responsible for residue problems and should follow these rules:**

- Do not market animals for food until the withdrawal time listed on the label or prescribed by the veterinarian has elapsed.
- Use only medications approved for cattle, and use them exactly as the label directs or as prescribed by your veterinarian.
- If ever in doubt, rely on the VCPR you have established with your veterinarian. Consult your veterinarian with all questions and concerns.
- Keep records that show drug and dosage used, animals treated, and withdrawal time.

All federally approved drugs will include the required withdrawal time for that drug on the product label or package insert. These withdrawal times can range from 0 to as many as 60 days or more. The Compendium of Veterinary Products, published by the North American Compendiums Inc., gives a comprehensive list of drugs approved for use in beef and dairy cattle as well as a description of each drug. In addition, the Compendium includes a chart of the withdrawal times for meat and also includes time of milk withholding. **The drug label itself always supersedes the Compendium if there is a discrepancy.** It is your responsibility to be aware of the withdrawal times of any drugs that you use on your cattle. More information is available at these Websites: <<http://www.fda.gov/>> and <<http://www.farad.org/>>.

## Managing Implants

Implants may provide an economic advantage in the production of safe and wholesome beef. Beef from implanted cattle has proven to be leaner than beef from non-implanted cattle, with minute differences in hormone levels (Figure 2-10). Nevertheless, consumer concern remains high with regard to implanted beef. Administer implants properly and follow label directions, including proper sanitation and the use of antiseptic on the needle between every use. Proper sanitation results in fewer abscesses in the ear and allows for higher utilization of the implant.

Regulations governing the use of implants are set by the FDA. Always read and follow the manufacturer’s directions before implanting any cattle. The growth promotant implants approved for use in the United States are extremely safe for both production and consumption. There is no required withdrawal time for slaughter with FDA approved implants.

The only approved location for implant administration is the middle third of the backside of the ear. All implants must be located SQ within this area (Figure 2-11). Implants should never be placed in locations other than the ear.

**Figure 2-10.** Hormone levels in beef.

<b>Small Amounts Found in Beef</b>	The difference in levels of estrogen found in beef from cattle raised with or without growth promotants is miniscule.
	<p><b>Growth promotants vs. no growth promotants (in nanograms of estrogen)*</b></p> <p>3-ounce serving of beef from a steer treated with growth promotants ..... 1.9</p> <p>3-ounce serving of beef from a steer raised without growth promotants, such as certified organic beef ..... 1.3</p>
<b>FDA-Approved Safe Levels</b>	One serving of beef from a steer implanted with a growth promotant has nearly 20 times less estrogen than what the FDA permits, and thousands of times less than the amount our bodies naturally produce, not to mention a fraction of the phytoestrogen levels present in foods such as soybean oil, cabbage and grains.
<b>Hormones in the Human Body</b>	The human body naturally produces hormones in quantities much greater than could ever be consumed by eating any food. In fact, the average man or woman daily produces 35,000 times more hormones than could be present in beef or other food.
	<p><b>Male vs. Female (in nanograms of estrogen)*</b></p> <p>Male child ..... 41,500</p> <p>Female child ..... 54,000</p> <p>Male adult ..... 136,000</p> <p>Female adult ..... 480,000</p> <p>Female adult (pregnant) ..... 3,415,000</p>
* A nanogram is one billionth of a gram, which is analogous to one blade of grass in an entire football field.	

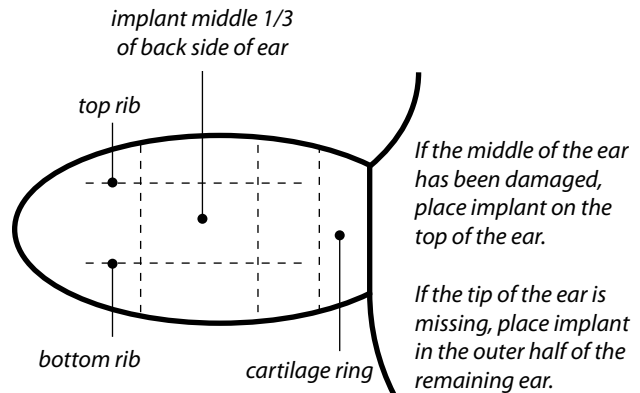
Sources: Food and Drug Administration; Hoffman and Evers; Scanga et al.; FSIS-USDA; Dr. Harlan Ritchie, Michigan State University.

Routine inspection of implant sites should be done every time animals are handled through a chute. Document the results of the inspection for future reference in implant management decisions.

Although there is no withdrawal period for implants, there are quality considerations in the timing. Aggressive implant strategies that maximize the response to the implant in growth and feed efficiency can compromise carcass grade. A conservative approach may not pay, however, when the Choice and Select price spread is too narrow to offset the lost value in feed efficiency and gain, which implants provide. It is as much an economic decision as it is a quality decision.

The objective is to know your options, then plan and keep records to evaluate your decisions.

Figure 2-11. Approved location for implant administration.



Using Implants Correctly—Implanting Mistakes and Solutions		
Problem	Cause	Solution
Abscess at implant site	Lack of sanitation	Disinfect equipment, dry ears, improve restraint
Bunched pellets	Needle moved, poor restraint	Improve cattle restraint
Retrograde abscess	Infection after implanting	Pinch site after implanting; improve sanitation
In cartilage	Poor needle; too fast; improper placement	New needle; slow down; place properly
Crushed pellet	Needle not fully inserted	Fully insert needle
Missing implant	Not advancing cartridge; needle placed through ear; abscess occurred	Check implant position, pinch site shut
Separated pellet	Rapid withdraw of needle, processing too fast	Slow down, withdraw needle slowly
Partial implant	Needle too short, too fast, poor restraint	Use needle provided, slow down, improve restraint
Pellet too close to the head	Inexperience	Implant only in middle one-third of the ear
Walled-off implant	Abscess	Improve sanitation

Source: *Compudose Technical Manual*, 1982.

## Producer's Guide for Judicious Use of Antimicrobials (Antibiotics) in Cattle

1. **Prevent problems.** Emphasize appropriate husbandry and hygiene, routine health examinations, and vaccinations.
2. **Select and use antibiotics carefully.** Consult with your veterinarian on the selection and use of antibiotics. Have a valid reason to use an antibiotic. Therapeutic alternatives should be considered prior to using antimicrobial therapy.
3. **Avoid using antibiotics important in human medicine as first-line therapy.** Avoid using as the first antibiotic those medications that are important for treating strategic human or animal infections.
4. **Use the laboratory to help you select antibiotics.** Cultures and susceptibility test results should be used to aid in the selection of antimicrobials, whenever possible.
5. **Avoid using broad spectrum.** Use narrow spectrum antimicrobials whenever possible. Combination antibiotic therapy is discouraged.
6. **Avoid inappropriate antibiotic use.** Confine therapeutic antimicrobial use to proven clinical indications, avoiding inappropriate uses such as for viral infections without bacterial complication.
7. **Treatment programs should reflect best use principles.** Regimens for therapeutic antimicrobial use should be optimized using current pharmacological information and principles.
8. **Treat the fewest number of animals possible.** Limit antibiotic use to sick or at-risk animals.
9. **Treat for the recommended time period.** This practice will minimize the potential for bacteria to become resistant to antimicrobials.
10. **Avoid environmental contamination with antibiotics.** Steps should be taken to minimize antimicrobials reaching the environment through spillage, contaminated ground run-off, or aerosolization.
11. **Keep records of antibiotic use.** Accurate records of treatment and outcome should be used to evaluate therapeutic regimens. Always follow proper withdrawal times.
12. **Follow label directions.** Never use antibiotics other than as labeled without a valid veterinary prescription.
13. **Extra-label antibiotic use must follow FDA regulations:** Prescriptions, including extra-label use of medications must meet the Animal Medicinal Drug Use Clarification Act (AMDUCA) amendments to the Food, Drug, and Cosmetic Act and its regulations. These regulations require a valid VCPR.
14. **Subtherapeutic antibiotic use is discouraged.** Antibiotic use should be limited to prevent or control disease and should not be used if the principle intent is to improve performance.

Source: Guidelines 1 through 13 adapted by NCBA, from AVMA, AABP, and AVC Appropriate Veterinary Antibiotic Use Guidelines.





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# Livestock Feeds and the Feed Supply

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**Sample records:**  
See Chapter 11.

Sound feeding and management practices are an integral part of raising wholesome meat and milk products for consumers. Cattle should be provided a clean, readily accessible source of water from tanks or watering devices free from bacterial or nutrient contaminants. Producers should feed nutritionally balanced diets composed of quality forages and feedstuffs harvested and stored to prevent contamination. To prevent contamination of the meat and milk produced, no harmful residues should be allowed to enter the feed supply when cattle are fed.



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**Birds and rodents not only consume feed but can spread disease by contaminating feed with their droppings.**



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Federal law prohibits the use of ruminant-derived animal protein in any feed fed to cattle (ruminants).

## Purchased Feeds

- Federal law prohibits the use of ruminant-derived animal protein in any feed fed to cattle (ruminants). At press time, an expanded version of this feed rule is under review. The producer is responsible for knowing and complying with regulations as they are amended.
- Several medicated feeds and feed additives are approved for use in cattle. However, medicated feeds must be used according to the label directions, and withdrawal times must be followed.
- Extra-label use of medicated feeds or feed additives by nutritionists or veterinarians is illegal and prohibited.
- Feeds (grain mixes as well as commodities) should be purchased from suppliers who have quality control programs in place and who stand behind their products.
- When purchasing commodities and/or by-products, ask for assurances that they do not contain contaminants (i.e., pesticides), which can cause meat residue problems.
- Maintain records of feed purchases to indicate source, date, and amount purchased for at least two years.



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To prevent the spread of diseases such as Johne's, wash tractor wheels and loaders after handling manure and before feeding cattle.



Be especially careful during years with drought, hail, or flood damage when grain crops are used as forages to feed to cattle.

## Feed Storage and Handling

- **Do not use** pesticide or insecticide containers to store feed or to feed cattle.
- **Do not store** crop chemicals, petroleum products, or other hazardous material in areas where feed is stored, mixed, or processed.
- **Do not allow** cattle access to areas where chemicals or other hazardous materials are stored.
- **Do not allow** moisture, rodents, and birds to contaminate the feed supply.
- **Do not contaminate** feeds with manure during feeding.

## Pesticide- and Petroleum-Based Products

To avoid residue problems in cattle, pesticides (both insecticides and herbicides) need to be used according to the directions on the label. These labels contain directions on the time that must elapse before the crop is harvested, as well as the crops and intended purpose of those crops (i.e., grazing, forage, or grain crop). Be especially careful during years with drought, hail, or flood damage when grain crops are used as forages to feed to cattle.

If feeds are purchased, ask if pesticides were used and at what time in the growing/harvesting season they were applied. A producer is responsible for making sure all feeds are of high quality and are residue-free.

- **Do not store** full or empty pesticide containers in areas accessible to cattle.
- **Do not store** pesticide containers where feed is stored, mixed, or fed.
- **Do not use** pesticide containers to store feeds or to feed cattle.
- **Do:** Routinely check equipment for leaks of hydraulic fluid.

Separate equipment for feeding and manure handling is the best management practice to prevent the spread of diseases.





The producer is responsible for knowing and complying with any changes to the regulations of the Ruminant Feed Ban as they are made.

## Ruminant Feed Ban Regulation

### Purpose and Scope

The U.S. Food and Drug Administration (FDA) adopted the “Animal Proteins Prohibited from Ruminant Feed” regulation to prevent the establishment of Bovine Spongiform Encephalopathy (BSE) in the United States through feed with the goal of minimizing any risk to animals and humans. The final rule went into effect on August 4, 1997.

The regulation establishes certain requirements for renderers, protein blenders, feed manufacturers, distributors (including haulers), and individuals and establishments that are responsible for feeding ruminant animals.

**The Ruminant Feed Ban regulation prohibits the use of proteins from ruminants in feeds intended for ruminant consumption.** There are, however, certain exceptions to the rule at this time, including:

- Pure porcine or pure equine protein
- Blood and blood by-products
- Gelatin
- Milk products (milk and milk protein)
- Inspected meat products that have been cooked and offered for human food and further heat processed for animal feed use

## Requirements for Producers Feeding Animal Proteins

This regulation applies to establishments, both large and small feeding operations, and to individuals who are responsible for feeding ruminants.

Producers are required to keep the following records for 24 months:

1. Copies of all purchase invoices for all feeds received that contain animal protein. If a feed intended for ruminants contains animal protein, the protein can consist only of nonprohibited material. The regulation requires maintenance of invoices for all feeds containing animal protein so that the FDA can verify, if necessary, that the animal protein contained in the ruminant feed is from nonprohibited sources.
2. Copies of labeling for feeds received, which contain permissible animal protein products. The agency recognizes that bulk shipments of feed are commonplace and that labeling information typically is contained in the invoices for bulk shipments. In those instances, maintenance of the invoice is sufficient.
  - If the only labeling for a bulk product is on a placard, the placard for each shipment should be retained.
  - Feed may also be received in bags or other containers that have attached labeling. In those instances, the labeling should be removed and retained. However, maintenance of only one such labeling piece is necessary from each shipment that represents a different product.
  - If the labeling cannot be removed from the bag or other container, maintenance of a representative bag or a transposed copy of the labeling information from a container that cannot feasibly be stored will suffice.

Records should be legible and easy to retrieve. Producers must make copies of both invoices and labeling available for inspection and copying by the FDA if audited.

## Requirements for Manufacturers Producing Feed with Animal Proteins

Following are the requirements for protein blenders, feed manufacturers, and distributors that separate prohibited material and nonprohibited material.

“Distributor” is defined as any firm or individual that distributes or transports feeds or feed ingredients intended for animals. Haulers are included in this definition. Haulers who haul both prohibited and nonprohibited material, including blended animal protein products, are subject to the same separation procedures as manufacturers. Haulers of complete and intermediate feeds are “distributors.”

All equipment, including that used for storage, processing, mixing, conveying, and distribution that comes in contact with feeds containing prohibited material and nonprohibited protein must use reasonable and effective procedures to prevent contamination of manufactured feed. The steps used to prevent contamination of feeds include one or more of the following or equally effective procedures:

- Physical means—vacuuming, sweeping, or flushing and/or sequential production of feeds.
- If flushing is utilized, FDA recommends that the flush material be properly identified, stored, and used in a manner to prevent contamination of other feeds. The volume of flushed material should be sufficient to equal the operating volume of the shared equipment.
- If sequential production is utilized, FDA recommends that it be on a predetermined basis designed to prevent unsafe contamination of ruminant feeds. An example of appropriate sequencing would be swine feed containing prohibited material, followed by a swine or poultry feed not using prohibited material, followed by a ruminant feed containing nonprohibited material.

For FDA Guidance Documents and Federal Register Notices, reference FDA's BSE homepage at <<http://www.fda.gov/cvm/bsetoc.html>>.



# Impact of Management Practices on Carcass Quality



**Sample records:**  
See Chapter 11.

**Carcass defects:** injection-site blemishes/lesions, bruises, dark cutters, liver condemnation, etc.

Improving quality and consistency begins with understanding the industry targets for carcass traits. As always, targets for carcass defects are zero.

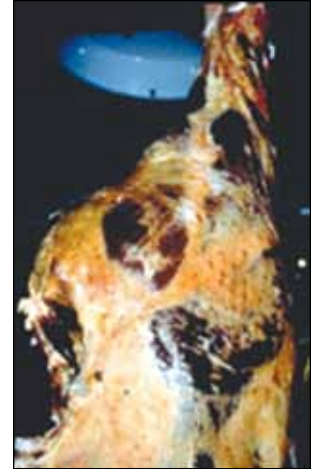
To improve quality and consistency, it is necessary to receive feedback on the performance of cattle that leave the production unit. Use this information as a basis for setting goals. By making adjustments, the consistency of meat products can be improved. Areas to evaluate include the rate of gain of cattle and feed conversion rate, and carcass grade.



Avoid standards and yield grades of 4 or 5.



Trait	Target
Yield Grade	< 3.0
Quality Grade	> Select, A-Maturity, No Dark Cutters
Carcass Weight	600 to 900 lb
Ribeye Area	11.0 to 15.0
Brands	No Hot Brands



## Importance of Genetics

Cutability, the percentage of boneless, closely trimmed retail cuts from a beef carcass, is reduced by both excessive external fat and inadequate muscling.

Muscling is more than a beef-quality issue; it is also a feedlot efficiency issue. Feeding practices that allow for the full expression of lean tissue (muscle) growth and development prior to finishing will also positively impact carcass cutability, even in lighter muscled cattle. Finally, muscle growth is energetically more efficient than fat accumulation, and this fact translates into better overall feed efficiency and a lower cost of gain in cattle with more muscle. Cow-calf producers must understand that their breeding and selection practices significantly impact muscling, as it is one of the most highly heritable genetic traits.

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## Reducing Bruising in Carcasses

Bruising costs the beef industry \$22 million annually in carcass trim at the time of processing. The most common cause of bruising is a hard bump against a protruding object or horns.

Rough, careless handling causes more than 50 percent of all bruises. It is advised not to rush livestock. Let them follow the leader and move at their own pace. Following are recommended practices to help reduce bruising:

### Horns

Horned cattle create bruises. Tipping of the horns will not reduce bruising. Polled cattle are recommended. Horned cattle need to be dehorned at an early age. Over-crowding horned cattle on a truck will increase bruising.

### Gates

Loin bruises are created when a gate is thrown into the side of an animal.

### Protruding Objects

Broken boards, nails, and exposed bolts should be eliminated. Check facilities by looking for shiny, rubbed spots or tufts of hair. Sliding gates (vertical or horizontal) should be padded with large-diameter hose. Corners can be padded by cutting strips from old tires or conveyor belts.



Carcasses with adequate muscling and without excess external fat are rewarded for quality—particularly when sold on a grade and yield basis.

## Fencing

Planks, sheet metal, or other fencing materials should be installed on the side of posts toward the cattle. If animals are being handled on both sides of the fence, install a rail to prevent cattle from catching hips on the posts. The area from 28 inches to 52 inches from the floor is the hazard zone.

## Flooring

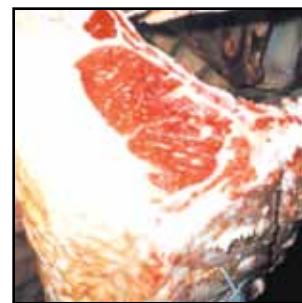
In new facilities with concrete floors where cattle are handled, prevent slipping and falling by scoring the concrete with an 8-inch diamond pattern with grooves 1 inch deep. In existing facilities, roughen the concrete or make a grid from 1-inch steel bars. Be sure to grind down sharp edges and let the concrete cure before permitting animal traffic.



Grooved concrete floors and scored rubber padding improve footing and comfort. This is most important for high traffic areas such as parlor holding pens and feedbunk alleys.

## Excessive External Fat

Excessive external fat costs producers \$50 per head of fed cattle marketed (2000 NBQA). Typically, the cost of this loss plus the carcass quality defects discussed in other sections of this BQA manual, are passed along to all producers because packers figure lost value into the prices paid for all cattle sold. In addition to average lost value to the market, excessive external fat creates less desirable yield grades, thus creating individual carcass discounts. Carcasses with adequate muscling and without excess external fat are rewarded for quality—particularly when sold on a grade and yield basis. National Beef Quality Audits indicated that beef quality improved with closely trimmed beef, heightened producer awareness of quality problems, improved cutability, and extended shelf-life or retail case-life of beef products. At the same time, the results of the audits show that more work remains to be done to improve eating quality and consistency.



Excessive external fat.

Beef cattle producers are encouraged to add disposition as a selection criteria.

## Dark Cutters

Dark-cutting beef carcasses (dark cutters) produce meat that is dark, firm, and dry, and result in significant economic losses in the United States. Dark cutters are caused by preharvest stress, which depletes muscle glycogen stores. Without sufficient glycogen in the carcass, lactic acid cannot be produced to reduce the pH of the meat. Weather, growth promotants, genetics, disposition, and handling practices before harvest all play a role in causing dark cutters.

## Feedlots

Mean percentages of dark cutters per pen differed between individual feed yards. This finding indicates that the incidence of dark cutters was in part due to different management philosophies or the structural attributes of the feed yards. The percentage of dark cutters may also be affected by when cattle are harvested during the week. Cattle that are “startup” cattle for the week can be expected to have more dark cutters because they may have more time to stand around than other sets of cattle brought in during the week.

## Implants

Data from Colorado State University indicate that cattle tend to have a lower incidence of dark cutters per pen when the time from reimplantation to harvest was longer than 100 days.

## Environment

The occurrence of dark-cutting beef is highest during very cold weather combined with precipitation. These conditions increase the rate of body-heat loss and elicit shivering, which depletes glycogen stores. The incidence of dark cutters is high in hot weather or when large fluctuations in temperature occur over short periods of time (i.e., when temperatures fluctuate more than 10 degrees in a 24-hour period).

## Mixing Different Groups of Cattle

Don't mix strange animals. Fighting to establish a new social order 24 to 48 hours prior to slaughter can increase the incidence of dark cutters. Bulls should be kept separate because mixing bulls with other cattle can cause dark cutters within 90 minutes.

## Crowding

Crowding can increase the incidence of dark cutters.

## Genetics

Temperament appears to be inherited. Producers are encouraged to add disposition as a selection criteria.



# Quality Assurance of Market Cows and Bulls



**Sample records:**  
See Chapter 11.

The sale of market cows and bulls accounts for 25 percent of all U.S. beef consumption. Beef and dairy producers must realize the value these animals contribute to the industry. Whole muscle products are fabricated and sold to food-service operators as entrees in family steak houses and “quick-to-fix” supermarket beef products such as fajitas. Fast-food roast beef sandwiches and “Philly steak” sandwiches are also examples of products that result from market cow beef.

The three largest quality losses in market cows and bulls are excess external fat, inadequate muscling, and whole cattle/carcass condemnation. With improved management techniques, these losses can be minimized or even eliminated.

**Culling:** the process of eliminating less productive or less desirable cattle from a herd.

National Market Cow and Bull Quality Audits show that producers lose market value on every beef and dairy cow they sell from product defects such as: bruises, injection-site lesions, hide damage, poor condition (lame cows, poor doers), and excess fat. In addition to these industry losses, individual producers lose much more when their own cull animals are condemned due to antibiotic residues and systemic diseases (i.e., bovine leukosis virus).

These economics are important at the individual farm level when considering the revenue cull animals provide for both the beef cow/calf and the dairy producer. According to the National Animal Health Monitoring Service (NAHMS), the income from the sale of cull animals provides 15 to 20 percent of gross herd revenue. This means the Best Management Practices found in this BQA Manual are just as important in culling and management for dairy and cow-calf producers as they are in marketing and management for steers and heifers. Today, the stakes are even higher because:

- Producers must demonstrate proper care for cull animals to be marketed.
- Producers must educate the public that cull animals are handled humanely.
- Public attention is focused on food safety and quality.
- More potential value is found today in defect-free sub-primal cuts from market cows and bulls, which can be utilized as higher-value whole muscle cuts instead of ground beef.

Producers must think of their cows and bulls as part of the food supply and treat them accordingly. This is the necessary mindset that adds value to beef, builds consumer confidence, and safeguards the public image of the beef and dairy industries.

The profit gained from the sale of cull animals is dependent on the quality assurance practices used by producers. Beef and dairy producers must do a quality job of managing, transporting, and marketing their cows and bulls. The industry has seen a significant increase in



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trim losses due to arthritic joints (severe lameness) and injection-site blemishes (improper injection site and/or technique).

Quality assurance must be used in the production, management, and marketing of cows and bulls to maintain the highest profits possible for all segments of the beef industry. Quality control guidelines are easy for producers to use and adhere to. Most of the guidelines simply require common sense. Beef and dairy producers who implement these practices will find they pay dividends in other areas of productivity, herd health, and profitability—in addition to producing a more valuable market cow or bull for the beef industry.

## Herd Culling

The Beef Improvement Federation defines culling as the process of eliminating less productive or less desirable cattle from a herd. Culling is used by beef and dairy producers to improve herd productivity and efficiency. Culling impacts revenue on a farm and contributes to the value of the total beef supply.

To improve culling management and income, cattle producers should use the following methods.

- Establish strategic culling methods to identify reasons to cull individuals based on production and economics.
- Understand and practice quality assurance.
- Establish sound management practices for those identified cull cows and bulls.

## Quality Control

Some quality control points require changes in current management practices, for instance:

- Giving injections in the neck instead of the hip
- Reading and following meat and/or milk withdrawal times on product labels
- Locating brands high on the hip instead of on the rib cage to prevent damage to the more valuable areas of the hide

Bruises frequently have been cited by packers as a quality problem (See Chapter 4). An NCBA audit revealed there were about five times more bruises on cows than on bulls. Proper care and nutrition of cattle saves value in terms of saleable meat as well as reduced bruising. Cattle should be marketed in good body condition. When producers allow cattle to become emaciated, bruising occurs more easily and more frequently. Bruising can also be greatly reduced by using good de-horning practices.

The three largest quality losses in market cows and bulls are excess external fat, inadequate muscling, and whole cattle/carcass condemnation. With an improvement in management techniques, these quality losses can be minimized or even eliminated. By incorporating best management practices, beef and dairy producers improve beef value, the industry's public image, and their bottom line.



Animals should be culled before advanced disease stages, or in this case, euthanized and rendered.

## Strategies for Marketing Cull Cows

### Prevent Damage to the Hide and from Bruising

#### Bruising

- Dehorn cattle at an early age.
- Correct deficiencies in facilities and transportation equipment.
- Use proper cattle handling techniques.

#### Hide Damage

- Use external parasite (lice, grubs, etc.) control practices.
- Use proper branding methods or permanent identification alternatives.

### Market at Adequate Body Condition

Evaluate body condition because better condition means better price. Producers can improve the end product by:

- Marketing before cattle get too lean, too fat, and too thinly muscled and before they become emaciated.
- Feeding cull animals for a brief period prior to marketing to improve poor body condition.
- Preventing severe lameness by promoting foot health, monitoring cattle for early signs of lameness, and addressing conditions promptly before they progress to severe lameness
- Providing dry-off time before marketing lactating cows

## Prevent Condemnation

Prevent drug residues and injection-site lesions by ensuring proper administration and observance of meat withdrawal times for all animal health products.

- **Don't:** Market treated animals before the drug withdrawal time for meat has expired (In many cases this is a longer period of time than required for milk withholding.)
- **Don't:** Market significantly lame cattle
- **Don't:** Market animals that are emaciated
- **Do:** Euthanize disabled cattle and those with advanced or terminal conditions
- **Do:** Market animals with physical disorders in a timely way to avoid condemnations
- **Do:** Improve beef safety by implementing practices that reduce bacterial condemnations



**BLV (bovine leukosis virus):**  
This blood-borne virus is a leading cause of carcass condemnation in market cattle facilities, especially in culled dairy cows.

## The Bottom Line for Quality Assurance of Market Cows and Bulls

- **Manage cattle to minimize defects** and quality deficiencies.
- **Monitor the health** and condition of market cows and bulls to improve herd profitability and produce a better end beef product to get a better price.
- **Market in a timely manner** and more expeditiously in terms of timing and season to lessen occurrences of disabled cattle, cancer eye, lameness, and emaciation.

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# Cattle Care: Handling and Facilities

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**Sample records:**  
See Chapter 11.

Cattle producers have long recognized the importance of proper livestock management. Sound animal care, handling, and biosecurity practices are based on practical experience, sound science, and animal behavior research. These practices impact cattle health, welfare, and productivity as well as enhance beef quality and producer profitability.



## Producer Code of Cattle Care

Large chain restaurants such as McDonald's are influencing how cattle are raised. The National Council of Chain Restaurants has developed an Animal Welfare Audit for how animals should be housed and treated on the farm.

### A producer code for care of cattle should:

- Provide adequate food, water, and care to protect the health and well-being of animals
- Provide disease prevention practices to protect herd health, including access to veterinary care
- Provide facilities that allow safe, humane, and efficient movement and/or restraint of livestock
- Use humane methods to euthanize sick or injured livestock and dispose of them properly
- Provide personnel with training to properly handle and care for cattle
- Make timely observations of livestock to ensure basic needs are met
- Provide transportation that avoids undue stress caused by overcrowding, excess time in transit, or improper handling during loading and unloading
- Include staying updated on industry advancements and changes to make decisions based on sound production practices with consideration for animal well-being, biosecurity, and food safety
- Not allow any willful mistreatment of animals

## Cattle Handling

Cattle are gathered to perform routine husbandry procedures such as veterinary care; weighing; sorting; weaning; and transportation to and from pastures, feedlots, and livestock markets. Handling procedures must be safe for the cattle and caretakers and cause as little stress as possible. Facilities should be designed and constructed to take advantage of cattle's natural instincts.

All employees who work with livestock should have a basic understanding of livestock handling techniques to ensure the welfare of the cattle and people. Training for those who care for and handle cattle should include:

- Understanding flight-zone and point of balance of cattle
- Proper use of handling and restraining devices
- How to avoid sudden movement, loud noises, or other actions that may frighten cattle
- Proper handling of aggressive/easily excited cattle
- Basic feeding/nutritional management of cattle
- Recognizing early signs of distress and disease
- Recognizing signs associated with heat and cold weather stresses and how to respond with appropriate actions
- How to properly diagnose common illnesses and provide proper care
- Proper administration of animal health products
- How to perform routine animal health procedures

**All employees who work with livestock should have a basic understanding of livestock handling techniques to ensure the welfare of the cattle and people.**



## Understanding Cattle Behavior— Ways to Reduce Stress

### Vision

Cattle have a wide-angle vision field in excess of 300 degrees. Loading ramps and handling chutes should have solid walls to prevent animals from seeing distractions outside the working area. Seeing moving objects and people through the sides of a chute can cause cattle to balk or become frightened. Solid walls (see Figure 6-1) are especially important if animals are not completely tame or if they are unaccustomed to the facility.

Handling facilities should also be designed to eliminate shadows that may prevent cattle from entering the chutes or working alleys. Cattle have a tendency to move from dark areas to lighter areas, provided the light is not glaring. A spotlight directed onto a ramp or other apparatus will often facilitate entry. Handling facilities should be painted a uniform color because cattle are more likely to balk at a sudden change in color.

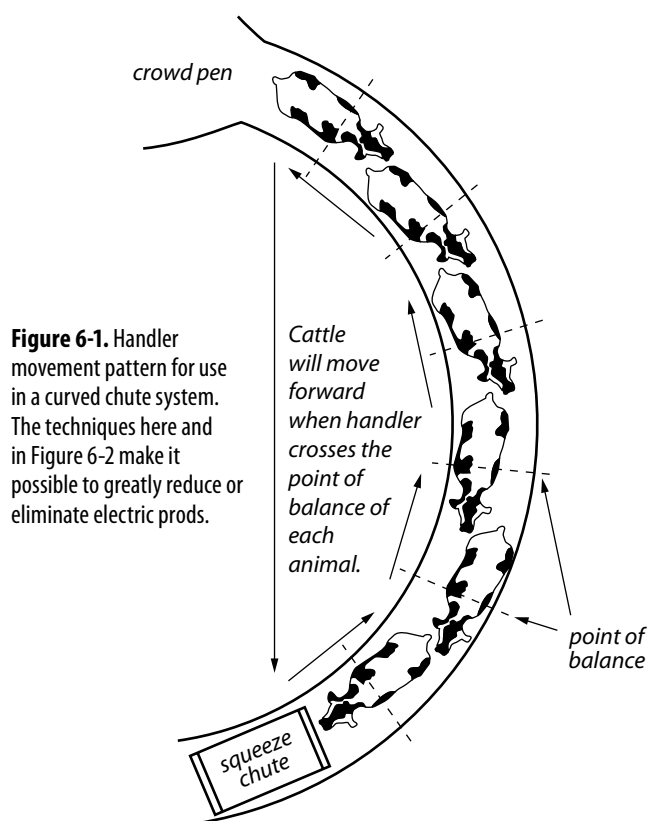
### Hearing

Loud noises should be avoided in cattle handling facilities. However, small amounts of noise can be used to assist in moving livestock. Placing rubber stops on gates and squeeze chutes, and positioning the hydraulic pump and motor away from the squeeze chute will help reduce noise. It is also beneficial to pipe exhaust from pneumatic powered equipment away from the handling area.

### Curved Chutes and Solid Fences

Curved single file chutes or working alleys are especially recommended for moving cattle into a truck or squeeze chute. A curved working system is more efficient for two reasons. First, it prevents the animal from seeing to the end of the chute until it is almost there. Second, it takes advantage of the natural tendency to circle around a handler moving along the inner radius. A curved chute provides the greatest benefit when animals have to wait in line for vaccination or other procedures. A curved chute with an inside radius of 15 to 16 feet will work well for handling cattle.

Livestock will often balk when they have to move from an outdoor pen into a building. To combat this problem, animals should be lined up in a single file chute/working alley outside. Again, solid sides are recommended on both the handling facilities and the crowding pen that leads to a squeeze chute or loading ramp.



**Figure 6-1.** Handler movement pattern for use in a curved chute system. The techniques here and in Figure 6-2 make it possible to greatly reduce or eliminate electric prods.

## Patience and Experience

Experienced and trained personnel should operate restraining equipment in the processing of cattle. Processing should never be treated as a race. Avoid overcrowding the crowd pen, and refrain from pushing the crowd gate up on the cattle. Instead, allow them to move forward naturally.

Working cattle too quickly can lead to bruises, injection-site damage, human injuries, and incorrect records. Stress caused by improper handling also lowers conception rates, reduces vaccination effectiveness, and reduces immune and rumen functions.

In addition to bruising losses from improper cattle handling, shipping fever and excess shrink (caused by the stress of mishandling) also lead to severe economic damage to the industry. An understanding of cattle behavior will facilitate handling, reduce stress, reduce bruise defects, and improve both handler safety and animal welfare.

Handling is safer when animals are moved quietly. Handlers should not yell or flap their arms, because this may agitate the animals. Excessive use of electric prods increases animal agitation as well as hazards to handlers. When cattle become agitated and fearful, up to 20 minutes is required for their heart rate to return to normal (Grandin.com). Agitated large animals are easier and safer to move if they are given an opportunity to calm down, perhaps while handlers are on a lunch or coffee break.



This cattle handling setup creates “tunnel vision” to limit visual distractions that can cause animal stress. The clean angles and solid sides limit the animal’s peripheral vision as an alternative to the preferred curved chute. Daylight at the headgate lures cattle forward. Balking and fear are reduced because the angled sides obscure the headgate until the cattle reach the end of the chute. Grooved nonslip flooring add to comfortable, confident movement of cattle through the chute.

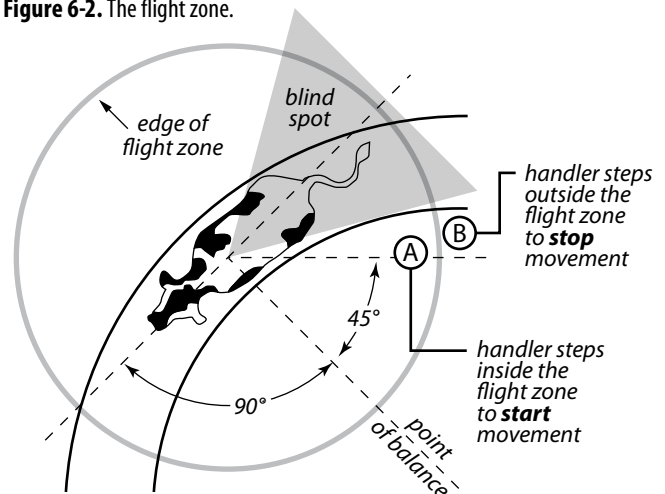
## Flight Zone

An important concept of livestock handling is the animal’s flight zone or personal space. When a person enters the flight zone, the animal moves away. Understanding of the flight zone can reduce stress and help prevent accidents (Figure 6-2).

The size of the flight zone varies depending on how accustomed the cattle are to their current surroundings, people, etc. The edge of the flight zone can be determined by slowly walking up to the animals. If the handler penetrates the flight zone too deeply, the animal will either bolt and run away or turn back and run past the person.

The animal will most likely stop moving when the handler retreats from the flight zone. The best place for the person to work is on the edge of the flight zone. Cattle sometimes rear up and become agitated while waiting in a single file chute. A common cause of this problem is a person leaning over the chute.

Figure 6-2. The flight zone.





## Reducing the Number of Scars and Bruises

First and foremost, cattle handling facilities must be available to assure that cattle management practices can be performed properly and in a way that will minimize the possibility of injury and stress to people and animals. Facilities need not be elaborate or expensive but should be functional and economical (Table 6-1).

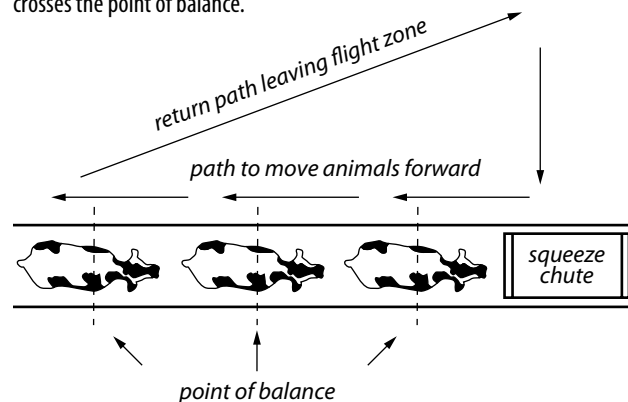
Cattle are bruised by hard bumps against protruding objects and by horns. Sticks and canes used as persuaders on the farm and at the market cause serious bruising and should be avoided. When animals are slaughtered, these bruises must be trimmed from the carcass, causing an economic loss.



All livestock handlers need to understand the point of balance. The point of balance is an imaginary line at the animal's shoulders. To induce the animal to move forward, the handler must be behind the point of balance. To make the animal move backward, the handler must be in front of the point of balance. Animals move forward when a handler walks past the point of balance in the opposite direction of desired movement (Figure 6-3).

Ongoing education should be part of the farm management plan, including the animal behavior concepts explained in this manual.

**Figure 6-3.** This movement pattern can be used to induce an animal to move into a squeeze chute. The handler walks inside the flight zone in the opposite direction of desired movement. The animal moves forward when the handler crosses the point of balance.



## Tips for More Efficient Handling

Proper design and quick recognition of problems that impede cattle flow are essential for safe, efficient cattle handling.

**Design and operate alleys and gates to avoid impeding cattle movement.** When operating gates and catches, reduce excessive noise, which may cause distress to the animals. Do not use whips, prods, and sticks. Avoid use of electric cattle prods with cattle. Whips are noisy and can frighten animals. Beating with sticks or boards stresses animals, causing injuries and making them more difficult to handle in the future. A good method for driving and sorting cattle is to use a broom or a plastic paddle. Cattle seem to see a wider implement better and follow directions more readily if such an aid is used rather than a stick. Avoid twisting tails too hard or the tail may break.

**Work cattle in groups.** Cattle have a strong herd instinct and become nervous or aggressive when alone. It is best to work at least two or three animals at a time. It is good to have one or two mature cows in the group if trying to work a group of young calves.

**Call cattle rather than drive them.** Train cattle to come to your shout or truck horn. This can be done by blowing your truck horn or shouting when feeding or moving cattle. Cattle are more likely to respond to your call in the morning or evening than in the heat of the day.

**Use one-way gates** to keep cattle from backing in the working chute. Various approaches work, from saloon-type doors to boards manually placed behind the cattle.

Hydraulic or manual restraining chutes should be adjusted to the appropriate size of cattle to be handled.

Regular cleaning and maintenance of working parts is imperative to ensure the system functions properly and is safe for the cattle and handlers.

**Avoid slippery surfaces,** especially where cattle enter a single-file alley leading to a chute or where they exit the chute. Grooved concrete, metal grating (not sharp), rubber mats, or deep sand can be used to minimize slipping and falling.



Grooved concrete floors and scored rubber padding improve footing and comfort. This is most important for high traffic areas such as parlor holding pens and feedbunk alleys.

**Quiet handling is essential** to minimize slipping. Under most conditions, no more than 2 percent of the animals should fall outside the chute. A level of more than 2 percent indicates a review is needed, asking questions such as:

- Is this a cattle temperament issue?
- Has something in the handling area changed that is affecting cattle behavior?

Some cattle are naturally more prone to vocalize, but if more than 5 percent of cattle vocalize (after being squeezed but prior to procedures being performed), it may be an indication that chute operation should be evaluated.

If more than 25 percent of cattle jump or run out of the chute, a review of the situation should address questions such as:

- Is this a result from cattle temperament or prior handling?
- Is the chute operating properly?

Provide a sound working knowledge of proper cattle handling techniques to all individuals who handle cattle on the farm. Observe employees to ensure they are properly trained and are using recommended techniques for the tasks at hand. Ongoing education should be part of the farm management plan, including the animal behavior concepts explained in this manual.

## **Cattle Handling Facilities**

Keep facilities and equipment in good condition to provide efficient movement and reduce stress when working cattle. Watch for nails, loose boards, and other hazards that could tear the hide or cause bruises or infections.

Equipment to restrain cattle is needed on most beef and dairy operations. The equipment should quickly and securely restrain the animal and should allow for the quick release of the animal upon completion of the procedures. Corrals, pens, and chutes should be the proper size for the number and size of animals and the type of processing to be done. Keep equipment clean and in good repair. Proper cattle handling requires the right facilities, equipment, and attitude.

### **Planning a Handling Facility**

The first step in planning a handling facility is to inventory existing facilities (old handling facilities, barns, sheds, etc.). Some of these might be used in the new handling facility. Consider the layout of pastures and existing facilities when deciding where to build so cattle will have easy access. The availability of water and electricity should also be considered. The proximity to neighboring homes or main roads, where odor, dust, noise, and flies might be objectionable, should be considered.

The breed and size of cattle to be worked will influence how the facility is to be constructed. Larger or more spirited cattle will demand stronger materials be used in construction. Obviously, the number of cattle to be worked will affect dimensions.

The site selected should be on an almost level spot with good drainage. If the site is on a slight slope, be sure cattle will be moved up the slope as they are worked to accommodate normal cattle movement. Cattle are easier to work if they move in a direction that is normal for them.

Consider creating an all-weather loading area that will allow all vehicles to access the facility and turn safely. While trying to make the plan friendly for loading and access, keep in mind the benefits of being able to limit access to the general public so as to decrease the possibility of disease transmission and interference with farm work.

### **Components of a Good Handling Facility**

The size and complexity of a cattle handling facility depends on the number of animals in the herd. A good handling facility should contain the following components: headgate, holding or squeeze chute, working chute, crowding pen, holding pens, scales, and loading chute. These facilities need not be elaborate or expensive. A discussion of each of these components follows.

#### **Headgate**

The headgate is the most important part of the entire working facility. It should be sturdy, safe, and easy to operate and should work smoothly and quietly. There are three basic types of headgates. They are self-catching, scissors-stanchion, and full-opening stanchion. The self-catching headgate closes automatically due to the movement of the animal. The scissors-stanchion type consists of two halves that pivot at the bottom. The full-opening stanchion consists of two halves that work like a pair of sliding doors.

The recommended types for small operations are the self-catching and the full-opening stanchion. These are extremely safe and will rarely choke an animal. The disadvantage is that animals can move their heads up and down unless a nose bar is used. Both headgates are available with either straight or curved stanchion bars. The curved-bar stanchion offers more control of the animal's head but is more likely to choke the animal than the straight-bar type. Thus, curved stanchions are not recommended. No matter which type of headgate is selected, proper adjustment for the type of cattle being worked is necessary to prevent injury to the animals.

### Squeeze Chute

The squeeze chute is located immediately behind the headgate and secured to it. The width of the squeeze chute should be adjustable for different sized animals, but should not be any wider than 28 inches, and the most common workable width is 26 inches. Other desirable characteristics include squeeze action, removable side panels for easier access to the animal, and a floor with a nonslip surface. Squeezes can be manually or hydraulically operated. V-shaped sides are preferred because they support cattle, preventing them from going down and choking.

The squeeze chute may be hinged on one side to release the animal if the headgate is not a walk-through type. Some type of see-through blocking gate or bar is needed to prevent the animal from backing up before the head is caught. Also, this will prevent the next animal from moving into the chute before the first animal is released. A 2-foot service gate at the back of the chute is desirable when working at the back of the animal (castrating, pregnancy testing, etc.) A palpation cage can be substituted for the service gate if desired.

### Working Chute

The working chute leads cattle from the crowding pen to the squeeze chute. The purpose of a working chute is to hold cattle in a line so that they can enter the treatment or loading area one at a time. Working chute sides should be solid. Solid walls prevent the animals from seeing the squeeze chute, people, and the truck until they are almost there. V-shaped sides are recommended, especially if the facility is used to handle both cows and calves. Sloped sides restrict the animal's feet and legs to a narrow path, which in turn reduces balking and helps prevent an animal from turning around. Curved chutes work best for animals awaiting treatment. It takes advantage of the cattle's natural circling behavior.

An alternative to curved chutes is an offset chute. In this case, part of the working chute is offset by 30 degrees (maximum), so that cattle are prevented from seeing the squeeze until they are almost there. Straight working chutes are not recommended. Whenever possible, the working chute should be at least 20 feet long regardless of herd size. Size specifications are given in Table 6-1.

To prevent balking, the blocking gate at the junction of the working chute and the squeeze chute should allow an animal to see the animal ahead. "Back up" or "tail gate" bars in the working chute can be used to prevent animals from moving backward.



### Crowding Pen

The crowding pen is located at the back of the working chute. Size should be about 150 square feet, which will hold six to 10 head of cattle. A circular crowding area with solid sides works best. Funnel-shaped pens are a good alternative to circular crowding tubs for smaller facilities. The funnel-shaped pen should form a gradual V as it approaches the working chute. The cattle will be less apt to bunch up if one side of the V is straight with the working chute and the other side angled out. A solid crowding gate should be used to push animals from the V into the working chute.

Table 6-1. Specifications for cattle handling facility dimensions.				
Facility Component		Recommended Dimensions		
		Up to 600 lbs	600 to 1,200 lbs	Over 1,200 lbs
<b>Holding pen</b>				
Space per head (sq ft)		14	17	20
Pen fence	Height (in)	60	60	60
	Post spacing (ft)	8	8	8
	Post depth in ground (in)	30	30	30
<b>Crowding Pen<sup>1</sup></b>				
Space per head (sq ft)		6	10	12
Post spacing (ft)		4 - 6	4 - 6	4 - 6
Solid wall height (in)		45	50	50 - 60
<b>Working Chute<sup>2</sup></b>				
Straight side (in)		18	22	28
Fully tapered—width at 32-in height (in)		18	22	28
Fully tapered—width at bottom (in)		15	16	18
Minimum length (ft)		20	20	20
Maximum curve angle (degrees)		15	15	15
Length for 16-foot outside radius (ft)		45	45	45
Solid wall height (in)		45	50	50 - 60
Overall height—top rail (in)		55	60	60 - 72
Chute fence	Post spacing (ft)	6	6	6
	Post depth in ground (in)	36	36	36
<b>Holding Chute/Squeeze</b>				
Height (in)		45	50	50
Width	Straight sides (in)	18	22	28
	V-shaped sides, bottom width (in)	6 - 8	8 - 12	14 - 16
Length—width headgate (ft)		5	5 - 8	5 - 8
<b>Loading Chute</b>				
Width (in)		26	26	26 - 30
Minimum length (ft)		12	12	12
Maximum rise (in/ft)		3.5	3.5	3.5
<b>Ramp Height</b>				
Stock trailer (in)			15	
Pickup truck (in)			28	
Stock truck (in)			40	
Tractor-trailer (in)			48	

<sup>1</sup> Crowding pen must be either circular (1/4 or 1/2 circle) or funnel-shaped.

<sup>2</sup> Working chute should be curved or offset (offset angle at 30° maximum).

## Holding Pens

Holding pens should be located so they fit conveniently with the rest of the facility. Each holding pen should provide approximately 20 square feet per animal.

## Scales

Scales are essential for performance testing, evaluating gains, and determining sale weights. A single animal scale (usually portable) is most useful when determining the rate of gain and also in selecting breeding stock or determining how much weight cows are gaining or losing. The scales should be located so cattle can be easily moved on and off.

## Loading Chute

The loading chute should be located directly off the crowding pen, allowing easy movement of cattle. A curved approach, 30 to 35 inches wide, prevents animals from seeing the truck until they are nearly loaded. The loading chute ramp can be either sloping or stepped. The maximum incline should be 30 percent (3½-inch rise per foot of incline). Adjustable ramps are convenient when trucks or trailers of different heights are used. The length of the loading chute depends on the height required; however, it should be at least 12 feet long. The loading chute should be 26 to 30 inches wide.

## Safety First

Properly designed working facilities can make handling cattle much faster and safer. Injuries and bruises to the cattle and producer can also be reduced by following these tips:

- **Use experienced people:** Inexperienced people are easily frightened by cattle and may be hurt if they do not understand cattle behavior.
- **Treat cattle with respect:** Cattle are large and strong and can be unpredictable. It is unwise to relax around them too much or to try to work them without adequate facilities. Consider how you can out-think cattle, not out-wrestle them.
- **Remove sharp objects:** Avoid protruding objects, sharp corners, low overhangs, or other traps that can harm humans or animals when working cattle.
- **Construct catwalks:** A catwalk built along the cattle working chutes or loading chutes is a much better place from which to work cattle than standing behind them.
- **Build service gates:** A small gate behind the catch or squeeze chute that allows access to the cattle from the rear makes it much easier and simpler for such procedures as pregnancy checking, artificial insemination, castration, or examining and treating certain injuries. Hang the service gate so it swings toward cattle in the working chute, blocking them from the person working behind the animal in the squeeze chute.
- **Build safety passes:** Safety passes or escape gates in strategic locations allow fast escape if cattle get too excited. Good locations are along the alleyway that takes cattle from holding pens to the working facility and close to the crowding area.
- **Watch for kicks:** If cattle are to be worked in close quarters, either work close to the animal or stay out of kicking range. Cattle cannot kick hard when you are very close. This is not recommended, however, because the danger of being stepped on is greatly increased. Do not place your head in a location where cattle can kick (e.g., examining udder or rear end).



- **Stay alert:** Cattle can become unruly when least expected. When working cattle, make certain that everyone is cautious at all times. If workers become fatigued, it is best to rest for a while.
- **Sort cows away from calves:** It is less stressful on the cattle and the sorter if cows are sorted away from calves instead of moving calves away from cows.
- **Use products carefully:** Many of the tools and products used in working cattle can be harmful if improperly used. Read and follow directions carefully. Accidental ingestion of chemicals by humans, spilling certain products (especially organophosphates, an active ingredient in insecticides) on the skin or in the eyes, or accidental injection can be harmful to people. If accidents happen, contact a physician immediately. Take the label with you so the physician can have full knowledge of the product that is causing the problem.
- **Properly restrain cattle when working them:** Cattle that are not properly restrained in good facilities can cause accidents by throwing their heads or kicking. This may result in human injury.
 

It is also difficult to deliver precise dosages of vaccines, pour-on insecticides, dewormers, or other products without good facilities. Improperly delivered product dosages can increase animal stress by inducing overdose reactions or, alternatively, by not doing the proper job because too little product is delivered.
- **Provide first aid:** Have a first-aid kit available near the cattle working area. First-aid training is recommended to handle possible emergencies.



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# Transportation

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**Sample records:**  
See Chapter 11.



The movement of cattle to and from farms, ranches, feedlots, and marketing facilities is an important aspect of beef and dairy cattle production. When transporting cattle, avoid undue stress caused by overcrowding, excess time in transit, or improper handling during loading and unloading. In addition to promoting safety and animal welfare, proper handling while sorting, loading, and transporting also contributes to beef quality and producer profitability by reducing defects from bruising, injury, or stress.

## **Transportation Quality Assurance Guidelines**

Cattle will perform better and yield higher quality beef when their exposure to stress is limited by careful handling and transportation.

Cattle transporters have many factors to think about before making a haul, including sanitation protocols. Preparation of the vehicle and the cattle being transported are important considerations. Pre-transit planning will help drivers provide quality service that benefits both consumers and the cattle being hauled. Planning on the behalf of producers will help them have healthier cattle delivered to the destination point.

Anyone transporting cattle should observe the following practices.

## **Driver Attitude and Professionalism**

- Act responsibly, showing concern for animal welfare.
- Use proper tone of voice and controlled emotions.

## **Animal Handling Procedures**

- Make safety a primary concern.
- Move animals in small groups and separate them by size or gender prior to shipping. If possible, load different groups into separate compartments of the truck or trailer.
- Use proper sorting tools to move animals, such as brooms or paddles. Use electric shockers only under extreme conditions.
- Eliminate aggressive handling. Move cattle as quietly and patiently as possible to prevent stress or injury during loading and unloading.
- Work with the natural instincts of cattle—understanding of flight zone and point of balance (See Chapter 6).

## **Transit Precautions and Animal Evaluation**

- Take precautions for extreme weather conditions—provide appropriate ventilation and/or protection.
- Schedule loading and unloading times to minimize the amount of time animals spend in the trailer.
- During long-haul transit, stop occasionally to ensure cattle are well dispersed and still standing, and observe appropriate guidelines and regulations for long-haul transit.
- Evaluate animals for illness and severe lameness prior to loading and during long-haul transit.
- Do not load animals that should not be transported (i.e., borderline non-ambulatory/downer animals).
- Check for signs of stress and adjust stocking density to accommodate tired or stressed animals.
- Plan delivery schedules to minimize the number of stops made, and follow the schedule closely.
- To prevent livestock from falling, avoid sudden starts/stops and sharp turns.
- Have an emergency response plan of action for events (i.e., truck/trailer rollover, plant shutdowns).



**Table 7-1.** Trailer stocking density (NCBA).

Average Weight (lb)	Head per Running Foot of Truck (77-in width)
200	2.2
300	1.6
400	1.2
600	0.9
800	0.7
1,000	0.6
1,200	0.5
1,400	0.4



## Equipment Condition

- Be sure equipment is in good running order.
- Use properly designed ramps/chutes.
- Consider stocking density and space requirements to avoid overcrowding
- Use trailer dividers to limit animals to each section. (Tables 7-1 and 7-2 show proper loading densities for cattle trailers.)
- Avoid slippery conditions by keeping floors clean and slip resistant.
- Ensure no sharp edges on loading chutes or trailer, and avoid shiny objects in the chute path/trailer, which may scare cattle from moving onto the trailer.
- Adhere to both federal and state weight limits and guidelines.
- Make sure drop gate is securely latched after trailer is loaded.

**Table 7-2.** Recommended maximum number of head for trailers of different lengths for polled and dehorned cattle.<sup>1</sup>

Trailer Size (ft) <sup>3</sup>	Average Cattle Weight (greater than or equal to)							Total Cattle Wt. (lb) <sup>2</sup>
	400	600	800	1000	1200	1400	1600	
14 x 6	16	11	8	6	5	5	4	<6500
16 x 6	18	12	9	7	6	5	5	<7400
18 x 6	21	14	10	8	7	6	5	<8400
20 x 6	23	15	12	9	8	7	6	<9300
22 x 6	25	17	13	10	8	7	6	<10200
24 x 6	28	18	14	11	9	8	7	<11100
26 x 6	30	20	15	12	10	9	8	<12000
28 x 6	32	22	16	13	11	9	8	<13000
30 x 6	35	23	17	14	12	10	9	<13900
32 x 6	37	25	18	15	12	11	9	<14800
34 x 6	39	26	20	16	13	11	10	<15700
20 x 7	27	18	13	11	9	8	7	<10800
22 x 7	30	20	15	12	10	8	7	<11900
24 x 7	32	22	16	13	11	9	8	<13000
26 x 7	35	23	18	14	12	10	9	<14000
28 x 7	38	25	19	15	13	11	9	<15100
30 x 7	40	27	20	16	13	12	10	<16200
32 x 7	43	29	22	17	14	12	11	<17300
34 x 7	46	31	23	18	15	13	11	<18400

<sup>1</sup> This chart represents the maximum number of polled/dehorned cattle for trailers of different lengths. When hauling horned cattle reduce the number of cattle by 5%. The number of head loaded during hot conditions should be reduced as well.

<sup>2</sup> The maximum weight of cattle for each trailer size with these calculations. Do not exceed the Gross Vehicle Rating for your truck and stock trailer.

Source: Jim Turner and Clyde Lane, University of Tennessee.

## Biosecurity Practices

- Thoroughly clean and wash truck/trailer with hot water after unloading and prior to loading again. (Hot water will remove 90 percent of pathogens.)
- Disinfect regularly.
- Have a written protocol for trailer sanitation.
- Use clean bedding on trailer and chute area.
- Utilize disposable coveralls, boots, and gloves to prevent possible disease cross-contamination.
- Deny entrance of animals exhibiting symptoms of disease onto trailer.

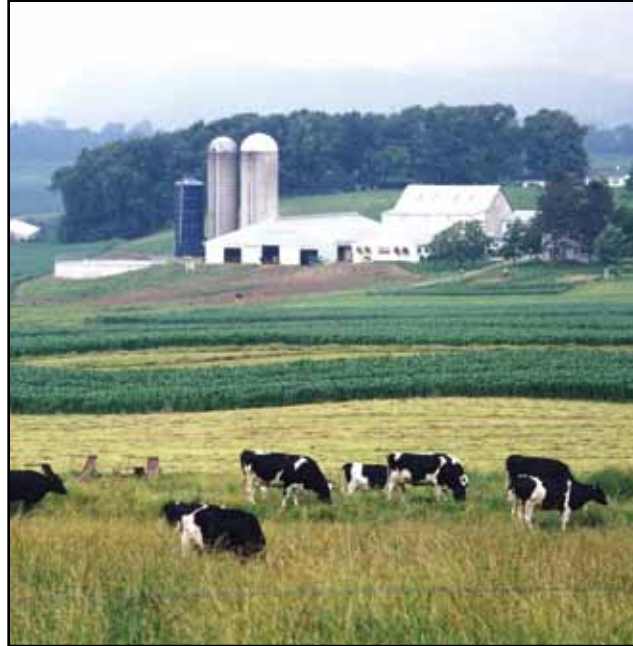
## Additional Resources

- National Cattlemen's Beef Association Master Trucker Transporter Guide  
<[www.tbqa.org](http://www.tbqa.org)>
- Kansas Transport Initiative  
<<http://www.beefstockerusa.org/transportationfact.htm>>
- Beef Stocker USA  
<<http://www.beefstockerusa.org>>
- National Institute of Animal Agriculture  
<<http://www.animalagriculture.com>>
- Temple Grandin  
<<http://www.grandin.com>>
- U.S. Department of Agriculture, Agricultural Marketing Service  
<<http://www.ams.usda.gov/tmd/livestock/products.htm>>

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# Biosecurity

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**Sample records:**  
See Chapter 11.

**B**iosecurity is a system of management procedures designed to prevent or greatly reduce the risk for introduction of new diseases to a cattle operation. Implementing a biosecurity program is like purchasing an insurance policy for the health and productivity of the herd. Producers should work with their veterinarians to develop a plan. Biosecurity affects beef quality directly in the case of diseases that pose a risk to public health and indirectly by reducing the potential of the meat quality being impacted by the disease or its treatment.



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The goal is to prevent disease from ever entering the operation and to minimize the risk of infection if it does occur.

An effective biosecurity plan will involve your employees, veterinarian, and other specialists. It will provide reasonable protocols, which are more likely to be followed, to minimize introduction of new diseases. The plan will require education of farm visitors and may include physical barriers. The biosecurity plan and the actual adherence to the plan must be periodically reviewed and adjustments made as needed.

## Sources of New Disease

New diseases can be introduced to your cattle operation in a number of ways, including:

- Cattle, including replacements from other herds, bulls, fence-line contact with neighboring herds, shows and fairs, and strays
- Manure on footwear and clothing, tractor and equipment tires, trailer, and equipment (foot trimming, etc.)
- Water, including ponds and pools of standing water, which animals may have access to
- Humans moving between herds or farms
- Nonlivestock, including pets, birds, deer, coyotes, rodents, ticks, and other insects
- Feed, especially feed which could be contaminated with feces, urine, molds, or ruminant by-products

## Animals New to Your Herd

- Know the herd health status of herds supplying replacements or bulls.
- Obtain the health/vaccination history of new animals.
- Isolate new animals in a location away from your cattle for a period of time (2 to 4 weeks) before introducing them into your herd. This practice includes not sharing feed or water and no nose-to-nose contact.
- Observe the health status of new animals daily before introducing them into your herd.
- Have your veterinarian speak with their veterinarian regarding the health at the farm of origin.

## Animals in Your Herd

- Be a diligent observer of your cattle for signs of disease.
- Know the signs of important foreign animal diseases, which include:
  - Blisters around animals' mouths, noses, teats, or hooves (FMD)
  - Central nervous system disorders, such as staggering and falling (BSE)
  - Abortions or abnormal discharges
- Report any sudden, unexplained death loss to your veterinarian.
- Have your veterinarian necropsy every dead animal, unless you are certain of the cause of death.
- Report to your veterinarian any severe illness affecting a high percentage of animals.
- Insist that outside individuals coming onto your farm adhere to clean, sanitary practices, such as clean clothing and footwear, clean equipment, and clean trucks.
- Maintain fences to prevent mixing your cattle and your neighbor's cattle.
- Dispose of dead animals properly:
  - If hauled off the farm, animals should be placed on the outer perimeter of the farm and away from the public view.

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**You cannot exclude all wildlife and may not wish to exclude visitors, but you can take steps to greatly reduce the risk of them introducing a new disease.**



- If composting is utilized, a site should be selected to protect runoff from contaminating water sources and located away from cattle.
- Minimize nonlivestock traffic, including pets, wildlife, rodents, birds, and insects.
- Keep feed storage areas free of all animals.

### Animals Returning from Shows or Fairs

- Do not share equipment with other exhibitors.
- Change or wash clothing and shoes worn at the fair before working with animals at home.
- Isolate from other animals for a minimum of 14 days.

### Visitors

- Minimize the number of access routes to your operation. Consider locking or obstructing alternative entry sites.
- Require visitors to use plastic boots or disinfectant footbaths.
- Minimize unnecessary direct contact with cattle.
- Place signs describing visiting policies in clear view.
- Keep a record of visitors, including dates.
- Determine if visitors have been on other farms/ranches prior to visiting you. Special care is needed if visitors have recently been in another country.
- Observe for suspicious individuals or abnormal activities.

### Vehicles and Equipment

- Designate parking places for visitors. Minimize their crossing tracks with feed suppliers/deliveries.
- Minimize all vehicle traffic in livestock and feed areas.
- Do not contaminate feed with manure.
- Have separate equipment for feed and for manure handling.
- Clean and disinfect equipment used for handling manure and dead animals before handling feed.



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# Non-Ambulatory Cattle

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**Sample records:**  
See Chapter 11.

Cattle can become non-ambulatory (commonly referred to as “downers”) for several reasons, including injury, diseases, or nutrition-related disorders.

A prompt diagnosis should be made to determine whether the animal must be humanely euthanized or will respond to additional care. Signs of a more favorable prognosis include the ability to sit up unaided, eating, and drinking.

Care for non-ambulatory cattle is the responsibility of livestock owners and caretakers, who must make every effort to provide proper care. Non-ambulatory cattle should be provided with adequate shade or shelter and access to water and feed in a location that provides good footing.

Cattle that are non-ambulatory cannot be sent to a livestock market or to a processing facility. If the prognosis is unfavorable or the animal has not responded to veterinary care, it should be humanely euthanized.



## Euthanasia

Euthanasia is humane death without pain and suffering. The producer may need to perform on-farm euthanasia because a veterinarian may not be immediately available to perform the service. The person performing the procedure should be knowledgeable of the available methods and have the necessary skill to safely perform humane euthanasia; if not, a veterinarian must be contacted.

When euthanasia is necessary, an excellent reference is the *Practical Euthanasia of Cattle* guidelines, which is provided at the end of this chapter. These guidelines were developed and published by the Animal Welfare Committee of the American Association of Bovine Practitioners. Additional resources including desk cards and wall charts for posting are offered by the University of Florida Department of Veterinary Medicine at <<http://www.vetmed.ufl.edu/lacs/humaneuthanasia>>.

## Disposal

Producers should also use proper methods of carcass disposal in accordance with federal, state, and local regulations. If utilizing a rendering service, keep deceased livestock in a screened area away from public view but close to the farm entrance for biosecurity purposes.

## Practical Euthanasia of Cattle

Considerations for the Producer,  
Livestock Market Operator,  
Livestock Transporter,  
and Veterinarian



Materials in this brochure were prepared by the Animal Welfare Committee  
of the American Association of Bovine Practitioners.

Euthanasia is defined as "the intentional causing of a painless and easy death to a patient suffering from an incurable or painful disease."

*Webster's II University Dictionary, 1996*



Most individuals who work with large domesticated livestock will encounter situations where an animal is unlikely to respond favorably to treatment. The likelihood of treatment failure, the potential for animal suffering and the presence of drug residues are considerations that can make euthanasia of an animal the best available option. This information is designed to aid producers, livestock market operators, animal transporters and veterinarians in making the appropriate decisions regarding euthanasia of cattle.

Individuals who work with livestock should read this information, discuss euthanasia options with a veterinarian and determine an action plan for livestock encountered in these situations. This action plan should be reviewed annually.

Euthanasia requires that the animal be rendered unconscious without distress or suffering prior to cessation of vital life functions. There are three physiological mechanisms for inducing euthanasia in cattle. Although several techniques exist for inducing euthanasia, all techniques will fall into one of the following categories:

- Physical disruption of brain activity caused by direct destruction of brain tissue (gunshot, penetrating captive bolt).
- Drugs that directly depress the central nervous system (anesthetics, barbiturates) and induce death by hypoxia (lack of oxygen).
- Agents that induce unconsciousness followed by mechanisms that induce hypoxia (narcotics followed by exsanguination).

### Some Indications for Euthanasia

- Fractured leg (irreparable); severe trauma
- Loss of production and quality of life (severe mastitis, etc.)
- Inability to stand or walk (disabled livestock)
- Diagnostic (eg. potential for human disease, such as rabies)



- Advanced ocular neoplasia (cancer eye)
- Debilitating or toxic condition
- Cost of treatment prohibitive and poor prognosis
- Extended withdrawal time for sale of meat and poor prognosis



Advanced ocular neoplasia

## Decision Making

Actions involving debilitated, disabled, or injured cattle may fall into the following categories: treatment, slaughter, and euthanasia. Criteria to be considered in decision making should include:

- 1) Pain and distress of the animal
- 2) Likelihood of recovery
- 3) Ability to get to feed and water
- 4) Medications used on the animal
- 5) Drug withdrawal time
- 6) Economics
- 7) Condemnation potential: risk of cattle being condemned (not allowed for human consumption) at the slaughter plant.
- 8) Diagnostic information

## Considerations

When euthanasia is the most appropriate option, the following considerations must be made when choosing a method:

- 1) Human Safety:** The first consideration in the choice of euthanasia method is human safety. Obviously, the use of a firearm carries some danger. Some methods, such as a barbiturate overdose, usually result in a calm animal being euthanized quietly and easily.
- 2) Animal Welfare:** Any euthanasia method utilized should produce a quick and painless death. However, certain environments and animal behaviors may prevent the use of a more desired technique. Use the technique that is safest for humans and animals alike.
- 3) Restraint:** Availability of cattle chutes or other forms of restraint may make certain forms of euthanasia more practical than others. For example, it may not be possible to euthanize an adult cow using barbiturates without proper head restraint. Several methods, such as use of the captive bolt or gunshot, necessitate appropriate restraint capabilities and training. In all cases, firm but gentle restraint should be exercised.
- 4) Practicality:** An appropriate euthanasia technique must also be practical to use. Only licensed veterinarians have legal access to drugs such as barbiturates, which require a federal license to store and use.

**5) Skill:** Some techniques, such as use of the captive bolt, require some skill and training to accomplish correctly. Designated individuals should be appropriately trained in proper euthanasia techniques wherever cattle are kept.

**6) Cost:** Some euthanasia techniques are more costly than others. However, other techniques (such as gunshot or captive bolt) require a larger initial investment, but continued use is very inexpensive.

**7) Aesthetics:** Certain euthanasia techniques, such as use of a barbiturate overdose, may ‘appear’ more pleasing to the untrained eye than other techniques. Many techniques result in significant involuntary movements of the animal which may be misinterpreted as a voluntary painful response to those inexperienced in bovine euthanasia. Trained individuals should know how the animal responds to different euthanasia techniques.

**8) Diagnostics:** Do not shoot cattle when the brain needs to be examined for rabies or other neurological diseases.

### Table of Bovine Methods

Method	Human Safety Risk	Skill Required	Cost	Aesthetic Concerns
Gunshot	High	Moderate*	Low	Moderate: some blood and motion
Captive Bolt	Moderate	Moderate*	Low	Moderate: some blood and motion
Barbiturate Overdose	Low	Moderate*	Moderate	Low
Exsanguination	Moderate	Moderate*	Low	High
Electrocution	High	Moderate*	High: Equipment	High

\* Moderate-Operator training required.

## Details of Table

1) **Gunshot:** The firearm should be held 2-10 inches from the intended point of impact, and the bullet should be directed perpendicular to the front of the skull to prevent ricochet. The point of entry should be at the intersection of two imaginary lines, each drawn from the inside corner of the eye to the base of the opposite horn (slightly above the ear in polled animals).

A .22 caliber long rifle bullet is sufficient for most animals, but a .22 magnum or 9mm round should be used on bulls. Use of a hollow-point or soft-nose bullet increases tissue destruction. If performed skillfully, gunshot induces instantaneous unconsciousness, is inexpensive and does not require close contact with the animal.

This method should only be attempted by individuals trained in the use of firearms and who understand the potential for ricochet. Care must be taken to minimize danger to the operator, to bystanders, and to other animals. In addition, since some cities have laws prohibiting the discharge of firearms in certain areas, the operator should be aware of local ordinances that may apply.



2) **Captive Bolt:** Captive bolt “guns” are either penetrating or non-penetrating. Penetrating captive bolt guns are meant to produce immediate brain tissue destruction. Both types (penetrating and non-penetrating) will consistently cause stunning of an animal. A stunned animal will “drop” but will still exhibit respiration and sudden quick limb movements. An additional procedure (exsanguination, chemical agents) **MUST** be used to insure death after the use of the non-penetrating captive bolt and is **RECOMMENDED** after use of the penetrating captive bolt.

The captive bolt gun must be placed firmly against the skull at the same entry point previously described for a gunshot. Since use of the captive bolt gun requires close proximity to the animal, good restraint and prior sedation or tranquilization may be required. Operator safety must be considered in the use of this technique.

Maintenance and cleaning of the captive bolt gun as described by the manufacturer must be followed exactly. In addition, selection of cartridge strength may vary among manufacturers and the appropriate strength for the size of the animal must be used.

3) **Barbiturate:** When properly administered by a licensed veterinarian the intravenous route, barbiturate overdose produces rapid unconsciousness and anesthesia followed by respiratory depression, hypoxia, and cardiac arrest. The barbiturate selected should be potent, long acting, and stable in solution. Tissue residues of the barbiturate can be high. Care should be exercised to limit access of scavengers to the carcass.

4) **Exsanguination:** (bleeding out an animal) This method can be used to ensure death subsequent to stunning, anesthesia, or unconsciousness. It must not be used as the sole method for euthanasia.

There are several methods for exsanguination. The most common method in the bovine is to lacerate one or both carotid arteries. A long 6 inch sharp knife is fully inserted behind the point of jaw, just below the neck bones, and directed downwards until blood is freely flowing. Brachial vasculature can be lacerated by lifting a fore limb, inserting the knife deeply at the point of the elbow and cutting skin and vasculature until the limb can be laid back against the thorax of the animal. The aorta can be transected via the rectum, by a trained individual, so that blood pools within the abdominal cavity.

5) **Electrocution:** This method should only be attempted using specialized slaughter plant equipment that applies a minimum of 2.5 amp across the brain. A 120 volt electrical cord does not apply sufficient amperage to induce unconsciousness.

Electrocution does involve current as well as violent involuntary reactions by the animals. Therefore, this method does involve some danger to the operator.

### **Confirmation of Death**

Confirmation of death is absolutely critical regardless of what method of euthanasia is chosen. Keep personal safety in mind when confirming death because animals can make sudden involuntary limb movements.

The following can be used to evaluate consciousness:

Lack of a heartbeat.

Lack of respiration.

Lack of corneal reflex (when applying pressure with a finger to the eyeball, the animal does not blink).

The presence of a heartbeat can be best evaluated with a stethoscope placed under the left elbow. Movement of the chest indicates respiration. (Note: breathing can be very slow and erratic in unconscious animals.) The corneal reflex can be tested by touching the eyeball and noting whether the animal blinks. A lack of heartbeat and respiration for more than five minutes should be used to confirm death.



### **Euthanasia of Calves and Bulls**

Calves and bulls require special consideration in selecting the proper method of euthanasia. Ethical considerations do not change for the calf because it is small or more easily handled. Calves can easily be euthanized with a penetrating captive bolt gun. Barbiturate overdosing also works well, but legal restrictions must be followed.

Bulls require special considerations because of their size, attitude and physical thickness of their skull. Operator safety is of primary concern in euthanasia of bulls, and for certain techniques, proper restraint is critical. Bulls may be euthanized with specialized heavy duty captive bolt guns, firearms using a 9mm shot, or by barbiturate overdose.

### **Unacceptable Methods of Bovine Euthanasia**

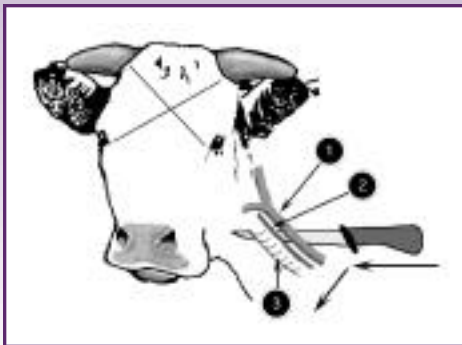
Ethical and humane standards of euthanasia **DO NOT** permit the following methods of euthanasia in the bovine:

- 1) Manually applied blunt trauma to the head.
- 2) Injection of chemical agents into conscious animals (e.g. disinfectants, electrolytes such as KCl and MgSO<sub>4</sub>, non-anesthetic pharmaceutical agents).
- 3) Air embolism (e.g. injection of large amount of air into the vasculature).
- 4) Electrocutation with a 120 volt electrical cord.

### **Conclusions**

Personnel at sites that routinely handle animals should at all times have the ability and facilities to carry out emergency euthanasia. Penetrating captive bolt and gunshot are the only two methods available to non-veterinarians for emergency euthanasia. Animal transporters should also be appropriately trained and should have phone numbers to contact appropriate personnel in case of an emergency.

Market and sale yards should have a written procedure to follow in case of emergency and should have personnel trained in emergency euthanasia during all shifts. When practical, choose a location where the carcass can be easily reached by removal equipment. An action plan for routine and emergency euthanasia should be developed and followed wherever animals are handled.



**Location for exsanguination and correct site for captive bolt or gunshot euthanasia of cattle.** The point of entry of the captive bolt or bullet should be at the intersection of two lines drawn from the inside border of the eye to the base of the opposite horn (slightly above the opposite ear in polled animals). Exsanguination should be done using a pointed, very sharp knife, with at least a 6-inch rigid blade. The knife is thrust into the neck just below the neck bones and drawn downward to sever the jugular vein, carotid artery and trachea: (1) external jugular vein; (2) common carotid artery; (3) trachea.



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# Cattle Identification

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**Sample records:**  
See Chapter 11.

**A**nimal identification is important in cattle herds for effective record keeping, performance testing, and artificial insemination, as well as routine observations. The three most common methods of identification are ear-tagging, tattooing, and branding.

A unique numbering system should be used so that your records are meaningful. Each animal should have a unique number. Herd size determines how many digits are necessary, but each digit should have some meaning.

**Sample numbering system:**

Ear tag 7214 could refer to:

**7:** 2007 birth year

**2:** sire No. 2

**14:** 14th calf born in 2007

Use of emerging cattle identification technology, such as electronic ear tags, is encouraged when practical. The cost is declining for electronic identification, also known as radio frequency identification. As speed, performance, and cost improve, more segments of the industry will use this technology for birth-to-slaughter animal identification. Full traceability back through all production segments is the ultimate goal.

Beyond the food safety and animal health goals of the National Animal Identification System, the driving force for electronic tracking comes down to economics. By “connecting the dots” through the entire beef chain, producers benefit from valuable data that allows them to make informed decisions, improve management, and take advantage of emerging profit opportunities. Tracking cattle is not just a matter of putting an ear tag in a calf. Electronic identification tags cannot do it all. Cooperation is needed among all segments of beef and dairy production, including those involved in the buying, marketing, and processing of cattle. More information on animal identification can be found at <http://animalid.aphis.usda.gov/nais/index.shtml>.

Hot or freeze branding is necessary under some management conditions. Hot branding in some states is the only legal proof of ownership. If cattle are branded, it should be accomplished correctly and with the proper equipment. When brands are used, place them high on the hip and use the smallest symbol possible to minimize or hide damage.



## Premise Identification

Many issues and concerns surround voluntary and mandatory identification programs. While these issues are being resolved, states are issuing premise ID numbers and developing satellite mapping to prepare emergency response plans in the event of a disease outbreak or chemical exposure. As stated in the strategic plan by the USDA, “The goal of the NAIS is to be able to identify all animals and premises that have had contact with a foreign or domestic animal disease of concern (i.e., foot-and-mouth or BSE) within 48 hours after discovery.”

In addition to safeguarding food safety and animal health, the goals of the NAIS plan protect beef and dairy producers by limiting the potential for devastating economic losses in the event of a disease outbreak. For more information about premise and animal ID, contact the Kentucky Department of Agriculture (<http://www.kyagr.com/statevet/nais/index.htm>).

# Records

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**T**o ensure consumer confidence and maintain market share, beef and dairy producers must be able to document the safety of their product. Through appropriate written documentation of products and processes used in managing beef and dairy cattle, producers can prevent residue problems. As a result, consumer confidence is strengthened. In addition, records showing and verifying the age and source of cattle are essential for value-added export markets.

Meat and milk products are routinely tested for violative residues by the U.S. Food and Drug Administration and the U.S. Department of Agriculture. If a problem is detected, good records can help demonstrate responsible management. Effective documentation shows compliance with BQA training, proper animal identification, and effective and responsible use of drugs, pesticides, and herbicides. All records must be maintained in a permanent or written format for a minimum of two years. Producers and commercial haulers of cattle are responsible for ensuring that cattle are free of potential residues.

The record keeping forms in this chapter can be used as is or as a reference for developing a good record keeping system. Computerized systems make extensive evaluation easy and efficient; however, hand-kept record systems are still very effective. Each system has its own merits. The important thing is to be consistent in keeping records that are legible, easily retrieved, and maintained for a period of at least 24 months.

## Maintaining Proper Records

Cattle producers must be able to document all the steps of production. Good production records allow for documentation, analysis, and improved financial decisions. Maintaining a permanent record of all animal treatments is crucial for keeping drug residues out of meat and milk. Records should also provide a history so you and your veterinarian can better prescribe meaningful therapy and ensure that animals do not get sold for harvest or milk is marketed before the withdrawal time has expired. Records also serve as protection in case of regulatory follow-up.

**It is important that all information recorded be maintained for at least two years.**

## Components of a Treatment Record

The treatment record should contain the following basic information:

- Treatment date
- Animal or group or lot identification
- Withdrawal time to slaughter for medication given
- Product used and manufacturer's lot/serial number
- Dosage given
- Route of administration (SQ, IM, etc.)
- Individual who administered the drug

Treatment record forms, found at the end of this chapter, can help record your cattle treatments.

It is important to have each animal permanently and uniquely identified to maintain an accurate treatment record.

## Example Record Forms

The example record sheets are for use in developing a system to accumulate all the information relevant to beef and dairy quality and safety.

This system of records need not be complicated. A simple yet accurate system that allows the producer to document management practices on specific groups of cattle, individual animals, and the farming operation in general is all that is needed.



# Dairy Herd Checklist

*This checklist will assist in the identification of Best Management Practices where problems commonly occur.*

## Individual Treatments

- 1. Written records are kept, including individual identification, date of treatment, product used, amount given, route and location of administration, withdrawal time, serial number (for vaccines), tentative diagnosis, and outcome of treatment. Dry eraser boards can be used in the milking parlor to identify cows treated, however these records must be transferred to a permanent written record.
- 2. All cattle receiving treatment are individually identified.
- 3. All injections are given in the neck region (or as specified by the product label).
- 4. All injections are given subcutaneously (SQ) if possible.
- 5. All medications and drugs are used according to label directions.
- 6. Extra care is taken to select injection sites free of manure and dirt.
- 7. Extra care is taken to see that needles are sharp, and use of broken and burred needles is avoided.
- 8. Needle size used is never larger than necessary to adequately perform the injection.
- 9. Label directions are followed for maximum volume per injection site (maximum 10 cc per site).
- 10. Methods of administration—intramammary, IV (intravenous), IM (intra-muscular), SQ (subcutaneous), or IN (intranasal)—are followed according to label directions.
- 11. A new needle and rectal sleeve is used for each animal to prevent the spread of blood-borne infectious diseases (i.e., Bovine Leukosis Virus [BLV] and anaplasmosis.)
- 12. Chemical disinfectants (i.e. rubbing alcohol) are avoided when using modified live viral products.
- 13. When extra-label animal health products are administered, their use and drug withdrawal time is based on a veterinarian's recommendation. This information should be provided on a label by the prescribing veterinarian. (Should there be any question about withdrawal period, veterinarians can evaluate the treatment history against information provided by the Food Animal Residue Avoidance Databank.)
- 14. All animal health procedures and products are periodically reviewed by a veterinarian.

## Feed Supply

- 1. Only feedstuffs manufactured in compliance with the Ruminant Feed Ban are utilized.
- 2. Records are kept for purchased concentrate or grain mixes indicating source, date, and amount purchased, and are maintained for at least 24 months when animal by-products are used.
- 3. Feed additives are used at recommended usage levels and appropriate products.
- 4. All pesticides used on crops fed to cattle are applied according to label directions and withdrawal times are followed.
- 5. Pesticides are stored in a room separate from feed supplies and feed additives.
- 6. All feeds are checked at regular intervals for changes in color, temperature, odor, moisture, and presence of foreign matter.

## Livestock Insecticides

- 1. All insecticides are applied on the basis of label dosages and routes of administration.
- 2. All insecticides are stored in a designated area away from the feed supply and are not accessible to cattle.
- 3. All insecticides are appropriately labeled.

## Facilities and Transportation of Cattle

- 1. All cattle are handled in a manner that minimizes bruises.
- 2. Loading facilities ensure quick and safe loading and unloading with no bruising.
- 3. Adequate shade and shelter provided and mud minimized around feeding areas.
- 4. Clean areas are provided at calving.
- 5. All farm personnel who handle cattle have been informed about proper processing techniques and provided with training to understand cattle behavior and recommended handling techniques.
- 6. Non-ambulatory (or downer) cows are euthanized humanely.

## Herd Management

- 1. Cows are observed regularly for body condition score, mastitis and early signs of lameness and are treated or culled in a timely manner to prevent the marketing of over-fat cows, extremely thin cows, lame cows and cows with physical problems.
- 2. Cows that are to be culled are given dry-off time before marketing.
- 3. Do not mix too much vaccine at one time. Modified live vaccines (MLV) begin to degrade after about an hour in the heat and sunlight. Therefore, place in a cooler with a cool pack and cover.

## Notes

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# Stocker/Backgrounder/Feedlot Checklist

*This checklist will assist in the identification of Best Management Practices where problems commonly occur.*

## Individual Treatments

- 1. Written records are kept, including individual identification, date of treatment, product used, amount given, route and location of administration, withdrawal time, serial number (for vaccines), tentative diagnosis, and outcome of treatment.
- 2. All cattle receiving treatment are individually identified.
- 3. All injections are given in the neck region (or as specified by the product label).
- 4. All injections are given subcutaneously (SQ) if possible.
- 5. All medications and drugs are used according to label directions.
- 6. Extra care is taken to select injection sites free of manure and dirt.
- 7. Extra care is taken to see that needles are sharp, changed after 10 to 15 animals, and to avoid broken and burred needles.
- 8. Needle size used is never larger than necessary to adequately perform the injection.
- 9. Label directions are followed for maximum volume per injection site (maximum 10 cc per site).
- 10. Methods of administration—IV (intravenous), IM (intra-muscular), SQ (subcutaneous), or IN (intranasal)—are followed according to label directions.
- 11. Needles and rectal sleeves can be changed between each animal to prevent the spread of blood-borne infectious diseases (i.e., Bovine Leukosis Virus (BLV) and anaplasmosis.)
- 12. Chemical disinfectants (i.e. rubbing alcohol) are avoided when using modified live viral products.
- 13. When extra-label animal health products are administered, their use and drug withdrawal time is based on a veterinarian’s recommendation. This information should be provided on a label by the prescribing veterinarian. (Should there be any question about withdrawal period, veterinarians can evaluate the treatment history against information provided by the Food Animal Residue Avoidance Databank.)
- 14. All animal health procedures and products are periodically reviewed by a veterinarian.

## Feed Supply

- 1. Only feedstuffs manufactured in compliance with the Ruminant Feed Ban are utilized.
- 2. Records are kept for purchased concentrate or grain mixes indicating source, date, and amount purchased, and are maintained for at least 24 months when animal by-products are used.
- 3. Feed additives are used at recommended usage levels and appropriate products (i.e., free-choice mineral).
- 4. All pesticides used on crops fed to cattle are applied according to label directions and withdrawal times are followed.
- 5. Pesticides are stored in a room separate from feed supplies and feed additives.
- 6. All feeds are checked at regular intervals for changes in color, temperature, odor, moisture, and presence of foreign matter.

## Livestock Insecticides

- 1. All insecticides are applied on the basis of label dosages and routes of administration.
- 2. All insecticides are stored in a designated area away from the feed supply and are not accessible to cattle.
- 3. All insecticides are appropriately labeled.

## Facilities and Transportation of Cattle

- 1. All cattle are handled in a manner that minimizes bruises.
- 2. Loading facilities ensure quick and safe loading and unloading with no bruising.
- 3. Adequate shade and shelter provided and mud minimized around feeding areas.
- 4. All farm personnel who handle cattle have been informed about proper processing techniques and provided with training to understand cattle behavior and recommended handling techniques.
- 5. Non-ambulatory (or downer) cows are euthanized humanely.

## Herd Management

- 1. Health management includes biosecurity evaluation and planning.
- 2. Isolate (no nose-to-nose contact) new additions from other cattle for minimum of 2 weeks.
- 3. If branding is used, they are placed high on the hip and as small as possible.
- 4. Do not mix too much vaccine at one time. Modified live vaccines (MLV) begin to degrade after about an hour in the heat and sunlight. Therefore, place in a cooler with a cool pack and cover.

## Notes

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# Veterinarian/Client/Patient Relationship Validation Form

FORM 1

*This form needs to be filled out yearly.*

Review Date: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

### Producer

Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_  
 State: \_\_\_\_\_  
 Zip: \_\_\_\_\_  
 Farm name and location: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Certified status: \_\_\_\_\_  
 Verified: \_\_\_\_\_

Type of operation certified:

<input type="checkbox"/>	Cow-calf
<input type="checkbox"/>	Dairy production (milk, cull cows, and replacement heifers)
<input type="checkbox"/>	Beef stocker
<input type="checkbox"/>	Other (specify): _____

### Veterinarian

Name: \_\_\_\_\_, DVM  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_  
 State: \_\_\_\_\_  
 Zip: \_\_\_\_\_  
 State license number: \_\_\_\_\_

I hereby certify that a valid Veterinarian/Client/Patient Relationship (VCP) is established for the above listed owner, and will remain in force until cancelled by either party, or the verification expiration date is reached.

Veterinarian's signature: \_\_\_\_\_  
 Date: \_\_\_\_\_

**Copy this page, cut on the dotted line, and enlarge to 150%. Form will fit on a legal-size page (8.5 x 14").**





FORM 4

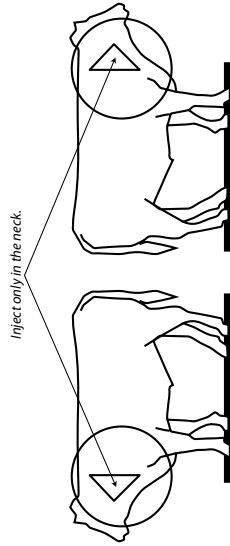
# Group Processing Record

All records should be maintained for at least two years.

Owner: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Group of Cattle: \_\_\_\_\_  
 Tag Numbers: from: \_\_\_\_\_ to: \_\_\_\_\_  
 Sale Date: \_\_\_\_\_  
 Sale Location: \_\_\_\_\_  
 Processor's Signature: \_\_\_\_\_

**Completing the Processing Record:**

1. Indicate (on the line to the left) the group of cattle being worked and the date.
2. Indicate on the diagram of the calf with a number "1" the location of the injection site of the first drug administered.
3. Repeat this step for each vaccine or procedure administered.



Site*	Product	Content	MLV, Killed, or Combo/Agent (i.e., MLV/IBR-)	Route	Date	Serial Number	Expiration	Withdrawal	Booster Date
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

\*Show location administered on cattle drawings at the top of the page.

Other management (creep feeding, minerals, etc.):

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# Cow/Calf Group Herd Health Procedures Record

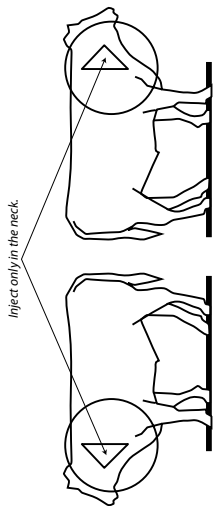
**FORM 5**  
Use both Forms 5 and 6 to record information when working cattle.

All records should be maintained for at least two years.

Owner: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Group of cattle: \_\_\_\_\_  
 Tag Numbers: from: \_\_\_\_\_ to: \_\_\_\_\_  
 Sale Date: \_\_\_\_\_  
 Sale Location: \_\_\_\_\_  
 Processor's Signature: \_\_\_\_\_

**Completing the Processing Record:**

1. Indicate (on the line to the left) the group of cattle being worked and the date.
2. Indicate on the diagram of the calf with a number "1" the location of the injection site of the first drug administered.
3. Repeat this step for each vaccine or procedure administered.



Products Used	Contents	Route*	Serial Number	Expiration	Withdrawal
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

\*IM or SQ

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# National Cattlemen's Beef Association's Beef Quality Assurance National Guidelines

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Revised June, 2001

## Feedstuffs

- Maintain records of any pesticide/herbicide use on pasture or crops that could potentially lead to violative residues.
- Adequate quality control program(s) are in place for incoming feedstuffs. Program(s) should be designed to eliminate contamination from molds, mycotoxins or chemicals of incoming feed ingredients. Supplier assurance of feed ingredient quality is recommended.
- Suspect feedstuffs should be analyzed prior to use.
- Ruminant-derived protein sources cannot be fed per FDA regulations.
- Feeding by-products ingredients should be supported with sound science.

## Feed Additives and Medications

- Only FDA approved medicated feed additives will be used in rations.
- Medicated feed additives will be used in accordance with the FDA Good Manufacturing Practices (GMP) regulation.
- Follow Judicious Antibiotic Use Guidelines.
- Extra-label use of feed additives is illegal and strictly prohibited.
- To avoid violative residues—withdrawal times must be strictly adhered to.
- Where applicable, complete records must be kept when formulating or feeding medicated feed rations.
- Records are to be kept a minimum of two years.
- Operator will assure that all additives are withdrawn at the proper time to avoid violative residues.

## Processing/Treatment and Records

- Following all FDA/USDA/EPA guidelines for product(s) utilized.
- All products are to be used per label directions.
- Extra-label drug use shall be kept to a minimum, and used only when prescribed by a veterinarian working under a Valid Veterinary Client Patient Relationship (VCPR).
- Strict adherence to extended withdrawal periods (as determined by the veterinarian within the context of a valid VCPR) shall be employed.
- Treatment records will be maintained with the following recorded:
  1. Individual animal or group identification
  2. Date treated
  3. Product administered and manufacturer's lot/serial number
  4. Dosage used
  5. Route and location of administration
  6. Earliest date animal will have cleared withdrawal period
- When cattle are processed as a group, all cattle within the group shall be identified as such, and the following information recorded:
  1. Group or lot identification
  2. Date treated
  3. Product administered and manufacturer's lot/serial number.
  4. Dosage used.
  5. Route and location of administration.
  6. Earliest date animal will have cleared withdrawal period.

- All cattle (fed and non-fed) shipped to slaughter will be checked by appropriate personnel to assure that animals that have been treated meet or exceed label or prescription withdrawal times for all animal health products administered.
- All processing and treatment records should be transferred with the cattle to next production level. Prospective buyers must be informed of any cattle that have not met withdrawal times.

### **Injectable Animal Health Products:**

- Products labeled for subcutaneous (SQ) administration should preferably be administered SQ in the neck region.
- All products labeled for intra-muscular (IM) use shall be given in the neck region only (no exceptions, regardless of age).
- All products cause tissue damage when injected IM. Therefore all IM use should be avoided if possible.
- Products cleared for SQ, IV or oral administration are recommended.
- Products with low dosage rates are recommended and proper spacing should be followed.
- No more than 10 cc of product is administered per IM injection site.

### **Care and Husbandry Practices:**

- Follow the 'Quality Assurance Herd Health Plan' that conforms to good veterinary and husbandry practices.
- All cattle will be handled / transported in such a fashion as to minimize stress, injury and/or bruising.
- Facilities (fences, corrals, load-outs, etc.) should be inspected regularly to ensure proper care and ease of handling.
- Strive to keep feed and water handling equipment clean.
- Provide appropriate nutritional and feedstuffs management.
- Strive to maintain an environment appropriate to the production setting.
- Bio-security should be evaluated.
- Records should be kept for a minimum of 2 years (3 for Restricted Use Pesticides).