



calF care & quality Assurance

ANIMAL CARE REFERENCE MANUAL

Version 1

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Healthy calves are the cornerstone of every beef, dairy, and veal facility. As no single organization or program covers all calves, to ensure optimal health and welfare throughout the supply chain, Beef Quality Assurance (BQA), Veal Quality Assurance (VQA), National Dairy Farmers Assuring Responsible Management (FARM), and Dairy Calf and Heifer Association (DCHA) have joined together to collaboratively create a new streamlined program for calf care and management.



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The Calf Care and Quality Assurance program promotes a mindset — a way of thinking — that prompts calf raisers to approach management decisions with thoughtfulness and an appreciation for the responsibility they have to their animals, consumers, the environment, and the broader cattle industries in the United States.



1. INTRODUCTION

Welcome to the Calf Care & Quality Assurance (CCQA) program, a first-of-its-kind program for the U.S. calf-raising sector. This vibrant and diverse sector boasts commercial facilities of all sizes. This manual is meant for those raising many different breeds of male and female calves intended for dairy and/or beef production systems. The program promotes a mindset — a way of thinking — that prompts calf raisers to approach management decisions with thoughtfulness and an appreciation for the responsibility they have to their animals, consumers, the environment, and the broader cattle industries in the United States.

1.1 WHY DO WE NEED THIS PROGRAM?

Healthy calves are the cornerstone of every beef, dairy, and veal facility. While the existing cattle quality assurance programs apply to much of the U.S. cattle industry, the industry is evolving and diversifying. The emergence of dairy, beef, contract heifer raising facilities, and calf ranches represent aspects of the cattle production system that currently fall outside of existing programs. As no single organization or program covers all calves, to ensure optimal health and welfare throughout the supply chain, Beef Quality Assurance (BQA), Veal Quality Assurance (VQA), National Dairy Farmers Assuring Responsible Management (FARM), and Dairy Calf and Heifer Association (DCHA) have joined together to collaboratively create a new streamlined program for calf care and management.

Quality assurance programs have become commonplace for all food-producing enterprises as a means to build consumer confidence that their food is ethically and responsibly produced. Many cattle-specific quality assurance programs already exist in the U.S. today. BQA, VQA, and FARM are all well-established programs. They establish practice guidelines and standards that help earn the public's trust, demonstrating that beef and dairy producers share their values and are committed not only to quality animal care, but also to ensuring safe, wholesome meat and milk. While not a formal quality assurance program, the Dairy Calf and Heifer Association Gold Standards also offer industry benchmarks and best management practices for raising dairy calves and heifers. Together, they have helped set customer expectations. As science and best practices evolve alongside public attitudes and perceptions, the cattle industries must continue to show their customers and consumers that they are holding themselves to the highest standards of animal care.

"...the cattle industries must continue to show their customers and consumers that they're holding themselves to the highest standards of animal care."

Calf raisers have many different customers, from cattle buyers and partners, to meat and dairy processors, as well as consumers. All of these customers expect that calves will be raised responsibly, in a manner that ensures optimal health and welfare. At the end of the supply chain, this expectation translates to ensuring safe, high-quality meat and dairy products from cattle that are well cared for. Maintaining customer trust that these products are being produced responsibly is key to the success and the sustainability of the industry. Importantly, employing these approaches will also translate into better outcomes for producers, from improved resource management to better financial returns. Committing to calf health management is the right thing to do, for calves, producers, and consumers.

1.2 GOALS & OBJECTIVES

The goal of the CCQA program is to raise the standards for U.S. calf raisers by uniting them around key management practices that assure consumers that all cattle raised at a calf raising facility are healthy and well cared for, and that the products they generate are wholesome and safe. Additionally, the program provides assurance that management meets current regulatory standards, the calves meet quality requirements throughout the production system, and they are raised using best practices to promote animal well-being.

As a result, the key objectives of this program are to:

1. Recommend animal welfare guidelines and production practices that are appropriate to a facility that producers can realistically meet or exceed while ensuring food safety and quality.
2. Provide training, certifications, educational resources, self-assessments, and guidance for adopting these guidelines to achieve desired outcomes for calf health and welfare.
3. Establish a foundation and framework for excellent animal care. Producers must take forward steps and instill excellence in animal care daily through their farms' cultures by way of active leadership, oversight, and management.

1.3 USING THIS Manual

This is the official manual of the CCQA Program. It is an easy-to-use, comprehensive resource detailing the most current key practices, guidelines, and suggestions for thoughtful and responsible calf management. Some of the recommendations contained with this manual refer to specific guidelines set out by the Food and Drug Administration (FDA) and/or United States Department of Agriculture (USDA). Other recommendations are based on best practice and/or research. Wherever possible, these recommendations follow the best available scientific evidence and describe practices that have been shown to increase the likelihood of achieving desired calf health and welfare outcomes.

This manual is meant to serve as an educational tool, not a legal or regulatory requirement for the industry. **The practices identified in the manual are not the only practices that can meet the desired outcomes.** The application of some management practices may vary due to certain regional norms, weather, or other conditions. Producers should work with their trusted advisors, veterinarians, and management team members to develop their management approach for meeting the identified guidelines.

Throughout this document, “animal welfare” will be used as the term to represent the concepts of animal well-being and quality of life, which are often used interchangeably to reference the outcomes experienced by the animal. “Animal care” is used as the term to encompass all of the inputs influencing animal welfare outcomes, including housing environments and facilities, management practices, standard operating procedures or protocols, and direct human-animal interactions and handling.

The CCQA program encourages you to seek and utilize all reliable sources of information. These actions will help accomplish the program's goals and objectives. Achieving success will require a cooperative effort among producers, veterinarians, nutritionists, extension staff, and other professionals from veterinary medical associations and allied industries.



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1.5 GLOSSARY

Acronyms & Abbreviations

AABP: American Association of Bovine Practitioners

ADG: Average Daily Gain

ADT: Animal Disease Traceability

AMDUCA: American Medicinal Drug Use
Clarification Act

AVC: Academy of Veterinary Consultants

AVMA: American Veterinary Medical Association

BCS: Body Condition Score

BSE: Bovine Spongiform Encephalopathy

BQA: Beef Quality Assurance

CCQA: Calf Care & Quality Assurance

DCHA: Dairy Calf and Heifer Association

FARM: National Dairy Farmers Assuring
Responsible Management Program

FDA: Food and Drug Administration

NMC: National Mastitis Council

NAHMS: National Animal Health Monitoring System

NSAID: Nonsteroidal Anti-inflammatory

USDA: United States Department of Agriculture

RFID: Radio Frequency Identification

VCPR: Veterinarian-Client-Patient Relationship

VFD: Veterinary Feed Directive

VOR: Veterinarian of Record

VQA: Veal Quality Assurance

Helpful Definitions

For the purposes of the Calf Care & Quality Assurance program, the following terms are defined as:

Animal Welfare: How an animal is coping with the conditions in which it lives. An animal is in a good state of welfare (as indicated by scientific evidence) if it is healthy, comfortable, well nourished, safe, able to express innate behavior, and it is not suffering from unpleasant states such as pain, fear, or distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate protection from heat and cold, management and nutrition, humane handling, and humane slaughter/euthanasia. Animal welfare refers to the state of the animal; the treatment that an animal receives is covered by other terms such as animal care, animal husbandry, and humane treatment.

Animal Abuse: Any inappropriate or unnecessarily rough, persistent handling or treatment that causes undue stress or harm to an animal.

Animal Neglect: When factors required to provide good animal welfare are not being met, causing the animal to be in a reduced or compromised state. Animal welfare is how an animal is coping with the conditions in which it lives.

Antimicrobial Resistance: When bacteria and other organisms evolve to survive in the presence of the medications that were intended to kill them. Occurs through inappropriate use of antimicrobial medications.

Antimicrobial Stewardship: Effort made to reduce the unnecessary and inappropriate use of antibiotics to preserve their effectiveness for both future use and for human medicine.

Average Daily Gain: A method for assessing animal growth, productivity, and feed efficiency. Calculated by measuring calves at predetermined intervals and dividing by the time elapsed in between to determine how much weight is gained per day, on average.

Benchmark: The minimum standard or level which producers should strive for on their own facilities. Often used as a measure of determining if management practices are effective.

Biosecurity: A set of measures aimed at preventing the introduction and/or spread of harmful organisms, in order to minimize the risk of transmission of infectious diseases to people, animals, and plants caused by viruses, bacteria, or other microorganisms.

Body Condition Score: A measure to assess the provision of appropriate and sufficient nutrition to growing calves. A score is assigned based on the evaluation of various parts of the animal's body looking for either bony prominences or the presence of fat and muscle cover.

Branding: A cattle identification procedure typically administered using either a hot or cold iron. Identification is established through permanent scarring on the animal's hide. Some states require branding by law.

Calf Raiser: Any person or facility that is involved in the contract growing or raising of dairy, beef, or veal animals. Calves on these facilities may be 48 hours old until breeding age, or slaughter.

Castration: The process or procedure in which the testicles are removed or destroyed.

Disbudding: Removal or destruction of horn-producing cells, prior to their attachment to the skull (less than eight weeks of age).

Dehorning: Removal or destruction of horn tissue after it has fused to the skull (over eight weeks of age).

Euthanasia: The intentional ending of an animal's life by an acceptable method to relieve pain and suffering.

Exsanguination: The removal of an animal's blood to facilitate death following stunning.

Extra-Label Drug Use: Actual or intended use of a drug in an animal in a manner that is not in accordance with the approved labeling. This includes, but is not limited to, use in species not listed in the labeling, use for indications (disease and other conditions) not listed in the labeling, use at dosage levels, frequencies, or routes of administration other than those stated in the labeling, and deviation from labeled withdrawal time based on these different uses.

Health Management Plan: An animal health management system developed with a veterinarian to prevent, diagnose, control, and treat disease or injury of all cattle at a facility.

Humane: Having or showing compassion.

Hypoglycemia: The condition of having low blood sugar due to insufficient nutrition. Can occur when calves do not eat willingly and/or with long transport times.

Local Anesthesia: Provision of a 'freezing' medication, typically lidocaine, to prevent sensation or feeling to a particular area of tissue.

Low-stress Handling: A method of animal handling where herdspeople are trained to effectively and efficiently move animals based on cattle's natural and innate tendencies. Low-stress handling does not utilize excessive arm waving, yelling, or use of implements that may cause pain, stress, or fear to encourage animal movement.

Morbidity: Having a disease; calculated by assessing the number of calves that were treated for a given disease divided by the population that is at risk of being infected.

Mortality: Dying of a disease; calculated by the number of calves that die over a certain period of time divided by the population that is at risk of dying (which is the entire population or group of calves).

Non-Ambulatory Animal: An animal that is not able to stand due to injury, illness, weakness, and/or pain.

Pain Mitigation: Relieving pain through changing housing or management, or through the administration of medication, such as a nonsteroidal anti-inflammatory drug.

Passive Transfer of Immunity: The process in which antibodies from a cow are deposited in colostrum to be ingested by the calf. The calf then relies on these antibodies to protect itself against various pathogens until its own immune system begins to develop. Passive transfer of immunity is ensured when calves receive a sufficient volume of high-quality colostrum very soon after birth. It is measured by using a refractometer to evaluate a blood sample taken from calves at 24 hours of age up until nine days of age.

Pithing: To pierce brain tissue to disrupt nervous system function. Usually performed following the use of a penetrating captive bolt to cause death to a stunned animal.

Pre-Weaned Calf, Pre-Weaning Age: A calf that is of an age that it is still receiving the majority of its nutrition from milk or milk replacer. For dairy calves, this is typically a calf less than 56 days of age.

Protocol: The decided-upon system of rules or procedures for completing a specific task. This is established to ensure consistency and continuity of care.

Residue Avoidance: Ensuring that animals treated with any medications observe the appropriate withdrawal time to prevent drug residues from entering milk or meat at the time of processing.

Restraint: Holding, tying, or catching an animal for a period of time to perform a procedure.

Source: The facility on which a particular animal was born or purchased from.

Standardized: To compare with a predetermined standard or goal. A means of ensuring that certain procedures are being performed in a similar, consistent manner.

Stocking Density: The number of animals in a given housing area.

Supernumerary Teat: An extra teat outside of the normal quarters on the udder.

Thermoneutral Zone: The ambient temperature at which a calf is not required to expend energy to keep itself warm or cool. For calves, this zone is approximately 50 - 78°F (10-25°C). A calf experiencing temperatures outside of this zone is prone to heat or cold stress.

Treatment: Providing an animal with a substance (such as an antimicrobial medication or electrolytes) to relieve the symptoms of an illness.

Veterinarian-Client-Patient Relationship: An established partnership with a trusted veterinarian that is in the best interest of your herd and business. This oversight should include but may not be limited to: Establishment of treatment protocols, training of personnel, review of treatment records, monitoring drug inventories, and assuring appropriate labeling of drugs.

Veterinarian of Record: The responsible party for providing appropriate oversight of drug use at the facility operation. Such oversight is a critical component of establishing, maintaining, and validating a VCPR.



2. CALF HEALTH

The success of any cattle facility is closely linked to the health and welfare of their animals. This section outlines good management practices for preventing and treating diseases, monitoring production and performance, and timely decision making.

2.1 Veterinarian-Client-Patient Relationship

What is it and Why is it Important?

Establishing a partnership with a trusted veterinarian is in the best interest of your herd and business. Your veterinarian brings a wealth of knowledge and expertise on animal health and biosecurity and can bring insight gained from visiting other similar facilities which may help with troubleshooting. Developing and maintaining a veterinarian-client-patient relationship (VCPR) is required to access prescription medications. In addition to a VCPR, a VCPR management team, comprised of consultants, veterinarians, nutritionists, and staff involved in decision making and direct animal care, can be established to build a single team with excellent knowledge and expertise to improve calf health care at your facility.

What Can You Do?

All calf raisers should have a valid VCPR. In addition, a VCPR is a must for extra-label use of drugs. The Veterinarian of Record (VOR) has the overall responsibility for providing oversight of treatment protocols, drug inventories, and usage, prescriptions, and personnel training at the facility. The VOR listed should agree to the role, have thorough knowledge of the facility, and have been on-site at least once within the last 12 months. The VOR is not a veterinarian that is used solely for accessing or selling medications.

What's Involved in a VCPR?

The American Association of Bovine Practitioners (AABP) outlines the expectations of a VCPR as follows:

- Establish a written agreement with your veterinarian which identifies the farm veterinarian who is accountable for drug use and treatments administered to the cattle on the farm operation. If more than one veterinarian or veterinary practice has a working relationship on the operation, then the agreement should establish which one is the VOR.
- The VOR is the responsible party for providing appropriate oversight of drug use on the farm operation. Such oversight is a critical component of establishing, maintaining, and validating a VCPR. This oversight should include, but may not be limited to, establishment of treatment protocols, training of personnel, review of treatment records, monitoring drug inventories, and assuring appropriate labeling of drugs. This oversight includes all drugs used on the farm regardless of how they are obtained. Regular farm visits are essential to a VCPR and frequency should be determined by the VOR based on type and size of the operation.
- If a veterinarian who is not the VOR provides professional services in any type of consultative or advisory capacity, then it is incumbent on that veterinarian to ensure that the VOR is contacted and informed of their findings and recommendations.
- Protocols and treatment guidelines for commonly occurring, easily recognizable conditions should be established in writing and agreed upon by all parties involved, signed and dated. Training of personnel authorized to use drugs on the operation should be undertaken and periodically reviewed.

- Written/electronic treatment records of all animals or groups of animals treated are an essential component of maintaining and establishing the VCPR and decreasing the risk of violative drug residues. Such records should include, at a minimum, the date, identification of animal(s), drug(s) used, frequency, duration, dose, route (method of administration), appropriate meat/milk withdrawal intervals, and the person administering the treatment.
- Provision of drugs or drug prescriptions should be for specific time frames appropriate to the scope and type of operation involved and only for the management groups within the operation for which the VOR has direct involvement and oversight. Establishment of a VCPR for the sole purpose of the sale of drugs or increased sales of a particular brand of drug product is not a valid or ethical reason for having a VCPR.

What are the Benefits of a VCPR?

Setting Goals & Protocols

Your veterinarian can be a valuable resource in establishing and reviewing protocols. They can help you to identify gaps in management and biosecurity, as well as protocol drift to identify how and where improvements might be made by providing objective observations with the goal of improving health and production.

Training & Guidance

Use your veterinarian as a resource for staff training in performing potentially painful procedures to ensure they are done appropriately and with sufficient pain control methods. They can also help you and your staff identify signs of disease, establish a monitoring program, and develop appropriate medication protocols to optimize recovery and treatment outcomes, as well as ensure antibiotic stewardship. This is extremely important for the reduction of violative residues in meat and milk, as well as where extra-label drug use (ELDU) may be required. Using your veterinarian as a resource and partner can improve animal health, production, and welfare as well as benefit your business.

Extra Support

Your veterinarian is also skilled and proficient in techniques that may be beyond the skill or comfort level of your staff. If euthanasia is a difficult task, consider involving your veterinarian to ensure the procedure is performed in a humane and timely manner to reduce animal suffering.

Desired Health Care Outcomes

- Establish and maintain a working VCPR, where the VOR has visited the facility within the past 12 months.

2.2 HEALTH MANAGEMENT PLAN

What is it and Why is it Important?

A Health Management Plan consists of a series of records, protocols, and procedures that document the key practices and outcomes at the facility. Record keeping is required for identifying and monitoring trends in calf health and management. Written protocols and procedures are also critical to help guide calf management and care. These are key elements of a Health Management Plan and are also one of the cornerstones of quality assurance.

What Can You Do?

A comprehensive Health Management Plan should include written protocols for all primary areas of calf health management and provide enough detail to ensure all family and non-family employees with animal care responsibilities can perform those duties accurately and consistently. To ensure the best understanding of job expectations, protocols should be translated into languages understood by those with animal care responsibilities. Written protocols can utilize images or other learning tools to enhance the understanding of the content of a protocol.

The primary areas that should be covered in your Health Management Plan include:

- Individual animal identification
- Drug use: stewardship, residue avoidance, treatment records
- Monitoring calf morbidity and mortality
- Vaccinations
- Biosecurity and sanitation
- Non-ambulatory animals
- Euthanasia
- Transportation
- Monitoring production and performance

Your Health Management Plan should focus on prevention, accurate and early diagnosis, and quick decision making on necessary treatment and care of all sick animals. A licensed veterinarian should help calf raisers develop and implement a Health Management Plan. Your written Health Management Plan should be reviewed by your VOR. Read below for an outline of each aspect of the Health Management Plan.

A licensed veterinarian should help calf raisers develop and implement a Health Management Plan.

Desired Health Care Outcomes

- ❑ Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - ❑ A written protocol for the prevention and treatment of common diseases including diarrhea, pneumonia, and umbilical infections. Facility-specific steps should be taken to prevent transmission of disease. Diseases should be detected and managed promptly.
 - ❑ Permanent drug treatment records (written or electronic) that include date of treatment, person administering the treatment, animal ID, disease or condition name, drug name, dosage, route of administration, injection site, whether a needle was broken, duration of treatment, and specified withdrawal times. A minimum of two years' worth of records must be available as per FDA regulations.
 - ❑ Health records (written or electronic) that include the type and severity of disease, date of diagnosis, actions taken, and outcomes (recovery or death). Records should be used in consultation with the VOR to monitor calf health trends.
 - ❑ A written vaccination protocol for specific diseases of concern, which includes the age(s)/ production class(es) that receive the vaccine, product used, storage, dosage administered, route of administration, and withdrawal times. A vaccination program should be considered, in consultation with the VOR, to prevent disease.
 - ❑ A written biosecurity protocol to prevent entry and spread of pathogens within the barn. Facility-specific measures should be taken to prevent the spread of disease.
 - ❑ A written protocol for caring for non-ambulatory calves, which includes details on detection, movement, housing, care, treatment, and decision-making. All non-ambulatory calves should be cared for and managed in a safe and timely manner.
 - ❑ A written protocol for euthanizing animals that includes criteria for the identification of animals to be euthanized, euthanasia techniques approved by the AABP and/or the AVMA, and carcass disposal using an appropriate method. All animals should be euthanized in a timely and appropriate manner.
 - ❑ A written protocol for assessing fitness for transport. All animals should be assessed for fitness before being transported.
 - ❑ A written protocol for monitoring production and performance of calves. Young calves should demonstrate positive gain between arrival at the facility and one week later.
 - ❑ A written protocol for the prevention and treatment of lameness.
 - ❑ 95% of calves at the facility should be sound, with normal locomotion and bearing weight evenly on all limbs.

2.2.1 INDIVIDUAL ANIMAL IDENTIFICATION

What is it and Why is it Important?

To ensure proper record-keeping, residue avoidance, and treatment, it is imperative that all animals within the facility have highly visible identification affixed to them upon arrival if they did not arrive with identification.

Animals may require treatment or producers may provide prophylactic or preventative treatments to calves soon after arrival. To be able to identify which animals may require follow-up treatments, monitoring, or record-keeping, they must have easily visible identification.

What Can You Do?

The USDA has implemented Animal Disease Traceability (ADT) rules to monitor and regulate the movement of animals between states. According to these guidelines, all animals must be identified using an approved method or device.

Approved methods are as follows:

- Radio Frequency Identification (RFID) tags
- Brite tags
- Vaccination tags
- Dangle tags
- Button tags
- Tattoos
- Hot or freeze iron brand with ranch and animal number. (Required in some areas, particularly for beef cattle.)

Inappropriate methods of identification include:

- Wattling
- Ear splitting
- Surgical alterations

Consider establishing a traceability system for your facility by tagging calves upon arrival with unique identifiers that also indicate the source or supplier. This will aid in disease management and allow for the ability to trace groups of calves with higher levels of mortality or disease to the source or supplier.

OTHER CONSIDERATIONS

To ensure consistency, it is recommended that all calves be affixed with an RFID tag (if they do not have one already) upon arrival. As a best management practice, it is recommended that an easily visible ear tag be attached at this time so that animals can be quickly and easily identified from a distance by all staff members to streamline treatment, record-keeping, monitoring, and overall management.

A Note on Branding

Branding is still a common form of animal identification in some regions, and is required by law in some states. Both hot and cold iron branding cause pain, with hot iron branding being more painful, which can result in indicators of pain and inflammation in cattle present for several weeks after the procedure.



To minimize pain associated with both hot and cold iron branding, consider developing a protocol with your VOR using the AABP standard of care. Pain relief can be accomplished by giving oral, injectable, or topical medications. Work with your veterinarian to develop a protocol tailored for your facility.

Some key considerations include:

- Nonsteroidal anti-inflammatory drugs (NSAIDs) will provide pain relief immediately after the procedure. Long-acting NSAIDs can also provide pain relief for an extended period of time. For example, meloxicam can minimize pain for up to 48 hours following a single dose of the drug, which will increase short-term weight gain and feed intake.
- Topical NSAID application may be practical at the time of branding when oral or injectable administration is not possible.
- Using NSAIDs to relieve pain from branding is considered ELDU and requires a VCPR and a prescription from your veterinarian.

Training is Key

Anyone involved in the performance of this procedure should be trained to ensure that it is being performed efficiently and effectively to reduce stress, inflammation, and reduce the risk of infection.

Desired Health Care Outcomes

- Ensure all animals are affixed with easily visible identification and/or branded (using appropriate techniques and providing pain control).

2.2.2 DRUG USE: STEWARDSHIP, RESIDUE AVOIDANCE, TREATMENT RECORDS

The FDA defines a drug as any substance (e.g., vaccine, antibiotic, analgesic) for use in the diagnosis, cure, mitigation, treatment, or prevention of disease. When used appropriately, these drugs can be important and effective animal health tools for producers to improve and maintain the health and welfare of their cattle. There are three key elements: antimicrobial stewardship, residue avoidance, and treatment records.

Stewardship

What is it and Why is it Important?

As defined by AABP stewardship guidelines, antimicrobial stewardship is the commitment to reducing the need for antimicrobial drugs by preventing infectious disease in cattle, and when antimicrobial drugs are needed, a commitment that antimicrobials are used appropriately to optimize health and minimize selection for antimicrobial resistance.

What Can You Do?

Your veterinarian is an excellent resource and should aid in the development of treatment protocols and have data available to oversee the use at your facility. In addition, the following information, obtained from American Veterinary Medical Association (AVMA), AABP, and Academy of Veterinary Consultants (AVC) guidance on Appropriate Veterinary Antibiotic Use, can be used as a guide to ensure judicious use of antibiotics:

- 1. Prevent problems.** Preventing health challenges will lead to a reduction in the need to use antibiotics. Ensure appropriate husbandry and hygiene, routine health examinations, and vaccinations.
- 2. Adhere to FDA guidelines.** Follow label instructions and FDA guidance for the use of all antibiotics. The use of antibiotics that are medically important in human medicine should only be used after careful consideration. If medically important feed grade antibiotics are used, they must be under the guidance of a Veterinary Feed Directive (VFD).
- 3. Select and use antibiotics carefully.** Work with your veterinarian on the selection and use of antibiotics under the VCPR. Have a valid reason to use an antibiotic. Consider appropriate therapeutic alternatives prior to using antibiotic therapy.
- 4. Use the laboratory to help you select antibiotics.** Cultures and sensitivity test results should be used to aid in appropriate antibiotic selection, whenever possible.
- 5. Don't use multiple antibiotics.** Combination antibiotic therapy is discouraged unless there is clear evidence the specific practice is beneficial.
- 6. Avoid inappropriate antibiotic use.** Avoid using antibiotics when inappropriate, such as for viral infections without bacterial complication. Only use antibiotics to treat diseases they are clinically proven to treat.
- 7. Treatment programs should reflect best use principles.** Regimens for therapeutic antibiotic 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.** To 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 regimes and always follow proper meat and milk withdrawals. Keep records for a minimum of two years or longer based on state and local regulations (this is an FDA requirement).
- 12. Follow label directions.** Follow label instructions and never use antibiotics other than as labeled.
- 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). This includes having a valid VCPR.
- 14. Medically important antibiotic use should be limited to treat, prevent, or control disease.** Medically important antibiotics should not be used if the principal intent is to improve performance. Antibiotics that are medically important to human medicine may not be used to improve performance.

Residue Avoidance

What is it and Why is it Important?

When drugs are used, it is important to ensure that there are no drug residues present in meat (or milk, if applicable). The marketing of food products with drug residues, even unintentionally, is illegal and can result in financial and criminal penalties.

What Can You Do?

The presence of drugs in products intended for human consumption can mean serious consequences for the producer. Take steps and ensure good treatment protocols and records are in place.

The following steps can help to avoid or lessen the chances of having antibiotic residues:

- Establish a valid VCPR to ensure proper diagnosis and treatment.
- Keep easily accessible records of antibiotic drug treatment records and have a system in place where staff are able to easily identify all treated animals.
- Implement a preventative Health Management Plan to reduce the incidence of disease.
- Implement training to improve awareness and understanding of treatment protocols and the proper animal drug use.
- Use drugs that are approved for specific disease indications according to labeled recommendations and withdrawal periods. If extra-label drug use is indicated by a veterinarian's prescription, that veterinarian must establish and document appropriate withdrawal periods.
- Do not use drugs that are specifically prohibited in the groups of animals being raised.
- If in doubt about residue status, do not market treated animals.
- Ensure antibiotics are stored in a secure location and monitor for any suspicious activity.

Drug Treatment Records



What are They and Why are They Important?

Animal health treatment records are critical for ensuring that we help keep unsafe food from reaching consumers. They are also important to determine the level of disease within your facility.

Specifically, maintaining excellent treatment records can:

- Ensure an effective Health Management Plan through periodic and timely review of treatment records with your veterinarian.
- Prevent an accidental violative residue.
- Save money.

What Can You Do?

The treatment records for the facility should be kept in a permanent (written or electronic) format for the treatment of common diseases that occur. The records should also be kept in a format that is easily accessible for those who work with animals. **Records on all animals treated with drugs should be kept for a period of at least two years per the FDA, or in accordance with local laws and regulations.**

Specific drug record components that should be recorded include:

- Date of treatment
- Person administering the treatment
- Animal ID
- Disease or condition name
- Drug name
- Dosage
- Route of administration [i.e., intramuscular (in the muscle), subcutaneous (under the skin), oral, intravenous (in the vein)]
- Injection site
- If a needle was broken during injection
- Duration of treatment
- Specified withdrawal times for meat (or milk, if appropriate) to ensure food safety

As animals from calf raisers can be moved to another facility, when possible, all treatment records should be transferred to the next owner or production level.

A template treatment record can be found in the Appendix.

Extra-Label Drug Use

The FDA defines ELDU as actual or intended use of a drug in an animal in a manner that is not in accordance with the approved labeling. This includes, but is not limited to, use in species not listed in the labeling, use for indications (disease and other conditions) not listed in the labeling, use at dosage levels, frequencies, or routes of administration other than those stated in the labeling, and deviation from labeled withdrawal time based on these different uses.

Some examples of extra-label drug use include:

- Changing the dose.
- Changing the route of administration.
- Giving a drug to a different production class of animal.
- Giving a drug for a disease not listed on the label.
- Not following labeled withholding times.
- Changing the amount of drug per injection site.
- Changing the duration of therapy.

The use of drugs in an extra-label manner is regulated by the FDA under the AMDUCA regulation, which permits veterinarians to prescribe extra-label uses of certain approved new animal drugs and approved human drugs for animals under certain conditions. This means that using a prescription drug or over-the-counter drug in an extra-label manner is illegal unless it is specifically prescribed with withdrawal times by a veterinarian working in the context of a VCPR. Convenience and economics are not acceptable reasons for ELDU in food animals. Therefore, any ELDU of antibiotics must be used as a prescription and must follow directions from the prescription.

If your veterinarian is unsure whether a drug can be prescribed in an extra-label manner, they should consult the AVMA's extra-label drug use Algorithm along with the AMDUCA regulations.

Desired Health Care Outcomes

- ❑ Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - ❑ Permanent drug treatment records (written or electronic) that include date of treatment, person administering the treatment, animal ID, disease or condition name, drug name, dosage, route of administration, injection site, whether a needle was broken, duration of treatment, and specified withdrawal times. A minimum of two years' worth of records must be available as per FDA regulations.
 - ❑ Health records (written or electronic) that include the type and severity of disease, date of diagnosis, actions taken, and outcomes (recovery or death). Records should be used in consultation with the VOR to monitor calf health trends.

2.2.3 MONITORING CALF MORBIDITY & MORTALITY

What is it?

Calves may become sick (morbidity) or die (mortality) for several reasons. Understanding the specific causes of sickness and death in your herd is key to reducing risk factors and preventing future problems. This not only impacts the health and welfare of your cattle, but also your bottom line.

Calf Morbidity

Can be defined as the number of calves that were treated for a given disease divided by the population that is at risk of being infected. To calculate the morbidity risk for diarrhea in the first 21 days after arrival (the highest risk period for diarrhea), you take the number of calves diagnosed with diarrhea in the first 21 days divided by the total number of calves (those with and without diarrhea in the first 21 days).

For example, if you had 62 calves diagnosed with diarrhea and 433 calves that were not diagnosed in the first 21 days, the diarrhea risk would be 12.5% [62 / (433 + 62)]. Similar calculations could be completed for respiratory disease and umbilical infections, or a cumulative calculation could be done for all disease.

calves with diarrhea diagnosed

$$\frac{62}{(433 + 62)} = 12.5\%$$

not diagnosed

risk

Calf Mortality

Defined as the number of calves that die over a certain period of time divided by the population that is at risk of dying (which is the entire population or group of calves). To calculate mortality risk of a group of calves in the first 60 days of life, you take the number of calves that died in the first 60 days divided by the number of calves that survived the first 60 days, plus the number of calves that died in the first 60 days (the total number of calves in that particular group).

For example, if you had 14 calves die in the first 60 days and 132 calves survive, the level of calf mortality would be 9.6% [14 / (132 + 14)].

calves died identified as dead

$$\frac{14}{(132 + 14)} = 9.6\%$$

live calves

risk

As the public is an important stakeholder in livestock agriculture, we need to ensure that mortality and morbidity are prevented to protect the future sustainability of the industry.



Why Assess it?

Disease occurring in the pre-weaning period has been associated with both short- and long-term consequences. In the short-term, disease can lead to reduced growth and a higher level of mortality, whereas, long-term, disease can lead to an increased age at calving or slaughter, and can lead to reduced future milk production for dairy animals.

Mortality, on the other hand, leads to lost genetic potential for heifers and dairy bulls and leads to higher costs for purchasing replacements. These factors are part of an economic argument that could be made; however, animal welfare should be part of the discussion. Many of the diseases that affect calves are painful and can last for long periods of time leading to poor animal welfare. An additional concern is sustainability of the industry. The care of newborn animals generates high empathy and concern from the public and their perception is important. Livestock producers have been the target of animal activists who represent the industry inaccurately and inappropriately. As the public is an important stakeholder in livestock agriculture, we need to ensure that mortality and morbidity are prevented to protect the future sustainability of the industry.

What Are You Looking For?

For mortality, it's about looking for calves that have died. A critical component of this is to ensure that deaths are recorded so that the mortality risk can be evaluated over long periods of time (or the entire production cycle). Depending on the size of the facility, mortality risk can be calculated over different lengths of time; however, it is critical to ensure that the level of mortality is being evaluated routinely to ensure that disease is being detected, treated, and prevented as much as possible. Work with your veterinarian to determine the best frequency to evaluate mortality at your facility.

Early disease identification is critical to prevent many of the negative consequences associated with disease development. To detect disease, consider using a standardized health scoring system to ensure that disease information is captured in a systematic way that is the same between all staff members.

Abnormal Manure

Abnormal manure not only shows that there is a problem related to calf management (e.g., sanitation and nutrition) but it is a risk factor for respiratory disease. Evaluating fecal consistency is the easiest way to find abnormal manure, which most commonly indicates the presence of diarrhea. However, the presence of blood and/or mucus is also considered abnormal even if the manure is of normal consistency. Use the following four-point fecal consistency scoring chart to detect abnormal manure:

Manure Score	Fecal Consistency
0	Normal feces that retain form
1	Normal feces that may be pasty but does not flow over a surface
2	Mild diarrhea where feces can flow across a surface easily leaving adherent material, and rests on top of bedding
3	Moderate to severe diarrhea where feces flow very easily across a surface leaving no adherent material, and sinks through bedding

Using this chart, calves would be classified as having abnormal manure if they had a fecal score of two or three or the presence of blood or mucus regardless of the score. A protocol should be in place, developed with the help of your veterinarian, for addressing calves that receive this score. For calves on milk, the highest risk period for diarrhea is less than 21 days of age. However, within one facility, the age range is usually much narrower. Therefore, the fecal consistency of calves in the typical age range for a given facility should be evaluated at least once per day to ensure that they are identified early. *For a visual representation and more information on fecal scoring, please see the Appendix.*

Respiratory Disease

Using the following four-point scoring system will help improve your diagnostic accuracy in identifying respiratory disease. This scoring system focuses on the presence of a cough, nasal or eye discharge, ear position, and rectal temperature:

Clinical Parameter	Respiratory Score			
	0	1	2	3
Rectal Temperature (°F)	100 - 100.9	101 - 101.9	102 - 102.9	> 103
Cough Score	No cough	Induced single cough	Induced repeated coughs or occasional spontaneous coughs	Repeated spontaneous coughing
Nasal Discharge Score	Normal clear discharge	Small amount of cloudy discharge in one of the nostrils	Cloudy or excessive mucus in both nostrils	Copious amount of nasal discharge with pus and mucus in both nostrils
Eye or Ear Score	Normal eye and ear	Mild discharge from eye or ear flicking	Moderate discharge from both eyes or slight drop in one ear	Heavy eye discharge, severe head tilt, or droop in both ears

* To induce a cough, manipulate the calf's upper portion of the trachea (or larynx).

Each parameter of the scoring system is evaluated individually. Calves scoring two or higher in two or more categories are considered positive for respiratory disease and should be treated according to the facility's protocol. Respiratory disease typically occurs for the first time during a relatively narrow age window, such as between 14 – 21 days of age, and most commonly occurs before weaning. In some settings, lung infections may actually develop 7 – 10 days before any clinical signs (e.g., nasal or ocular discharge, cough, fever) are obvious. Work with a veterinarian to identify when onset of respiratory disease occurs through the use of lung ultrasound so that you can focus your detection efforts on the correct age group of calves.



Training is Key

For both respiratory disease and diarrhea diagnosis, ensure training is sought for those working with calves to make sure disease diagnosis and treatment is occurring consistently. Work with your veterinarian to provide training for disease diagnosis and develop systems to identify disease quickly and accurately. *For a more detailed chart for calf health scoring, please see the Appendix.*

Consider Lung Ultrasound

Lung ultrasound can also be used to promote calf health and is better at identifying respiratory disease compared to the scoring systems highlighted above. It is recommended as a tool to identify the level of respiratory disease at weaning, determine detection and treatment efficiencies, and identify high-risk age groups for follow-up management. In facilities where subclinical pneumonia is common, routine lung ultrasound can also be used to identify and treat calves for respiratory disease before they become visibly sick.



You Manage What You Measure

Similar to mortality, recording disease when it is identified is critical. Recording disease levels allows you to monitor herd health to ensure you are meeting your target goals, and if not, seek assistance to correct these levels. This can also help to identify trends (such as seasonality) where a multi-tiered problem-solving approach including assessment of facilities, feeding, and calf sources might be required to reduce the impact of calf disease. Treatment outcomes can also be evaluated by combining with mortality and growth data to determine how your treatment protocols are working. Depending on the size of the facility, morbidity risk can be calculated over different lengths of time. Work with your veterinarian to determine the best frequency to evaluate morbidity.

How Do You Compare?

While there are few national estimates of morbidity and mortality originating from U.S. calf raising facilities, the National Animal Health Monitoring System (NAHMS) conducted surveys in 2011 and 2014 to explore morbidity and mortality. A positive finding in the USDA surveys is the levels of disease and mortality have declined over time; however, there still remain areas for improvement.

Here are some of the NAHMS results:

Type of Facility	U.S. Heifer Raisers ¹		U.S. Dairy Farms ²	
	Pre-Weaning	Post-Weaning	Pre-Weaning	Post-Weaning
Average % with Diarrhea	25%	21%	21%	1%
Average % Treated for Respiratory Disease	18%	12%	12%	5%
Average % Mortality	6%	6%	6%	2%

¹ USDA. 2011. Dairy Heifer Raiser: An overview of operations that specialize in raising heifers. Available at: https://www.aphis.usda.gov/animal_health/nahms/dairy/downloads/dairyheifer11/HeiferRaiser_1.pdf

² USDA. 2014. Dairy 2014. Health and management practices on U.S. dairy operations. Available at: https://www.aphis.usda.gov/animal_health/nahms/dairy/downloads/dairy14/Dairy14_dr_PartIII.pdf

To measure how your facility might compare, a starting metric might be to compare to the Dairy Calf and Heifer Association's Gold Standards Program, which can help guide calf raisers to achieve benchmarks and best management practices.

The Gold Standards Suggest Several Key Targets for Survival Rates:

Age	Survival Rate
24 hours to 60 days	> 97%
61 - 180 days	> 98%
6 months to freshening/slaughter	> 99%

The Gold Standards also Suggest Targets for Morbidity:

Age	Respiratory Disease	Diarrhea
Pre-weaning	< 10%	< 15%
Post-weaning to 120 days	< 10%	< 2%
121 - 180 days	< 2%	< 1%

What Can You Do to Improve?

Start by measuring and recording calf morbidity and mortality. Determine if these are appropriate, discuss with your staff, and determine how to foster continuous improvement in preventing disease and death for optimal calf health and welfare. If you're not meeting targets for morbidity or mortality, work with your veterinarian and other advisors to develop a plan to prevent and reduce disease burden.

Key areas to evaluate include:

- Passive transfer of immunity
- Nutrition
- Hygiene & cleanliness
- Biosecurity
- Vaccinations
- Disease detection & treatment
- Testing & diagnostics

Passive Transfer of Immunity

The level of passive transfer (an indicator of the volume, quality, and timeliness of colostrum being administered) is a key predictor of future disease. Consider measuring passive transfer on calves between 24 hours to nine days of age. This is done by obtaining a blood sample and measuring the level of protein in the serum which correlates to the level of immunoglobulins that would have been obtained through colostrum. The following benchmarks for calves can be used to guide whether colostrum management at the source facility is creating a challenge for arriving calves¹:

Category	Serum IgG (g/L)	Total Protein (g/dL)	% Brix	Target (% calves) ¹
Excellent	> 25.0	> 6.2	> 9.4	> 40
Good	18.0 - 24.9	5.8 - 6.1	8.9 - 9.3	~30
Fair	10.0 - 17.9	5.1 - 5.7	8.1 - 8.8	~20
Poor	< 10.0	< 5.1	< 8.1	< 10

¹ Lombard, J., N. Urie, F. Garry, S. Godden, J. Quigley, T. Earleywine, S. McGuiirk, D. Moore, M. Branan, M. Chamorro, G. Smith, C. Shivley, D. Catherman, D. Haines, A.J. Hendrichs, R. James, J. Maas, and K. Sterner. 2020. Consensus recommendations on calf- and herd-level passive immunity in dairy calves in the United States. *Journal of Dairy Science* 103:7611-7624.

If arriving calves are not meeting these targets, work with producers supplying their calves to your facility to aid them in improving their colostrum management.

Nutrition

Work with your veterinarian and other advisors to develop a nutritional program for pre- and post-weaning that is adequate to maintain health, growth, and vigor of your calves.

Research¹⁻³ has shown that feeding 20% of body weight (at least eight quarts of milk) will lead to higher levels of gain and can improve calf health and performance.

Hygiene & Cleanliness

Cleanliness is a critical component of disease prevention. Minimizing exposure to pathogens (especially those found in manure) is especially critical for preventing diarrhea as calves will become infected by unintentionally ingesting these pathogens orally. Evaluate the cleanliness of your animals on a weekly basis to ensure that they are able to maintain the target of having 90% of the herd clean. Maintaining deep, dry bedding and low stocking density can help significantly!

For best results, when cleaning feeding equipment or housing systems, ensure manure and debris are first removed, then disinfectant is applied and allowed to dry.

Consider doing periodic cleanliness checks and quality control on certain items where samples from feeding equipment and housing are collected and either cultured or assessed using a luminometer to ensure your cleaning protocols are effective. This can be done using your staff or veterinary service.

Biosecurity

Certain principles of biosecurity are critical in disease prevention, including:

- Working from the youngest to oldest calves to prevent the spread of pathogens older calves may have, that young calves do not have immunity to yet.
- Wearing clean boots and coveralls especially for the youngest calves to prevent the transfer of manure that could cause disease.
- Practicing all-in, all-out management where an entire group of calves arrives and leaves at the same time, and are not introduced into pens of other animals, allowing for complete cleaning and disinfection between groups. This also reduces the stress of establishing hierarchy when new additions are constantly being added. Calves required to adapt to stress put less energy toward growth and immune function, making them susceptible to disease.

For more information regarding biosecurity, see section 2.2.5.

¹ Khan, M.A., D.M. Weary, and M.A.G. von Keyerslingk. 2011. Invited review: Effects of milk ration on solid feed intake, weaning, and performance in dairy heifers. *J. Dairy Sci.* 94:1071-1081. ² Ollivett, T.L., D.V. Nydam, T.C. Linden, D.D. Bowman, and M.E. Van Amburgh. 2012. Effect of nutritional plane on health and performance in dairy calves after experimental infection with *Cryptosporidium parvum*. *JAVMA.* 241:1514-1520. ³ Maier, G.U., W.J. Love, B.M. Karle, S.A. Dubrovsky, D.R. Williams, J.D. Champagne, R.J. Anderson, J.D. Rowe, T.W. Lehenbauer, A.L. Ven Eenennaam, and S.S. Aly. 2019. Management factors associated with bovine respiratory disease in preweaned calves on California dairies: The BRD 100 study. *J. Dairy Sci.* 102:7288-7305.

Vaccinations

Vaccine programs can help prevent certain diseases; there are a wide variety of products available for calves to protect against respiratory disease as well as diarrhea. Work with your veterinarian to develop a vaccine program tailored to pathogens present at your facility. For more information regarding vaccinations, see section 2.2.4.

Disease Detection & Treatment

Early disease detection and prompt treatment are critical in preventing mortality and many of the short-term consequences associated with disease. Work with your veterinarian to establish treatment protocols based on the diseases of concern to ensure all staff are treating calves promptly and with appropriate medications. This will increase the chances of treatment success as well as help ensure antibiotic stewardship.

If levels of mortality are high, re-evaluate your disease detection and treatment strategy with your veterinarian, and ensure all staff are appropriately trained!

Testing & Diagnostics

When levels of mortality or morbidity are higher than normal, consider completing diagnostic tests (such as fecal samples, nasal swabs, and/or blood samples) to understand what the underlying reasons are for the high levels. Work with your veterinarian to determine which samples to collect.

Have a veterinarian perform postmortem exams when an increase or spike in mortality occurs. This can help pinpoint the cause of death and pathogens involved which may influence where calves are sourced from, as well as treatment protocols.

Desired Health Care Outcomes

- ❑ Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - ❑ A written protocol for the prevention and treatment of common diseases, including diarrhea, pneumonia, and umbilical infections. Facility-specific steps should be taken to prevent transmission of disease. Diseases should be detected and managed promptly.
 - ❑ Health records (written or electronic) that include the type and severity of disease, date of diagnosis, actions taken, and outcomes (recovery or death). Records should be used in consultation with the VOR to monitor calf health trends.

2.2.4 Vaccinations

What is it and Why is it Important?

Vaccination is one of the best ways to bolster the immunity of the herd against specific viruses and bacteria that cause disease. When used properly, vaccines can help prevent or reduce the effects of disease, which not only helps maintain the health and welfare of your herd, but decreases the need for antimicrobials, which can be costly and lead to antimicrobial resistance (see section 2.2.2).



What Can You Do?

Your written Health Management Plan should include an effective written vaccination protocol for specific diseases of concern. Your VOR is the ideal resource to assist the facility with developing a vaccination protocol. Such a protocol should include the age(s)/production class(es) that receive the vaccine, product used, storage, dosage administered, route of administration, and withdrawal times. Further vaccination strategies can be implemented based on the veterinarian's knowledge of the disease history and risk for your specific facility.

Desired Health Care Outcomes

- ❑ Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - ❑ A written vaccination protocol for specific diseases of concern, which includes the age(s)/production class(es) that receive the vaccine, product used, storage, dosage administered, route of administration, and withdrawal times. A vaccination program should be considered, in consultation with the VOR, to prevent disease.

2.2.5 BIOSECURITY & SANITATION

Biosecurity management practices can be tailored to fit calf ranches with the aim to prevent disease spread by minimizing movement of viruses, bacteria, and parasites both within and onto an operation.

What is it and Why is it Important?

Preventing exposure to diseases that can be transmitted from other animals, equipment, vehicles, or other external sources thereby reducing calf disease is critical to health and performance. Creating and implementing a biosecurity protocol will help prevent disease outbreaks and maintain business continuity as well as animal health and well-being. Biosecurity can be challenging at calf facilities where there may be calves, vehicles, and personnel continuously entering. However, biosecurity management practices can be tailored to fit calf facilities with the aim to prevent disease spread by minimizing movement of viruses, bacteria, and parasites both within and into a facility.

What Can You Do?

To develop a biosecurity protocol, work with your veterinarian and other advisors, as they are key sources of knowledge regarding disease control. Some of the key elements to include in your protocol are listed below. A *biosecurity SOP template can be found in the Appendix*.

Cleaning and Disinfection

Between Groups

Consider using all-in, all-out management where all animals are brought in as one group and all animals leave at the same time. Once all animals leave, clean and disinfect the area and allow the area to dry thoroughly. All equipment, boots, and coveralls should also be cleaned. This strategy will reduce the chance of transmitting disease between groups and has been shown to reduce morbidity and mortality. Consider keeping this particular pen, hutch, or area empty from incoming animals for at least one week (down time). If all-in, all-out management cannot be used, ensure that each arriving calf is placed in housing that is clean and disinfected, ideally away from other calves at the facility, to minimize the risk of disease transmission.

Within Groups

Equipment can harbor disease-causing pathogens which can, in turn, be spread throughout a facility. Consider having designated equipment for certain age groups of animals, areas, barns, or groups to reduce the spread of disease. If that is not possible, ensure that equipment used on sick animals is cleaned after each use, and that sick animals are worked with last. Regular cleaning and disinfecting of feeding equipment is recommended to prevent disease spread. Boots and coveralls should be cleaned frequently to prevent disease spread. Ideally, one set of clean boots and coveralls would be used when managing young animals and a different set used for older animals.

Type of Cleaning Solutions

There are a number of different cleaning solutions and disinfectant products available on the market. Be sure to select products that are safe and effective for their intended use. *Beef Quality Assurance has prepared a useful chart to compare the characteristics of some of the more common products used, which can be found in the Appendix.*

Visitor Policy

Visitors can bring pathogens onto your facility especially when they have manure on their clothing or equipment. Consider providing clean coveralls, gloves, and footwear (or coverings) to prevent contamination. It also may be prudent to keep a record of visitors. Provide a sign at the entrance with your contact information so visitors do not need to enter the facility to locate you. Ensure all visitors are familiar with your expectations for biosecurity prior to coming on to your facility.

Sick or Hospital Pen for Isolating, Segregating, or Quarantining Sick, Weak, or Injured Calves from Healthy Animals

Provide sick and/or injured animals a separate area to facilitate recovery and prevent the spread of potentially infectious pathogens to healthy animals. Consider developing an isolation area (depending on how animals arrive at your facility, and in what quantity) to allow for close observations of signs of disease prior to mixing with existing animals.

Work from the Youngest to Oldest & Manage Sick Animals Last

Older animals can often harbor disease-causing pathogens which do not affect them, but which young calves are susceptible to (because they have not yet been exposed, and therefore do not yet have immunity). Working from the youngest to oldest will help to minimize the risk of disease spread that could cause illness. Working with sick animals last will also prevent the spread of any pathogens they may harbor to animals that have not been exposed to and therefore do not have immunity to.

Disease Outbreaks

In the case of an outbreak, it is important to ensure plans are in place to minimize the spread of disease. Consider establishing cleaning and disinfecting stations around the area of the outbreak and having designated equipment, coveralls, and boots when handling animals in that area. These animals should be handled last.

Staff Training

It is critical to conduct employee training so all members of the team understand the importance of following the biosecurity protocol developed for your facility.

Transport

Trailers used for transporting calves have been found to have high levels of pathogens. Ensure that animals are transported in a clean and disinfected trailer to minimize disease spread. Consider visually inspecting trailers arriving at your facility to evaluate cleanliness and when necessary, provide feedback to the transporter to improve cleanliness.

Pest, Parasite, & Fly Control

Pest, parasite and fly control is part of a thorough herd health program because parasites, pests and flies transmit diseases and interfere with the animals' comfort. In some regions, rabies and other diseases are spread to animals by wildlife in addition to cats and dogs. Restrict birds, rodents, stray animals, dogs, cats, and other wildlife from accessing animal feed and water as they could spread disease. Exercise caution to avoid contaminating feedstuffs when implementing pest control, as contaminants may pass into the animals' bodies and milk. A certified pesticide applicator or a pesticide service may be used. Read and follow label directions for all pesticide products.

Desired Health Care Outcomes

- Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - A written biosecurity protocol to prevent entry and spread of pathogens within the barn. Facility-specific measures should be taken to prevent the spread of disease.

2.2.6 NON-AMBULATORY ANIMALS

What is it and Why is it Important?

Sick and injured animals are a reality of livestock agriculture. Non-ambulatory cattle occur at all facilities, even with the best management practices in place. The way in which these animals are handled reflect the quality of care they are provided and can have a role in improving treatment outcomes. For more information on animal handling, see section 3.

Non-ambulatory calf management can impact the public's perception of livestock agriculture. To combat this, it is important that producers prevent calves from becoming non-ambulatory as much as possible, and in the event that this does occur, respond quickly, appropriately, and make timely decisions to reduce pain and suffering.

What Can You Do?

All facilities should have a written protocol for caring for non-ambulatory calves, developed with the help of their veterinarian.

If a calf at your facility becomes non-ambulatory:

- Move this animal to a separate area where it can be easily assessed, monitored, and treated. Such an area should protect the calf from trampling, weather elements, and predators.
- There should also be ample amounts of clean, dry bedding, as well as access to water and feed.
- It is then important to conduct a physical examination to determine why the animal is unable to stand.
- If the condition is easily managed or treatable, follow protocols developed with the help of your veterinarian for the treatment of disease. Pain control, antibiotics, and/or fluid therapy may be warranted.
- If you are uncomfortable with the treatments that are required (i.e., casting an injured limb, giving intravenous injections or fluid therapy), call your veterinarian for assistance. They can also assist you in determining a diagnosis for a non-ambulatory calf if it is not immediately identifiable, as well as recommend or provide treatment.

It is important that producers prevent calves from becoming non-ambulatory as much as possible, and in the event that this does occur, respond quickly, appropriately, and make timely decisions to reduce pain and suffering.

What Can You Monitor?

Aspects of health that should be monitored include:

- **Signs of physical injury:** Broken bones and/or limbs, lacerations, punctures, bleeding
- **Signs of illness:** Nasal discharge, coughing, increased respiratory rate (Normal is 30 - 60 breaths per minute), diarrhea, swollen navel, joint ill
- **Rectal temperature:** Normal is < 103°F.
- **Hydration:** Look for placement of the eyeball within the socket. Normally hydrated animals have their eyeballs touching the medial canthus (inside corner of the eye). Dehydrated animals have a gap between the eye and the medial canthus as fluid loss causes the eyeball to sink within the socket. If there is evidence of dehydration, fluids are required.
- **Body condition** (see section 4.1.3 describing BCS)
- **Will they recover?:** If the reason for a calf being unable to stand is determined, consider whether this animal can be reasonably treated with a realistic chance of recovery, or if euthanasia is more appropriate to prevent or end undue pain and suffering.

What Can You Do to Improve?

Housing Can Have an Impact

Non-ambulatory calves should be housed in a separate area away from healthy animals. This will reduce their risk of injury, trampling, and spread of infectious disease. Non-ambulatory calves will also need assistance with eating and drinking, and should have these resources easily available to them where they lie. Ideally, they will still be housed in an area where they have visual contact with other cattle.

Their housing should protect them from predators, the elements such as rain, snow, or wind, as well as extreme heat and cold. Non-ambulatory cattle are vulnerable and may have less capacity, energy, or resources to protect themselves. Their energy is also best spent on recovery rather than keeping warm or cool to adapt to their environment.

Handle With Care

A sick or injured animal will not stand because it cannot stand, not because it is stubborn. These animals are vulnerable and may be in pain; they require special handling to facilitate their recovery. **Non-ambulatory calves should never be tossed, thrown, dragged, or have electric prods used on them.** This is unacceptable behavior. If you witness unacceptable animal handling by anyone, whether staff, advisor, or visitor, notify appropriate personnel or implement the **See it? Stop it!** initiative (see section 3.1). See section 3 for more detailed information on animal handling.



Offer Feed & Water

Down calves require continuous access to water and starter feed (if age appropriate). For pre-weaned calves there is no evidence to suggest that withholding milk or milk replacer feedings will exacerbate diseases such as diarrhea. Withholding milk reduces nutrient and caloric intake which is necessary to facilitate recovery.

Continue to offer non-ambulatory, pre-weaned calves milk or milk replacer at regular intervals to prevent dehydration, hypoglycemia, and malnutrition. If the animal has not eaten within 24 hours, consider contacting your veterinarian.

Never tube milk to calves that will not drink.

Tubed milk is deposited into the rumen which can contribute to the development of rumen acidosis, exacerbating illness. The risk of tubing either milk or electrolyte solutions to non-ambulatory calves also presents a significant risk for aspiration, or depositing fluids into the lungs. Proper training for anyone involved is required.



Do Not Ship

Non-ambulatory, sick, or injured cattle are not fit for transport and should never be marketed.

Make a Timely Decision

Every hour an animal is non-ambulatory reduces the chance of their recovery. Upon discovery of a non-ambulatory animal and determination of the cause, it is important to administer appropriate treatments as determined with the help of your veterinarian to maximize the likelihood of recovery and success.

Monitor these animals closely for 24 hours following the discovery and administration of treatment. Consider whether the animal is still showing signs of pain after pain control medications, if symptoms of disease are showing signs of improvement, and if the animal shows an interest in eating and/or drinking. If after 24 - 48

hours the animal does not show signs of improvement, consider contacting your veterinarian. They may advise a different treatment protocol. Euthanasia could also be warranted, and may be the best treatment option at this time. Making timely euthanasia decisions is often the most ethical outcome for calves that are unlikely to recover. This will reduce undue pain and suffering. Contact your veterinarian if you or your staff are not comfortable performing this procedure to ensure it is being done properly, humanely, and promptly.

Review Your Prevention Strategies

If you are experiencing high numbers of non-ambulatory calves, or are interested in reducing the number of non-ambulatory animals at your facility, consider the following areas:

Source Facility Colostrum Protocols

Providing high-quality colostrum in sufficient volumes and in a timely manner is the cornerstone to disease prevention.

Size Uniformity in Group-Housed Pens

Larger animals can injure smaller calves and prevent their access to resources.

Ventilation, Stocking Density, and Bedding Cleanliness

Housing area hygiene can reduce exposure to respiratory pathogens, and clean, dry bedding can reduce exposure to manure pathogens as well as bacteria entering unhealed navels in young calves.

Handling

Using quiet, low-stress handling techniques reduces the risk of slipping, falling, and injury that may be caused by rough or inappropriate handling. See section 3 for more detailed information on animal handling.

Disease Monitoring, Identification, and Treatment

Ensure calf health is being monitored daily, and all staff are competent in their ability to identify disease for more prompt treatment.

Desired Health Care Outcomes

- Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - A written protocol for caring for non-ambulatory calves, which includes details on detection, movement, housing, care, treatment, and decision-making. All non-ambulatory calves should be cared for and managed in a safe and timely manner.

2.2.7 EUTHANASIA

What is it and Why is it Important?

Cattle raisers strive for optimal health and welfare, but illness and injury from which animals may not reasonably recover are a reality of livestock agriculture. While euthanasia can be a difficult decision to make on behalf of a young animal, there are situations when it is appropriate, respectable, and a good animal welfare practice. **It should not be considered a sign of failure or poor management.** To provide an animal with a dignified death to relieve their pain, suffering, fear, and stress is a demonstration of compassion and can often be the best decision you make on their behalf.

What Can You Do?

Every facility should have a written protocol for euthanizing animals that includes criteria for the identification of animals to be euthanized, euthanasia techniques approved by the AABP and/or the AVMA, and carcass disposal using an appropriate method. Your veterinarian is an excellent resource for assisting with decision-making and determining criteria for euthanasia, developing protocols, and training staff to ensure this procedure is being performed humanely.

What Are You Looking For?

Decision-making is an important part of the euthanasia process. It can be a difficult decision to make on behalf of a young animal.

Some criteria for euthanasia include animals:

- That have been non-ambulatory for 24 - 48 hours.
- That have been deemed unfit for transport.
- That are in severe pain.
- With hip and spine injuries.
- With broken limbs that are too large to use a splint appropriately.
- That cannot breathe without difficulty.
- With chronic conditions and/or low body condition score.

It is extremely important that all staff involved in the care of cattle at your facility are familiar with the farm's protocols developed for euthanasia, including notifying the person responsible for euthanasia if animals are identified in distress. Those who are responsible for completing euthanasia should be trained on the farm's protocol for euthanasia. There should always be personnel present at the facility (or quickly available) at all times who are trained in the approved techniques to end an animal's life in the event of an emergency. *For extra assistance with deciding whether an animal requires euthanasia, see the decision tree located in the Appendix.*

What Methods Are Appropriate?

The AABP and AVMA have developed guidelines for appropriate methods of humane euthanasia. It is vital that these guidelines are adhered to. Acceptable methods of euthanasia include:

- Gunshot
- Penetrating captive bolt followed by a secondary method
- Administration of barbiturates by a veterinarian

Gunshot

This is the most common method of euthanasia used for cattle. It is important that calf raisers have an appropriate firearm and shot/shell or bullet for the largest size of animal being raised at the facility to ensure this method is effective in the event of an emergency. Solid point bullets are the only type that can consistently produce enough force to penetrate the skull. When performing the procedure, the muzzle of the firearm must be flush with the animal's skull to ensure the bullet enters the brain and causes immediate unconsciousness and death. Safety is of the utmost concern for all firearm users. Ensure staff are properly trained in using this method both for animal welfare and human safety, and that animals are restrained to ensure consistency and effectiveness.

Animal/Firearm	Handgun	Rifle	Shotgun
Calves	.32 - .45 caliber solid-point bullet	.22 LR caliber or larger solid-point bullet	.410 - 12 gauge #4-6 bird shot or slug
Adult	.38 - .45 caliber solid-point bullet	.22 magnum or larger solid-point bullet	20 - 12 gauge #4-6 bird shot or slug (within three feet)

Penetrating Captive Bolt Followed by a Secondary Method Such as Pithing or Exsanguination

The other method of euthanasia that producers may perform is the use of a penetrating captive bolt gun, where a high-powered bolt or pin causes a concussive force penetrating the skull causing immediate unconsciousness. The use of adequate restraint is important for proper placement of the bolt as well as to perform secondary procedures.

Signs of unconsciousness (and therefore, appropriate use of the captive bolt gun) include:

- **Absence of corneal reflex:** If the animal has passed, there should not be any blinking or movement of the third eyelid if the surface of the eyeball is touched
- **Absence of vocalization**
- **Absence of gag reflex:** No voluntary movements or swallowing
- **Lack of rhythmic respiration**
- **No coordinated attempt to rise or right itself**

This procedure requires a follow-up method to ensure destruction of brain tissue occurs. The use of a captive bolt on its own typically only causes a loss of consciousness, and the follow-up method is what causes the death of the animal, and is therefore a critical step. One method that is available for producers to perform after stunning is **pithing**, where a long rod or implement is used in the puncture wound produced by the captive bolt to cause death by destruction of brain tissue after unconsciousness has occurred. **Exsanguination** (or bleeding out) is also an option following the use of a captive bolt gun if the animal is located in an appropriate area for this procedure. This is typically done by cutting the blood vessels located on either side of the trachea (windpipe).

A Note on Captive Bolt Guns

There are different types of captive bolt guns. A non-penetrating version exists, typically used for swine. This type does not puncture the skull. This is typically not of sufficient strength for appropriate euthanasia of cattle.

Penetrating captive bolts must be cleaned after each use and kept in good repair. If not, they will not have the appropriate strength and capacity to sufficiently stun animals. This could lead to animal welfare concerns in performing euthanasia.

Administration of Barbiturates by a Veterinarian

The final method involves having your veterinarian administer a drug (such as pentobarbital) directly into the bloodstream that depresses the central nervous system and induces death. Tissue residues of the barbiturate can be high, and care should be exercised to limit access of scavengers to the carcass.

Unacceptable Methods of Euthanasia

Failure to euthanize animals using a technique not listed above, or by personnel without proper training, may result in pain, suffering, and poor animal welfare.

Unacceptable methods of euthanasia include:

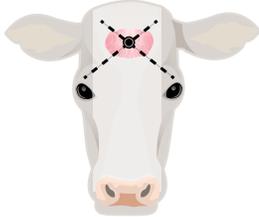
- Blunt force trauma to the head on animals of any age
- Thoracic compression
- Suffocation
- Hypothermia
- Drowning
- Pithing or exsanguination as the primary method of euthanasia
- Injection of medication unless directed by or under the direct supervision of your veterinarian
- Methods that pose a risk to human safety



2019 AABP Acceptable Primary Methods of Euthanasia

The "AVMA Guidelines for the Euthanasia of Animals (2013)" recognizes and accepts three primary methods of euthanasia for cattle:

- **Intravenous (IV)** administration of a lethal dose of a barbiturate or barbituric acid derivative to induce a transition from consciousness to unconsciousness and death.
- **Gunshot** using an appropriate firearm, ammunition and anatomic site to cause physical disruption of brain activity by direct destruction of brain tissue.
- **Penetrating Captive Bolt (PCB)** to induce unconsciousness in combination with an adjunctive step such as exsanguination, intravenous administration of a saturated solution of either potassium chloride or magnesium sulfate, or pithing (increasing destruction of brain and spinal cord tissue) to ensure death. Non-penetrating captive bolt can be used for the euthanasia of neonates and calves less than two-three months of age.




How Can You Confirm Death?

After euthanasia is performed, confirmation of death is required to ensure the procedure was effective. If not, the animal does not experience a painless, humane death. This is a welfare concern. If the first attempt was not effective, the procedure should be repeated immediately, and death confirmed.

Criteria to confirm death include:

- **Lack of pulse or heartbeat if using a stethoscope for more than five minutes.**
- **Lack of breathing for more than five minutes.**
- **Lack of corneal reflex:** If the animal has passed, there should not be any blinking or movement of the third eyelid if the surface of the eyeball is touched.
- **Development of rigor mortis:** Although this is the most effective method for confirmation, it takes some time to occur, and the above criteria should be ensured before leaving the animal.

How Should You Dispose of the Carcass?

Following euthanasia, animals should be disposed of according to state laws and guidelines. Options may include rendering, burial, composting, incinerating, and landfills.

Desired Health Care Outcomes

- Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - A written protocol for euthanizing animals, that includes criteria for the identification of animals to be euthanized, euthanasia techniques approved by the AABP and/or the AVMA, and carcass disposal using an appropriate method. All animals should be euthanized in a timely and appropriate manner.

2.2.8 TRANSPORTATION & FITNESS FOR TRANSPORT

What is it and Why is it Important?

Transportation is a necessary component of moving animals to and from calf raising facilities. However, it can be a stressful event, especially for young calves. While very little research in this area has been conducted in North America, preliminary research suggests that as the distance an animal is transported increases, the risk of mortality also increases, in part, due to various physiological parameter changes. Seasonal effects also play an important role when transporting as both heat and cold stress could lead to negative outcomes for your calves. As a result, fitness for transport is an important consideration that should be evaluated prior to calves leaving the source and departing your facility.



What Can You Do?

An effective written protocol should be created for assessing fitness for transport. It is important to consider that animals may not arrive at their destination at the same level of fitness as they left in. Slightly compromised animals and young animals are at risk of further illness or injury during transport. Training should be provided to staff responsible for assessing fitness for transport, and animals that are unfit or may become unfit during transport should not leave the facility.

What Are You Looking For?

There are a number of key components to consider when assessing fitness for transport. Ask yourself the following questions when considering if an animal is fit for transport. If the answer is “yes” for any of these questions, the animal is unfit.

- **Is the Animal Dehydrated?**

Calves that are dehydrated prior to transport are at a greater risk of disease and will not gain as much weight over their growth period. Delay transport for dehydrated calves and provide fluid therapy to resolve dehydration. Young calves that go long periods without feed and water are at risk of developing dehydration.

- **Is the Animal Non-Ambulatory or is There a Good Chance it May Become Non-Ambulatory During the Transport or Marketing Process?**

Non-ambulatory animals cannot be marketed. Dehydrated, sick, or injured animals are at risk of becoming non-ambulatory during transport and should not be shipped.

- **Does the Animal Have a Poor Body Condition Score [$<$ BCS 2 for both dairy and beef breeds (see section 4.1.3 for information on assessment of BCS)]?**

These animals may be weak, injured, or ill. Depending on the duration of transport, animals may go long periods without feed and need to rely on stored energy reserves.

- **Is the Animal Severely Lame?**

Consider the amount of weight shifting required for an animal to remain standing during transport. A lame animal will not be able to do this without experiencing pain.

- **Does the Animal Have Bone Fractures of the Limbs, Injuries to the Spine, or Open Wounds?**

Again, animals will be required to shift weight to remain standing on a trailer, and cannot do this with injuries. Open wounds are likely to become infected and may also impair the animal's ability to remain standing.

- **Does the Animal Have an Active Case of Disease?**

Many symptoms of disease (such as dehydration) are exacerbated during transport. Stress that occurs during transport can also compromise an animal's ability to fight disease it is exposed to during and shortly thereafter.

When assessing fitness for transport for animals destined to slaughter, do not transport if:

- The animal does not meet withdrawal period for meat.
- Calving is imminent and likely to occur during the transport or marketing process.
- The animal has a condition that will not pass pre-slaughter inspection at the packing or processing plant. If unsure, consult with your veterinarian prior to transporting an animal to a packing or processing plant.

What Else Should You Consider?

Duration of Transit

As stated above, as the duration of transit increases, the risk that calves experience more challenges increases; as highlighted by losses in body weight, increased dehydration, and a longer time to gain weight following transportation. Consider keeping the time in-transit less than 24 hours to minimize these negative effects. If the trip is longer than 24 hours, consider stopping and providing electrolytes and feed, as it has been shown to reduce dehydration.

Stressful Procedures

Avoid stressful procedures such as dehorning, weaning, and vaccinating within one week before and/or after transport.

Transport Trailer

Transport trailers can contain high levels of disease-causing pathogens. Prior to transporting a new group of animals, the trailer should be washed and disinfected with new bedding added. Ensure flooring is secure, non-slip, and provides solid footing (avoid abrasive floor and wall surfaces), sides are high enough to prevent animals from jumping over them, ventilation and vehicle covering is adequate for weather conditions, and proper bedding is present (to absorb manure and urine and protect animals from extreme weather). Pre-weaned calves prefer to lie down during transport. To accommodate this, pre-weaned calves should be stocked at a low density during transit that allows each calf to lie down throughout the journey. There should be enough space that they are not at risk of being stepped on by animals that are standing. The age and size of calves should be considered when determining stocking density to ensure safety and welfare during transport.

Weather

During cold weather (< 60°F is outside a calf's thermoneutral zone), young calves can have difficulty maintaining body temperature during transit and must expend energy to do so. Therefore, it is important to provide bedding which calves are able to nest in and/or provide calf jackets to aid in keeping calves warm. In addition, during cold weather, consider covering ½ - ⅔ of the holes in a trailer to keep the trailer warm.

During hot weather (> 78°F is outside a calf's thermoneutral zone), calves can become dehydrated during transit. Consider transporting at night or in the early morning when the temperature is lower to mitigate the impact of heat stress. If severe weather or inclement weather is expected which could create dangerous driving conditions, delay transport.

Transporter

Animal transporters need to be trained to properly handle and transport cattle to improve welfare during transit. Ensure employees and/or transporters are trained in how to move cattle onto the trailer, distribute the cattle correctly onto the trailer, employ hauling techniques to minimize cattle stress, and handle emergency situations. BQA Transportation (BQAT) is an excellent training resource and calf raisers may consider requiring BQAT certification of transporters. *For more information on this program, see the Appendix.*

Loading & Unloading

In some circumstances, loading and unloading can be the most stressful process for calves. To minimize stress, provide training to those that are responsible for loading and unloading, locate holding areas near loading/unloading areas, minimize the number of directional changes an animal must make, and properly design and maintain loading facilities. For loading ramps, the angle of the ramp should not exceed 25°, should have non-slip flooring, and should be designed to have no gap between the ramp, its sides, and the vehicle for ease of movement of cattle, and to minimize injury. Cattle should be loaded, unloaded, and moved with patience as quietly as possible to minimize stress and the risk of an injury. Young calves may require manual loading and unloading. In addition, the use of cattle prods and canes should only be used in emergency situations. Calves should never be tossed, thrown, kicked, or have prods used in these situations. Young calves may need to be manually lifted and moved to load or unload.

Desired Health Care Outcomes

- ❑ Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - ❑ A written protocol for assessing fitness for transport. All animals should be assessed for fitness before being transported.

2.2.9 MONITORING PRODUCTION & Performance

What is it and Why is it Important?

One of the key performance criteria for raising calves is growth. Average daily gain (ADG) is one of the best ways to ensure calves are meeting your production and performance goals and will become profitable and productive members of the herd.

To calculate average daily gain, simply divide the weight gained over a defined period of time. For example, if a calf weighs 80 lbs at birth and 180 lbs at 56 days of age, then the calf is gaining 1.8 lbs per day $[(180 - 80)/56]$.

Diagram illustrating the calculation of Average Daily Gain (ADG) for a calf:

$$\frac{\text{calf weight} - \text{calf starting weight}}{\text{days of age}} = \text{gain per day}$$

$(180 - 80) \div 56 = 11.8 \text{ lbs}$

Why Assess it?

High levels of gain are important to raise dairy and beef animals efficiently. The benefit of providing ample, high-quality nutrition to calves far outweighs the expense of feeding calves. Specifically, for dairy heifers, high levels of gain in the pre-weaned period are associated with a higher level of milk production in the first lactation due to improved udder development.

Of particular importance to calf raisers, and an important indicator of animal welfare, is growth very early in life, particularly in the first seven - 10 days. These calves are required to overcome the challenges faced during transport to the facility, mixing with animals from other facilities, and adjusting to new surroundings. Managing this stress requires energy, all while calves are expected to grow, thermoregulate, and develop their immune system. During the early period of life, calves rely on liquid feed for all of their nutrition. If not provided ample amounts of milk or milk replacer, these animals must sacrifice one of these factors (do they put their energy towards staying warm or cool, growing, or fighting the diseases they are exposed to?), causing them to be more susceptible to disease.

Specifically, for dairy heifers, high levels of gain in the pre-weaned period are associated with a higher level of milk production in the first lactation due to improved udder development.



What Are You Looking For?

To assess growth performance, a digital scale or weigh tape can be used. It is recommended to measure calves upon arrival, within a week following, at weaning, and post-weaning. The time period post-weaning may vary depending on the purpose of the calf. If the calf is destined for meat, it may be best to measure the calf when they leave your facility to calculate the gain over the entire period housed there. For both dairy and beef heifer calves, it would be useful to measure them prior to first breeding. When a group of animals is assessed and a cumulative ADG is determined, this will allow for determination of specific areas where an opportunity exists to improve growth.

How Do You Compare?

In the pre-weaned period, the target growth rate according to the [Dairy Calf and Heifer Association Gold Standards Program](#) is at least doubling weight from first measurement at arrival to weaning. Because of the welfare implications for young calves (less than two weeks of age), there should be a demonstration of positive weight gain in the time period between arrival and within one week of placement. Because calf raisers will not likely have an opportunity to measure calf weights at birth, collecting information upon arrival and within one week (when calves arrive at the facility less than two weeks of age) is incredibly important, and will be used as an indication as to whether calves are on an appropriate feeding program.

Following weaning, the goals of growth performance depend on what the calf is being raised for and specific targets should be generated for your individual herd.

What Can You Do to Improve?

Young calves should demonstrate positive weight gain between arrival at the facility and one week later. This is of particular importance for calves less than two weeks of age as an indication that their feeding program is sufficient to overcome the unique challenges they face early in life during transport and placement at the calf facility. If your calves are not meeting the target for growth performance at this time or throughout the growing period, work with your veterinarian, nutritionist, or other advisors to develop a plan to improve growth.

Key areas to evaluate include:

- [Milk feeding program](#)
- [Solid feed intake & weaning](#)

Milk Feeding Program

Ensure that milk feeding programs are providing calves nutrients and energy for health, growth, and vigor. Important factors to consider to ensure proper nutrition include:

- Research¹⁻³ has shown that feeding 20% of body weight (at least eight quarts of milk) will lead to higher levels of gain and can improve calf health and performance.
- Some sources of milk, such as waste milk, have inconsistent nutritional value and can lead to reduced growth.
- If calves are housed in groups, ensure that stocking density is appropriate so all calves have ample access to feeders. In group housing, a high plane of milk nutrition also helps reduce cross sucking.

Solid Feed Intake & Weaning

To ensure a smooth transition of the calf from a predominantly milk-based diet to solid feed, it is important that:

- Fresh, palatable starter feed is provided by day three to maintain health, growth, and vigor.
- Water is provided continuously (starting within 24 hours of arrival) as water consumption will lead to higher levels of solid feed intake and helps to facilitate rumen development.
- The transition from milk to solid feed occurs gradually over the period of at least a week to minimize stress.
- All calves should have ample access to starter throughout the day.

Desired Health Care Outcomes

- Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - A written protocol for monitoring production and performance of calves. Young calves should demonstrate positive gain between arrival at the facility and one week later.

2.2.10 Lameness & Locomotion

What is it?

Lameness is an important welfare concern in all cattle sectors. Mitigation, early identification, and treatment where applicable should be a high priority concern. Lameness is the result of a painful condition affecting the leg, joint, or hoof and should be addressed as soon as possible.

Why Assess it?

In calves, lameness is often a result of poor, uncomfortable housing conditions, or injuries as a result of housing, stocking density, or handling.

What Are You Looking For?

Look for and identify issues with lameness and locomotion on a quarterly basis or more frequently. This might be best done shortly after a period of handling or processing to identify any animals that may have been inadvertently injured during that time. Develop a program to identify new cases of lameness early that accounts for new arrivals and calves at a young age. Walk calves in small groups down an alleyway or area of the barn that is free of steps, turns, and other obstructions. Move them at a slow walk to be sure to identify subtle signs of lameness or pain. Observe at least four strides for each calf, while visually assessing how they bear weight on their hooves, any arch in their back, and how fluid their stride is. *To help assess calf lameness at your facility, see the Appendix for more resources.*

Calves with normal locomotion scores are sound and bear weight evenly on all limbs. Sound cattle:

- Walk with all limbs in a fluid motion.
- Walk with a flat back.
- Bear weight evenly.
- Walk with head at shoulder level.

Indications of abnormal locomotion scoring, or subtle signs of lameness include:

- Limping or reluctance to bear weight on a particular limb.
- Head bobbing.
- Arched back.
- Uneven length of stride, where the affected limb has a shorter stride, and weight is not placed on it for an equal amount of time compared to other limbs.
- May not be able to keep up with the herd or compete for resources as readily.

What Can You do to Improve?

Evaluate bedding and housing areas. This may include ensuring that lying areas are comfortable and bedding is sufficient to provide padding between surfaces and joints, walking areas are clean and as free of moisture as possible to prevent slipping, walking surfaces have traction including rubber mats in standing areas, and grooved concrete. Other measures to evaluate include ensuring that all animals have ample access to feed bunks, troughs, waterers, nipples, etc., so that there is no competition for resources where animals are required to push between others, causing injuries. Ensure calves are housed in areas where they can easily stand, turn, and adopt normal resting behaviors to avoid limb and joint stiffness.

In the event that you find an animal showing signs of lameness, be sure to house them separately from the herd in a pen or area with deep, dry bedding. This will prevent them from being trampled by herdmates and will ensure they do not have to compete for resources. Ensure they are able to access feed and water and minimize the distance they are required to travel to access it. Work with your veterinarian to develop a protocol for various conditions to evaluate to determine the cause of lameness, and a pain mitigation strategy to facilitate recovery.



A Common Cause of Lameness in Calves: Septic Arthritis (Joint Ill)

Septic arthritis, also known as joint ill, is an infection of the knees, fetlock, stifle, and hocks causing pain and lameness. Calves typically develop septic arthritis within the first week of life. Bacteria infiltrates the joint from the bloodstream; often these bacteria enter from an open, infected, and/or improperly healed navel. The source of this bacteria may also come from the gut and respiratory tract.

Signs of septic arthritis include:

- Swollen, hot, painful joint(s)
- Lameness
- Thickened, painful navel
- Elevated rectal temperature (> 103°F)
- Non-ambulatory calves
- Weakness, depression, lack of appetite
- Septic shock
- Meningitis

What Should You Look For?

In the event that you discover cases of septic arthritis in your herd of calves, trace back those animals to the source. Often, septic arthritis is the result of calves born into unsanitary calving pens, not being removed quickly after birth (exposure to manure of adult cattle), and inadequate colostrum protocols (targets for colostrum provision are discussed in section 4.1.2). Provide this feedback to the source so they can identify issues within their colostrum management protocols.

What Can You Do?

Work with your veterinarian to develop a treatment protocol to identify and treat cases of septic arthritis. These animals may be in need of a combination of antibiotic therapy and pain mitigation. In some cases, your veterinarian may be able to perform a lavage (or flush) of the joint to remove necrotic and infective material. It is important to involve your veterinarian in these cases as these calves can become systemically ill with septicemia and meningitis. In some cases, the joint may not heal and will remain painful, and euthanasia may be the most humane option.

Desired Health Care Outcomes

- Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - A written protocol for the prevention and treatment of lameness.
 - 95% of calves at the facility should be sound, with normal locomotion, bearing weight evenly on all limbs.

2.3 CHECKLIST OF DESIRED HEALTH CARE OUTCOMES

The following checklist reviews the key desired outcomes calf raisers should strive for to achieve optimal health and welfare of their cattle:

- Establish and maintain a working VCPR, where the VOR has visited the facility within the past 12 months.
- Ensure all animals are affixed with easily visible identification and/or branded (using appropriate techniques and potentially providing pain control).
- Develop a Health Management Plan, in consultation with your veterinarian, that includes written protocols and records for all primary areas of calf health management. The key protocols and desired outcomes include:
 - A written protocol for the prevention and treatment of common diseases including diarrhea, pneumonia, and umbilical infections. Facility-specific steps should be taken to prevent transmission of disease. Diseases should be detected and managed promptly.
 - Permanent drug treatment records (written or electronic) that include date of treatment, person administering the treatment, animal ID, disease or condition name, drug name, dosage, route of administration, injection site, whether a needle was broken, duration of treatment, specified withdrawal times. A minimum of two years' worth of records must be available as per FDA regulations.
 - Health records (written or electronic) that include the type and severity of disease, date of diagnosis, actions taken, and outcomes (recovery or death). Records should be used in consultation with the VOR to monitor calf health trends.
 - A written vaccination protocol for specific diseases of concern, which includes the age(s)/ production class(es) that receive the vaccine, product used, storage, dosage administered, route of administration, and withdrawal times. A vaccination program should be considered, in consultation with the VOR, to prevent disease.
 - A written biosecurity protocol to prevent entry and spread of pathogens within the barn. Facility-specific measures should be taken to prevent the spread of disease.
 - A written protocol for caring for non-ambulatory calves, which includes details on detection, movement, housing, care, treatment, and decision-making. All non-ambulatory calves should be cared for and managed in a safe and timely manner.
 - A written protocol for euthanizing animals that includes criteria for the identification of animals to be euthanized, euthanasia techniques approved by the AABP and/or the AVMA, and carcass disposal using an appropriate method. All animals should be euthanized in a timely and appropriate manner.
 - A written protocol for assessing fitness for transport. All animals should be assessed for fitness before being transported.
 - A written protocol for monitoring production and performance of calves. Young calves should demonstrate positive gain between arrival at the facility and one week later.
 - A written protocol for the prevention and treatment of lameness.
 - 95% of calves at the facility should be sound, with normal locomotion, bearing weight evenly on all limbs.
- Ensure all staff are trained and competent in the protocols and actions listed within the Health Management Plan.



3. ANIMAL HANDLING & STOCKMANSHIP

Animal handling is critical to operational efficiency and to ensure optimal animal welfare. This section outlines good management practices for animal handling, movement, restraint, using restraint devices, processing considerations, and reviews the importance of addressing broken tails, banning tail docking, and employing a zero-tolerance policy for animal abuse and neglect.

3.1 BASIC HANDLING, MOVEMENT, RESTRAINT

What is it and Why is it Important?

The hallmark of excellent animal care is the way in which animals are handled at the facility. Good herdspeople use patience and empathy and have a thorough understanding of cattle behavior. They can predict movements without yelling, hitting, or causing undue stress or frustration to their herd. This is important for animal welfare, but also for maintaining the perception of excellent animal care by the public.

What Can You Do?

All staff at your facility who handle cattle and/or calves should be trained on animal handling and move calves using quiet, low-stress handling techniques. This is not only important for reducing calf stress, but it can also improve safety for staff. Handling calves appropriately using a calm and gentle manner early in life can make current and future handling events more positive experiences.

Principles of animal movement that are helpful to be familiar with and keep in mind at all times include:

- Flight zones
- Blind spots
- Point of balance

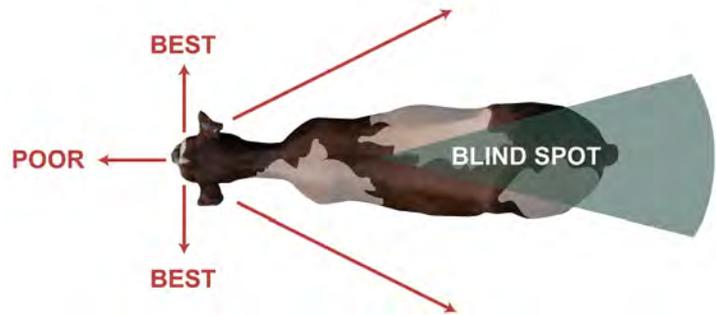
Flight Zones

A calf's flight zone is the distance from an animal that a handler must maintain for the animal to feel comfortable. It is similar to personal space, and if a handler enters into that space, it can cause a flight response or escape behavior by cattle. The flight zone will often vary depending on how accustomed they are to human interaction. Using the flight zone is an important training and movement principle for handling cattle. To use the flight zone effectively, the handler must be aware of where an animal is able to see you (from the side, and not from directly behind), as well as how closely you can approach to appropriately initiate movement. Because cattle adopt a herd mentality and prefer to stay as a group, they will do so until a perceived threat moves into their flight zone, causing them to bolt or move away from it.



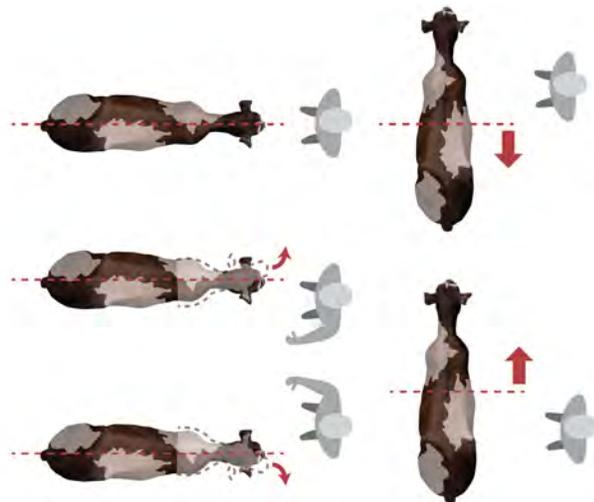
Blind Spots

Blind spots are helpful to keep in mind when moving animals. Cattle see approximately 300° around their selves but cannot see directly behind them. When an unfamiliar object or person moves into an animal's blind spot, they will turn to visualize them (disrupting the flow of forward movement). Or, if movement appears suddenly from the blind spot, they can become startled or frightened by the perceived threat (responding dangerously towards handlers or causing injury to themselves).



Point of Balance

Cattle have an imaginary point of balance at their shoulder, where if you were to move or stand in front of the point of balance, the animal would stop moving or move backward, away from you. If you were to move or stand behind the point of balance, the animal would move forward. This is useful when trying to direct animals into a particular area, such as through a gate.



Extra Considerations for Calves

Calves can be fearful, unsteady on their feet, uncoordinated, and unsure of your expectations of them. They do not move fluidly and do not follow the same patterns of movement as adult cattle do, so they often do not have a well-defined point of balance or flight zone. These animals must be handled calmly, gently, and with great patience. When calves are young (less than one month of age) they can easily be lifted (using a hand under the neck and around the rump for support) or gently moved using a safe, clean movement device (such as a wagon, wheelbarrow, rolling gate, halter, or other device).



Unacceptable Handling

All staff should be familiar with and employ low-stress handling techniques at all times. A zero-tolerance policy for unacceptable handling must be in place.

Unacceptable forms of handling include:

- Kicking, hitting, slapping, punching, dragging, or tossing.
- Dragging.
- Tossing.
- Pulling by the ears, tail, hair, neck, or a single limb.
- Use of items such as needles, screwdrivers, or other sharp and potentially painful objects as a means of encouraging animal movement.
- Use of any type of an electric prod on sensitive areas (belly, genitals, facial, or anal areas), repeatedly on the same animal, and on calves less than three months of age.
- Use of an electric prod should only be used in the event of an emergency, where animal and/or human safety is a concern, and when all other handling techniques have been unsuccessful.
- Yelling, excessive waving of the arms.
- Slamming with gates.

Training is Key

Offering your staff training and continuing education on handling is key to optimizing animal handling, implementing a system to ensure accountability, and sets the workplace culture to consistently follow the principles employees are trained on. Staff should behave with best management practices in mind, regardless of whether someone is watching them. All staff should feel comfortable to express their concerns about animal handling to the appropriate personnel without retaliation. Ensure your team recognizes a culture of care and compassion that prioritizes optimum animal care and welfare and strives for continuous improvement. If you witness unacceptable animal handling by anyone, whether staff, advisor, or visitor, notify appropriate personnel or implement the [See it? Stop it!](#) Initiative.

See it? Stop it!

A national initiative that confirms the culture of care that facility owners and managers demand of every person who comes in contact with their animals.

The purpose is to:

- Highlight the integrity of the facility's philosophies on responsible animal care.
- Help staff understand their important role in animal protection.
- Provide clear direction to employees who suspect or witness deliberate animal abuse, neglect, harm or mishandling on how to immediately report it to a supervisor or other individual responsible for enforcement of proper animal care.



What Else Should You Consider?

Restraint

When performing procedures or crowding animals temporarily in holding pens, be sure that calves are restrained for the least amount of time as possible. Ensure all equipment required is maintained, functional, close at hand, and there are plenty of personnel available to assist if needed. Animals being restrained must be supervised (i.e., when using a halter, or when using sedative medications) to prevent injury, asphyxiation, trampling, etc.

Moving Groups

When moving groups of animals, always ensure there is ample space for animals to move into (don't force animals on top of one another and into locations where they cannot fit or pass through), and ensure no animal loses their footing during this process.

Environment

Ensure all alleyways and areas where cattle are expected to walk provide good footing for traction, are free from sharp objects or protrusions, are well-lit and free of shadows (as much as possible), and novel objects or noises that may cause distractions are removed to facilitate safe, efficient movement.

Desired Animal Handling Outcomes

- All staff should be trained in quiet, low-stress handling, and employ these techniques at all times.
- Enforce a zero-tolerance policy on animal abuse and neglect for all staff.

3.2 Animal Handling & Processing Measures

What is it and Why is it Important?

Handling and processing measures are a series of benchmarks to evaluate the safety and handling of animals being handled for examinations or procedures. When processing measures are being evaluated, it provides the producer feedback on the handling skills and safety techniques being employed.

Why Assess Them?

Processing and loading/unloading can be a very stressful event for cattle. Using excellent, low-stress handling techniques is key to ensuring these events are effective, efficient, and most importantly, safe for all animals and humans involved. This will also make using the chute, loading ramp, and moving groups of animals for procedures much less stressful for cattle and handlers in the future.

When poor handling techniques are employed, stress levels increase and cattle will adopt coping mechanisms to adapt to their surroundings. These coping mechanisms appear as stubbornness and uncooperativeness to handlers and can make handling more difficult. Using a quiet, calm, and patient approach allows for better animal flow and reduced stress.

Using excellent, low-stress handling techniques is key to ensuring these events are effective, efficient, and most importantly, safe for all animals and humans involved.

What Are You Looking For?

Chute, restraint, and/or processing techniques can be managed and evaluated when indicators of animal stress are measured.

Some of the key areas that should be considered include:

- Electric prod use
- Miscaught animals
- Vocalization
- Animal behavior after processing

Electric Prod Use

Use of an electric prod to move cattle should be minimized as much as possible. If prod use is needed when loading/unloading, processing, or restraining, evaluate pens, alleyways, and holding areas. Ensure the areas leading up to chutes or ramps etc. are well-lit and free of shadows and distractions. **Electric prods should not be used on animals that can be lifted or moved manually. The use of prods should be restricted to older animals (more than three months of age; those that cannot be lifted or moved manually) and only used in the event of an emergency, where animal and/or human safety is a concern, and when all other handling techniques have been unsuccessful. This level should not exceed 10% of animals handling in a given handling event. Electric prods should not be used on the face, rectum, genitals, or other sensitive areas. This is a sign of poor handling technique and results in poor animal welfare.** With knowledgeable and trained herdspeople, electric prod use is likely unnecessary. Consider providing paddles with beads or flags for use on older animals as persuasion devices to extend the handler's reach into the animals' flight zones. These aids are not to be used to strike animals. Use of other items such as needles, screwdrivers, or other sharp and potentially painful objects as a means of encouraging animal movement is unacceptable.

Miscaught Animals

When using a chute or other restraint device (such as a halter, headgate, etc.), a miscaught animal is defined as the animal being in any position other than with its head fully outside of the device. If animals are miscaught in a restraint device, it is required that animals be able to readjust their position or be released and restrained properly. Ensuring the path leading to the device is clear and free of distractions, is well-lit, and proper low-stress handling techniques are employed will reduce the number of animals that rush into confined areas such as gates, chutes, etc. as a means of finding an escape route.

Vocalization

Few animals should vocalize if caught and restrained appropriately. To evaluate if the amount of vocalizing is appropriate relative to the restraint techniques being used, observe the number of cattle that vocalize following restraint but prior to occurrence of a procedure. If vocalization exceeds 5% of the cattle observed, evaluate handling techniques of cattle processing, and assess whether restraint devices are being utilized properly (i.e., it is in good working order, the squeeze is appropriate for the size of animal, are halters on appropriately so as not to restrict an animal's ability to breathe, etc.).

Animal Behavior After Processing

Animals rushing, jumping, slipping, and falling as they exit the restraint device, holding pen, trailer, etc. are all signs that should be observed to determine how well animals are being handled and the overall facility maintenance and/or design. If you are experiencing many cattle running, jumping, slipping, and/or falling, it is unlikely that it is solely a result of poor animal temperament or excitability. Animals that rush away from handling are stressed and are also prone to injuries. Animals that stumble or slip (knees hitting the floor), or fall (where their belly hits the floor) are at risk of developing knee injuries and lameness as a result of bruising and soft tissue injury. Evaluate handling techniques and facilities as described above and ensure that using a chute, ramp, or alleyway is done as safely as possible. This will improve workflow and reduce injuries and slowdowns. Ideally, upon leaving the chute or restraint device, < 25% of animals run or jump, < 10% of animals stumble or slip, and < 2% of animals fall.

What Else Should You Consider?

Check in With Your Staff

They may feel pressured or rushed into processing or moving animals as quickly as possible at the detriment of animal welfare and safety. Make excellent handling techniques part of your team culture over speed. This may also reduce stress and frustration experienced by staff when animals are fearful and seemingly uncooperative and encourage staff to take a more appropriate approach to dealing with these situations.

Desired Animal Handling Outcomes

- Animal handling and processing measures:
 - < 10% of animals require the use of an electric prod.
 - No animals should be miscaught and processed/treated in an unsecure or uncomfortable position in a chute or other restraint device. All miscaught animals should be allowed to readjust their position or released and restrained appropriately.
 - < 5% of animals vocalize while being restrained.
 - Upon leaving the chute or restraint device, < 25% of animals run or jump, < 10% of animals stumble or slip, and < 2% of animals fall.
- Enforce a zero-tolerance policy on animal abuse and neglect for all staff.

3.3 Broken Tails

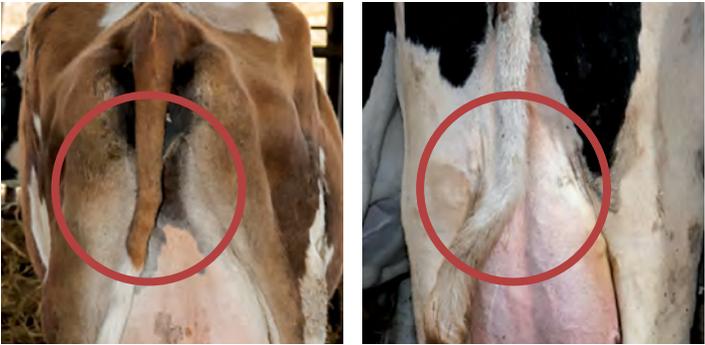
What is it and Why is it Important?

Cattle use their long, bony tail for communication with herd mates, for locomotion, and for ridding their hide of insects and pests. The tail is made up of many small vertebrae (bones that surround and protect the spinal cord), muscles, blood vessels, and nerves.

The presence of broken tails within a herd of cattle can be an indication of poor handling as well as poor facility maintenance. Injuries to the tail are painful, and if present within a herd at high numbers, can be an indicator of poor animal welfare. Facility management can contribute to the number of broken tails present within a herd, where stocking density may contribute to animals' tails being stepped on or where tails may become injured due to being caught in housing features.

What Are You Looking For?

Broken tails can be visually identified by the presence of a bend or kink that does not disappear when the tail is in a normal position. An unbroken tail should lie straight and flat when in a resting position. If a large number of calves at your facility have broken or injured tails, investigate the youngest age at which broken tails are observed and the location on the tails where these injuries are most commonly occurring to determine if housing or stockmanship protocol changes are required. If more than 5% of animals at your facility have broken or injured tails, be sure to investigate the cause and address immediately.

Broken	Not Broken
<p data-bbox="201 1268 782 1335">Tail has any swelling, deviations in vertebrae that can be seen, or any evidence of necrotic tissues in the tail.</p> 	<p data-bbox="954 1268 1416 1373">Tail does not have any swelling, deviations in vertebrae that can be seen, or any evidence of necrotic tissues in the tail.</p> 

Adapted from the FARM Animal Care Manual Version 4.

What Can You Do to Improve?

Ensure all staff members are trained in quiet, low-stress handling techniques. The tail should not be used for grabbing or dragging calves, nor should handlers routinely grab the tail to force animals forward. When cattle sense pain in the tail region, they will struggle to escape instead of walking forward in a straight line (remember, you have entered their blind spot). Calves should not have their tails twisted or lifted aggressively as it may result in breaking or crushing of the vertebrae and cartilage. Tail jacking may be used as a restraint technique for older animals for performance of medical exams and certain procedures, but should not result in injury.

When using a chute or performing examinations or medical procedures, be sure that animals are caught appropriately and are not able to back into anti-kick bars and other portions of the chute. Cattle should never have their tails tied during restraint to prevent damage and injury with sudden movements.

Desired Animal Handling Outcomes

- ≥ 95% of calves at the facility have unbroken tails.
- Measures are taken to ensure broken tails and tail tip injuries/necrosis are minimized or eliminated, which can include routine facility maintenance, appropriate handling and training, adjusting stocking density, evaluating housing areas to identify areas of potential injury, and providing clean and dry bedding that allows for nesting behavior by calves.
- Enforce a zero-tolerance policy on animal abuse and neglect for all staff.

3.4 TAIL DOCKING

What is it and Why is it Important?

There is insufficient evidence to support tail docking as a measure to improve cattle cleanliness and reduce mastitis/improve milk quality. The AABP, AVMA, and the NMC all oppose routine tail docking. Tail docking is a painful procedure and is banned in dairy facility participating in the FARM program.

What Can You Do?

In keeping with the requirements and expectations of the U.S. cattle industry, CCQA does not condone the routine docking of tails by calf raisers. Calf raisers should also not accept calves from facilities that routinely perform this procedure. An exception is if the procedure is performed by a veterinarian due to injury, and documentation for this should be provided. If the number of tail injuries occurring within a facility is high, evaluate housing areas as outlined below.

What Can You Do to Improve?

Ensure Good Animal Hygiene

If animal hygiene and cleanliness is a concern, consider increasing the frequency in which pens and housing areas are scraped and cleaned, and increase the amount of bedding provided to prevent manure accumulation on the skin and hair. Monitor animals for the accumulation of bedding and manure material on the tail to prevent necrosis and tail injury. For more information on hygiene scoring animals, see section 4.2.1.

Reduce Injuries to the Tail

If tail tip injuries and necrosis are a concern, consider decreasing stocking density to prevent tails from being crushed or stepped on, and evaluate housing areas to identify areas of potential injury such as scrapers, gates, slats, etc. Provide clean and dry bedding that allows for nesting behavior in calves raised in cold weather climates to prevent injury to tails as a result of frostbite and exposure.

Trim the Switch

As an alternative to tail docking, trimming the hair at the end of the switch is an acceptable practice. The use of scissors, shears, and/or clippers is acceptable. All staff performing this task should be appropriately trained to prevent injury to the handler and the animal.

Desired Animal Handling Outcomes

- Do not perform routine tail docking of cattle.
- Measures are taken to ensure broken tails and tail tip injuries/necrosis are minimized or eliminated, which can include routine facility maintenance, appropriate handling and training, adjusting stocking density, evaluating housing areas to identify areas of potential injury, and providing clean and dry bedding that allows for nesting behavior by calves.

3.5 Animal Abuse & Neglect

THE CCQA PROGRAM DOES NOT TOLERATE ANIMAL ABUSE OR NEGLECT IN ANY FORM.

Abuse

What is it and Why is it Important?

Animal abuse is considered any inappropriate or unnecessarily rough, persistent handling or treatment. No human-animal interactions should cause undue stress, fear, or pain. Abuse may be overt but can also exist within a facility with lax animal care policies or team culture, as well as due to complacency.

Examples of abuse may include:

- Hitting, kicking, punching, and/or slapping an animal.
- Dragging an animal by the neck, ears, tail, limbs, etc.
- Tossing or throwing an animal.
- Persistent and aggressive handling that causes injury.
 - This may include animals falling, being trampled or smothered, inappropriately caught in a restraint device, etc.
- Inappropriate and/or unacceptable methods of euthanasia that do not result in a humane death.

Neglect

What is it and Why is it Important?

Animal neglect may be more subtle, but still has a significant impact on animal welfare. Neglect occurs when the factors required to provide good animal welfare are not being met, causing the animal to be in a reduced or compromised state. Animal welfare is how an animal is coping with the conditions in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behavior, and if it is not suffering from unpleasant states such as pain, fear and distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate protection from heat and cold, management and nutrition, humane handling and humane slaughter/euthanasia.

Some examples of neglect may include:

- Lack of provision of bedding and/or protection from weather conditions (heat, cold, precipitation).
- Insufficient feed or water available for health, growth, and vigor of calves.
- Lack of timely disease or injury identification and treatment.
- Lack of timely decision-making for euthanasia.
- Needs not being met with respect to social contact and appropriate housing.
- Poor biosecurity protocols leading to spread of disease. This may include the use of feeding equipment heavily contaminated with manure, reusing dull needles, etc.

What Can You Do?

Enforce a zero-tolerance policy for animal abuse and provide staff with an opportunity to discuss any concerns. All employees should be accountable for their actions; they ultimately reflect the care being provided at your facility and so their attitude and behavior should be align with your expectations. Provide continuous education to ensure that they strive for continuous improvement in their animal handling and care skills. Your facility should also participate in the [See it? Stop it!](#) Initiative and provide information for reporting concerns.



Desired Animal Handling Outcomes

- Enforce a zero-tolerance policy on animal abuse and neglect for all staff.

3.6 CHECKLIST OF DESIRED ANIMAL HANDLING OUTCOMES

The following checklist reviews the key desired outcomes calf raisers should strive for to achieve optimal health and welfare of their cattle:

- All staff should be trained in quiet, low-stress handling, and employ these techniques at all times.
- Animal handling and processing measures:
 - < 10% of animals require the use of an electric prod.
 - No animals on the premises should be miscaught and processed/treated in an unsecure or uncomfortable position in a chute or other restraint device. All miscaught animals should be allowed to readjust their position or released and restrained appropriately.
 - < 5% of animals vocalize while being restrained.
 - Upon leaving the chute or restraint device, < 25% of animals run or jump, < 10% of animals stumble or slip, and < 2% of animals fall.
- ≥ 95% of calves at the facility have unbroken tails.
- Do not perform routine tail docking of cattle.
- Measures are taken to ensure broken tails and tail tip injuries/necrosis are minimized or eliminated, which can include routine facility maintenance, appropriate handling and training, adjusting stocking density, evaluating housing areas to identify areas of potential injury, and providing clean and dry bedding that allows for nesting behavior by calves.
- Enforce a zero-tolerance policy on animal abuse and neglect for all staff.



4. Management & care

There are a number of critical management practices that must be in place to ensure that each calf has what it needs (feed, water, housing, etc.) to achieve optimal health and welfare. This section outlines good management practices for providing water, feed and nutrition, space allowances and resting areas, environmental quality, social contact, exercise and freedom of movement, guidelines for assessing body condition, hygiene and cleanliness, hock and knee injuries, lameness and locomotion, and conducting routine procedures.

4.1 WATER & FEED

The provision of clean drinking water, good quality colostrum, adequate volumes of milk, and fresh, palatable starter feed are the cornerstones of calf feeding, and essential to maintain health, growth, and vigor. This section describes each aspect in further detail.

4.1.1 DRINKING WATER

What is it and Why is it Important?

Access to clean, fresh water is essential for the health and well-being of all animals. In calves, providing water will also aid in increasing the intake of starter grain to improve post-weaning gain. As such, calves should have access to water within 24 hours of arrival to the facility to maintain proper hydration and growth. Ideally, continuous access to water should be provided; if that is not possible, such as in freezing conditions, water should be made available to allow animals to drink to satiation at least twice a day.

For pre-weaned calves, it is important to note that milk or milk replacer are not acceptable alternatives to water and in facilities where continuous access to water is not possible, it is ideal to provide fresh water within 20 minutes after feeding milk or milk replacer.

What Can You Do?

Calves should have access to water within 24 hours of arrival. Pens and/or housing areas should be prepared ahead of time.

What Else Should You Consider?

Heat Stress

Under conditions of heat stress, cattle must have sufficient access to water to meet their intake needs.

Contamination & Cleanliness

Contaminated water or water bowls can serve as a source of bacteria and other pathogens that can cause disease. In addition, contaminated or dirty water can discourage cattle from drinking water and lead to dehydration issues. It is recommended to regularly monitor and clean water sources to ensure appropriate water quality and function of watering devices.

Desired Management & Care Outcomes

- All animals have access to clean, fresh water within 24 hours of arrival to the facility.

4.1.2 NUTRITION

What is it and Why is it Important?

Similar to water, access to feed in sufficient quantity is critical to support maintenance energy requirements, health, and growth. To ensure well-balanced and proper feed is provided to your animals, it is important to work with a qualified professional nutritionist, reputable feed supplier, and your veterinarian to ensure your calves maintain health and growth.

What Can You Do?

Evaluate whether the animals at your facility are receiving adequate feed and nutrition to maintain health, growth, and vigor.

Some key areas to evaluate are as follows:

- [Colostrum](#)
- [Milk feeding program](#)
- [Solid feed intake & weaning](#)

Colostrum

Calf raisers are often not responsible for the provision of colostrum to their calves, however, as colostrum is critical to protect against disease, it is necessary to work with these producers to ensure that colostrum management is excellent. When discussing colostrum management with the sources your calf facility works with, ensure that both heifers and bulls receive high-quality colostrum equal to 10% of the calf's bodyweight ideally within the first two hours of life, and no later than six hours after birth. To ensure that the colostrum is high-quality, it is recommended to test colostrum using a Brix refractometer or colostrometer, as quality of colostrum can be variable.



To determine the success of the colostrum management program, consider measuring passive transfer on a sample of at least 12 calves between 24 hours to nine days of age. As stated in section 2.2.3, this is done by obtaining a blood sample and measuring the level of protein in the serum, which correlates to the level of immunoglobulins that would have been obtained through colostrum. Consider using these benchmarks below to guide whether colostrum management at source facilities may be an area for improvement¹.

Category	Serum IgG (g/L)	Total Protein (g/dL)	% Brix	Target (% calves)
Excellent	> 25.0	> 6.2	> 9.4	> 40
Good	18.0 - 24.9	5.8 - 6.1	8.9 - 9.3	~30
Fair	10.0 - 17.9	5.1 - 5.7	8.1 - 8.8	~20
Poor	< 10.0	< 5.1	< 8.1	< 10

¹ Lombard, J., N. Urie, F. Garry, S. Godden, J. Quigley, T. Earleywine, S. McGuirk, D. Moore, M. Branan, M. Chamorro, G. Smith, C. Shivley, D. Catherman, D. Haines, A.J. Hendrichs, R. James, J. Maas, and K. Sterner. 2020. Consensus recommendations on calf- and herd-level passive immunity in dairy calves in the United States. *Journal of Dairy Science* 103:7611-7624.

Milk Feeding Program

Feeding a high plane of milk nutrition in the pre-weaning period can have significant advantages in the short-term, including an improved rate of gain and better immune system development and capacity to fight against disease. Long-term benefits include earlier breeding age, increased milk production, and for beef animals, earlier time to slaughter. In addition, calves are extremely motivated to consume large amounts of milk or milk replacer, so providing higher volumes of milk will lead to reduced signs of hunger and improved welfare. Calves will especially benefit from higher milk intakes in the first four weeks of life when their ability to digest solid feed is limited. It is recommended that you develop a written protocol for your milk feeding program in consultation with your nutritionist and/or veterinarian to ensure calves receive a volume of milk or milk replacer that maintains health, growth, and vigor until weaned.

When setting up your milk feeding program consider:

- Research¹⁻³ has shown that feeding 20% of body weight (at least eight quarts of milk) will lead to higher levels of gain and can improve calf health and performance.
- There are no known consequences of providing more milk/milk replacer.
 - Feces may be looser; however, this is not indicative of diarrhea and is the result of an increased amount of fluids being consumed. In fact, higher levels of milk/milk replacer being provided reduces clinical diarrhea and promotes recovery.
- Some sources of milk, such as waste milk, have inconsistent nutritional value and can lead to reduced growth.
- If calves are housed in groups, ensure that stocking density is appropriate (> 35 square feet per calf), so all calves have ample access to milk feeders.
 - In group housing, a high plane of milk nutrition is critical to reduce cross-sucking behavior.

- If using milk replacer, consider:
 - Working with a reputable source.
 - Weighing milk replacer powder volume.
 - Assessing the temperature, freshness, and cleanliness of water used to mix the milk replacer.
 - Ensure milk feeding equipment is routinely cleaned to prevent the buildup of bacteria.
 - Adjust diet depending on energy demands imposed by the environment.
 - In cold conditions, energy requirements will increase as calves need to generate heat to stay warm. When calves are outside of their thermoneutral zone (< 50°F for newborn calves, or < 32°F for slightly older animals), calves will be cold stressed and require additional energy.
-

Solid Feed Intake & Weaning

Introduction of fresh, palatable starter feed to pre-weaned calves on the day of arrival will help to maintain health, growth, and vigor. Early access to starter feed will allow calves to become more familiar with solid feed leading to earlier consumption of the starter and allowing the rumen to better prepare to adjust from a milk-based to a solid feed diet.

As calves begin to grow significantly, it is critical to fill the nutritional gap that may exist between the growing animal and fixed nutrients coming from milk. Build a written protocol for solid feed intake and weaning with your advisors to determine the best protocol to ensure calves maintain health, growth, and vigor when transitioning to a solid feed diet.

The transition from a milk-based to solid feed diet can be a stressful period.

To ensure a smooth weaning process, it is important to consider:

- Early access to starter feed.
- Water is provided continuously (starting within 24 hours of arrival) as water consumption will lead to higher levels of solid feed intake and helps to facilitate rumen development.
- Transition from milk to solid feed over period of at least a week where milk is gradually reduced to minimize stress.
- All calves should have ample access to starter throughout the day.
- Starter is purchased from a reputable dealer that is balanced for the calves.

What Else Should You Consider?

Feed Access

Feed access is important to ensure that all calves are able to eat an ample amount of feed without competition. As such, it is suggested to design facilities to ensure all animals have access to feeding space. Feed should also be provided continuously by delivering several times per day or replenishing through a push-up process.

Feed Quality

The feed being provided should be of high quality, and safe to consume. As such, feed quality should be routinely monitored, and a qualified nutritionist should be consulted to ensure the feed meets the basic requirements for the animals' maintenance, production, and health.

A qualified nutritionist can aid in the formulation of economical diets that meet the nutritional needs of the animals and provide some of the following services:

- Check that feed and feed ingredients are mixed carefully and formulated according to the animals' dietary requirements.
- Adjust the ration depending on the availability of new ingredients.
- Check feed quality to ensure it meets the manufacturer specifications and determine if there are issues with nitrates, mycotoxins and other soil or climate-induced conditions.

Feed Storage

Feed should also be stored in appropriately designed areas to prevent the buildup of moisture and contamination with vermin, bacteria, or fungi. This will maintain feed quality and safety.

Animal-Derived Proteins

To prevent the development of Bovine Spongiform Encephalopathy (BSE) in the United States, the FDA has adopted the Animal Proteins Prohibited from Ruminant Feed regulation. This regulation prohibits the use of protein derived from mammals in ruminant animal feed and this regulation should be followed.

There are certain exceptions to the regulation including:

- Pure porcine or pure equine protein.
- Blood and blood by-products.
- Gelatin.
- Inspected meat products which have been cooked and offered for human food and further heat process for animal feed use.
- Milk products (i.e., milk and milk protein).

Desired Management & Care Outcomes

- ❑ Animals should be fed colostrum, milk, and/or starter feed levels sufficient to meet requirements for health, growth, and vigor. Establish a written protocol for colostrum and milk feeding and transitioning to your calves to starter feed.

4.1.3 BODY CONDITION

What is it?

Body condition scoring is an important animal-based measure to determine if nutritional demands are being met and to assess the energy reserves that an animal possesses. Liquid feed, starter, and grower rations should be well balanced to meet the animal's demands for growth, immune function, and thermoregulation.

Why Assess it?

Body condition scoring is an important indicator of animal health and welfare, as well as growth and future performance. As calves age, body condition score can be a predictor of reproductive success as well as complications during and after calving. Because calf raisers may acquire calves from a variety of different sources, it can be difficult to establish body condition scoring that would suit all breeds and purposes.

What Are You Looking For?

Calves should have muscle development around the tail head, hook and pin bones (hips), and should not have prominent ribs, short ribs, or vertebrae. Ideally, body condition scoring should be done using a hands-on approach by feeling ribs and along the spine, as the hair coat can often cover bony prominences. Each individual examination should take approximately 10 seconds. *For resources on post-weaned heifer body condition scoring, see the Appendix.*

What is an Ideal Score?

Indications of ideal body condition (equivalent to a score three out of five for dairy cattle and score five out of nine for beef cattle on commonly used standardized scoring systems) include:

- Calves should not have a hollow-looking appearance in the flank area.
- Hips (hook and pin bones) are visible and there is fat and muscle cover giving them a rounded appearance.
- Backbone may appear as a rounded ridge without individual vertebrae being visible.
- Short ribs should not have a shelf-like appearance.
- Some ribs may be visible through the hair coat, but should not appear prominently.

Calves with low body condition score may have:

- A hollow flank.
- Prominent, angular hook and pin bones.
- Backbone that is apparent with vertebrae feeling sharp.
- Visible short ribs.
- More than three or four sets of prominent ribs.

SCORE 1: Low body Condition	SCORE 2: Low body Condition	SCORE 3: Ideal Body Condition
<p>Gaunt, emaciated animal, having little to no fatty tissue around tailhead and short rib region. Extremely pronounced back, hook and pin bones.</p>	<p>Thin animal, with minimal coverage around the tailhead and short rib region. Minimal coverage over back, hook and pin bones.</p>	<p>Well-conditioned animal with coverage around the tailhead and short rib region. Back, hook and pin bones are not pronounced.</p>
		

Adapted from the FARM Animal Care Manual Version 4.

Dairy Cattle Body Condition Score Scale

SCORE 1

Gaunt, emaciated animal, having little to no fatty tissue around tailhead and short rib region. Extremely pronounced back, hook and pin bones.



SCORE 2

Thin animal, with minimal coverage around the tailhead and short rib region. Minimal coverage over back, hook and pin bones.



SCORE 3

Well-conditioned animal with coverage around the tailhead and short rib region. Back, hooks and pin bones are not pronounced.



SCORE 4

Slightly over-conditioned animal with more than average coverage around tailhead and short rib region, short ribs cannot be felt or seen. Back, hooks and pin bones have more than average coverage and bone structure difficult to see due to amount of coverage.



SCORE 5

Over-conditioned animal with thick coverage around tailhead and short rib region; short ribs cannot be felt or seen at all. Back, hook and pin bones have significant coverage and bone structure is not visible due to amount of coverage.



Adapted from the FARM Animal Care Manual Version 4.

Beef Cattle Body Condition Score Scale

BCS 1

The animal is severely emaciated and physically weak with all ribs and bone structure easily visible. Cattle in this score are extremely rare and are usually affected by with a disease and/or parasitism.



BCS 3

The animal is very thin with no fat cover on ribs or in the brisket and the backbone is easily visible. Some muscle depletion appears evident through the shoulder and hindquarters.



BCS 5

The animal may be described as moderate to thin. The last two ribs may be seen and little evidence of fat is present in the brisket, over the ribs, or around the tail head. No muscle depletion is seen in the hindquarter or shoulder area. The transverse spinous processes are now smooth and no longer identifiable.



BCS 7

The animal is in very good flesh. The brisket is full, the tail head shows pockets of fat and the back appears square because of fat. The ribs are very smooth and covered with fat.



BCS 9

These animals are very obese and are rarely seen. They can be described as similar to eight but taken to greater extremes. They also have a heavy deposition of udder fat.



Adapted from the BQA National Manual.

What Can You Do to Improve?

Evaluate feeding protocols by ensuring liquid volumes fed are appropriate, starter and grower rations are available to all animals at all times (check stocking density), and that rations are increased to accommodate energy expenditure required for thermoregulation during periods or seasons of both hot and cold temperatures. With proper milk and solid feeding protocols, almost all of the animals within the herd should have an ideal body condition score.

Desired Management & Care Outcomes

- ❑ 99% of calves at the facility should have an acceptable body condition score (equivalent to a score 3 out of 5 for dairy cattle and score 5 out of 9 for beef cattle on commonly used standardized scoring systems).

4.2 RESTING Area: SPACE ALLOWANCE & BEDDING

What is it and Why is it Important?

The health and welfare of your calves depend on having adequate space to rest and perform natural behaviors with a comfortable lying surface. Space provided to calves, whether raised in hutches or group pens, should allow calves to have a comfortable lying area, and should allow all animals to easily stand, lie down, adopt normal resting and grooming behavior, and turn 360°. Visual and/or physical contact with other cattle has been shown to be beneficial. Resting areas should be comfortable and allow for the provision of bedding. Poor or inappropriate resting areas can contribute to low hygiene scores. Insufficient bedding and/or uncomfortable resting areas prevent calf cleanliness and contribute to the development of hock and knee injuries as well as lameness. Insufficient bedding also limits calves' ability to thermoregulate in cold weather.

The prevalence of knee and hock injuries are also an indication that the housing and bedding being provided is inadequate. Hard, abrasive surfaces can cause hair loss and painful swelling of the joints. This is an animal welfare concern that will be discussed in further detail.

What Can You Do?

In group-housing situations, all animals should have space to rest on the bedded area of the pen at the same time. Stocking density and cleaning frequency should be sufficient to maintain appropriate hygiene scores for calves. It is generally accepted that 35 square feet is an acceptable amount of resting space for young calves housed in groups. This will need to be increased as calves grow. Be aware and in compliance of state laws or local regulations that may require more space allowance per calf.

Resting areas should be comfortable and allow for the provision of bedding.

What Can You Do to Improve?

For calves housed in hutches, consider providing a fenced area to increase their space allowance. Fencing is preferred over tethering calves. Calves should be moved from hutches around the time of weaning before they outgrow this space. It is also recommended that calves be provided ample straw (at least 12 inches for most systems) for comfortable bedding. Where manure management systems do not allow for loose bedding and rubber mats are being used, they should be sufficiently thick, comfortable, and in good condition to prevent knee injuries to calves.

4.2.1 Hygiene & Cleanliness

What is it?

The cleanliness and hygiene of an animal is a good indication of the quality of the area where they spend the majority of their time. Bedding that is clean and dry will not cause manure or urine to adhere to or stain their hair coat when calves lie down.



Why Assess it?

Providing livestock with ample clean, dry bedding not only provides comfort and warmth, but also helps to prevent injuries, reduce exposure to bacteria and parasites, and maintain air quality. If bedding areas contain high levels of manure and urine, their skin and hair coat become saturated with these materials. Bedding material can also serve as a reservoir for pathogens. Poor animal hygiene is an indication that there is a considerable amount of urine and feces present in the environment. As cattle spend much of their day lying down in these areas, you can appreciate that they are in close contact with and at high risk of ingesting manure (both their own and of other animals; presenting a disease transmission opportunity). Poor hygiene in walking areas such as alleyways, crossovers, and ramps also pose a hazard for slipping and falling. This contributes to hock and knee injuries, as well as lameness.

What Are You Looking For?

Hygiene and cleanliness within a facility is measured by assessing the amount of urine and manure on the legs and belly area. Cattle typically lie sternally, or on their chest and abdomen with their legs tucked under. When monitoring hygiene and cleanliness, conduct a visual assessment of the amount of manure tags and urine staining found on the belly/flank and leg areas of the calf. It may also be helpful to evaluate walkways, feeding equipment, etc. for the presence of manure build up, as this is a source of contamination and manure ingestion. You can measure the cleanliness and dryness of bedding by kneeling in the pen and assessing how much moisture your clothing wicks up. High levels of ammonia in the air can also be an indication of bedding cleanliness. This is of particular importance for air quality which can irritate the upper airway of calves. Ensure your ventilation system can accommodate the size, structure, and stocking density of your barn to aid in keeping bedding dry.

Hygiene scoring assigns calves a score out of three. The levels of hygiene and cleanliness used for scoring are as follows:

SCORE 1: CLEAN	
SCORE 2: MODERATE	
SCORE 3: DIRTY	
<p>There are no signs of manure on legs or flank of the animal. Clean.</p> <p>Mud or manure does not exceed 5.5 inches in length in area A or B.</p>	
<p>There are signs of manure on legs of the animal but flank is clean.</p> <p>Mud or manure exceeds 5.5 inches in length in a single area of A or B.</p>	
<p>There is manure on the legs and flank of the animal. Dirty.</p> <p>Mud or manure exceeds 5.5 inches in length in both areas, A and B.</p>	

Adapted from the FARM Animal Care Manual Version 4.

What Can You Do to Improve?

Evaluate hutches, pens, and lying areas for cleanliness and bedding. Ensure manure management systems are in proper working order. Ensure pens and hutches are placed and/or built to allow for adequate drainage to prevent moisture accumulation to help keep bedding dry. If maintaining clean calves is becoming a challenge, consider scraping pens and alleyways more frequently or top up bedding daily or every other day. If time or labor is a challenge, reduce stocking density to decrease the amount of manure per pen and increase the amount of time required between scraping or changing bedding. It is unrealistic to expect that a barn environment will stay clean all the time, but it is important for producers to consider the potential long-term impacts that poor bedding quality may have on animal health, comfort, and production. With good management, a target of no more than 10% of the herd being considered dirty should be realistic and achievable.

Desired Management & Care Outcomes

- 90% of calves at the facility should have a hygiene score of two or less on a three-point scale.

4.2.2 HOCK & KNEE INJURIES

What is it?

Hock and knee injuries can be common in animals housed primarily indoors. They occur because of prolonged contact with abrasive and rough surfaces on the skin where there is insufficient or inappropriate bedding. Hock and knee injuries can also occur as a result of handling, during which animals slip and fall.

Why Assess it?

Visually inspecting hocks and knees can give producers an indication as to whether or not there is sufficiently deep and dry bedding in lying areas. In housing systems where manure management systems do not allow for added bedding, the presence of injuries can be an indication of the suitability and condition of mats or other lying surfaces calves are exposed to.

What Are You Looking For?

Any signs of swelling, hair loss, or scabbing on the hocks or knees is an indication of inflammation. While standing, visually inspect both knees at the same time to compare size, and look at hocks from both the side and behind. Side views allow for inspection for hair loss and scabbing. When viewing from behind, be sure to compare both hocks together, and assess for symmetry. If an animal typically lies on one side more frequently, you may notice more prominent swelling there, and you can use the opposite hock for reference. *Resources with images for scoring injuries can be found in the Appendix.*

Hock and knee injuries are categorized as follows:

NORMAL KNEE SCORING	ABNORMAL KNEE SCORING
No hair loss or swelling is present.	Minor to severe hair loss, swelling, ulceration, or scabbing is present.
	

Adapted from the FARM Animal Care Manual Version 4.

NORMAL HOCK SCORING	ABNORMAL HOCK SCORING	
No hair loss or swelling is present.	Minor to severe hair loss, swelling, ulceration, or scabbing is present.	
		

Adapted from the FARM Animal Care Manual Version 4.

What Can You Do to Improve?

Evaluate quality and depth of bedding provided as well as the comfort of common lying areas if mats are used. In group housing areas, all animals should have access to the lying area at the same time. Bedding should conform to the animals' body, be clean and dry, be sufficiently deep to allow for nesting behavior to provide warmth, and should keep animals clean to prevent ulceration of the skin on contact areas. It may also be helpful to determine if injuries occur after periods of handling and determine if quiet, low-stress handling techniques are used to prevent calves from slipping and falling. Be sure to speak to your veterinarian about implementing management changes if the presence of injuries within your herd exceeds 5%.

Desired Management & Care Outcomes

- 95% of calves at the facility should have normal hocks and knees, with no hair loss or swelling present.

4.3 ENVIRONMENT QUALITY

What is it and Why is it Important?

Facilities should be designed and maintained to provide the herd with a clean, safe, and comfortable environment. Optimal housing environments are adequately lit and protect animals from inclement weather, keep animals thermally comfortable, and reduce exposure to pathogens through clean bedding, adequate ventilation, drainage, and adequate traction.

What Can You Do?

Prevent injuries by identifying gates where animals may become trapped, holes in the floor that pose a tripping hazard, or equipment that is no longer operating effectively or safely. Facilities include all housing structures, handling structures, lots, pens, pastures, and/or alleys where an animal might be housed or walk through.

Key elements to a high-quality environment include:

- Shelter
- Protection from heat & cold
- Bedding
- Ventilation
- Adequate lighting
- Traction
- Stocking density
- Hospital pen

Shelter

Animals should be protected from the elements as well as predators at all times.



Protection from Heat & Cold

Calves perform optimally when the environmental temperature is within their thermoneutral zone (50 - 78°F). Outside of this range, calves must expend energy to keep warm or cool. Outside of this range, calves may begin to experience thermal discomfort, affecting their welfare.

In cold weather:	In hot weather:
<ul style="list-style-type: none">• Ensure calves have sufficient deep, clean bedding that allows for nesting behavior.	<ul style="list-style-type: none">• Ensure calves have access to shade.
<ul style="list-style-type: none">• Use calf jackets.	<ul style="list-style-type: none">• Provide adequate clean, fresh water at all times.
<ul style="list-style-type: none">• Increase milk allowance to account for the extra energy required to keep warm.	<ul style="list-style-type: none">• Ensure adequate air movement in indoor housing through the use of fans.
<ul style="list-style-type: none">• Ensure that indoor housing provides some insulation and is relatively draft-free to reduce accumulation of condensation on indoor surfaces; supplemental heat sources may be required.<ul style="list-style-type: none">• Temperatures should not fluctuate more than 5° within climate-controlled buildings.	<ul style="list-style-type: none">• Use sprinklers to help dissipate heat.

Bedding

Ideally, housing design should allow for the provision of bedding to provide animals with a comfortable, warm, and clean environment. Deep bedding will keep calves clean, prevent cold stress, and will minimize exposure to disease-causing pathogens. Bedding is sufficiently deep when calves' legs are not visible when they are lying down (about 12 inches).

Ventilation

Adequately ventilated barns keep the environment dry, help to remove respiratory pathogens from the air, reduce noxious gases, dust, and odors, and maintain a draft-free environment. Natural and environmental control ventilation exists. Work with engineers and experts in barn design to ensure adequate air exchange.

Adequate Lighting

Lighting in indoor housing should allow for animal observation. Appropriate lighting, whether natural or artificial, contributes to the safety of both animals and humans and mimics natural day/night cycles.

Traction

Ensure areas of animal movement (scrape alleys, walkways, etc.) are kept as clean, well-drained, and dry as possible. This will reduce the risk of slipping and falling. Keeping these areas clean and dry will also reduce the pathogen load in the environment and help to maintain calf cleanliness.

Stocking Density

Group-housed calves should be kept at a stocking density that allows for at least 35 square feet for every animal. This may need to be adjusted as animals grow. This space allowance will allow for better access to resources and for cleaner, drier resting areas, as well as improved air quality.

Hospital Pen

Provide a segregated area (e.g., with solid walls or away from other pens) for animals recovering from illness or injury to prevent the spread of infectious disease as well as facilitate recovery by allowing them easy access to feed and water.

Desired Management & Care Outcomes

- Calf housing and facilities should be designed to provide:
 - Shelter from the elements and predators.
 - Protection from heat and cold.
 - Deep bedding (roughly 12 inches).
 - Adequate ventilation to keep the environment dry, help to remove respiratory pathogens from the air, reduce noxious gases, dust and odors, and maintain a draft-free environment.
 - Adequate lighting.
 - Clean, well-drained, dry areas of animal movement to ensure good traction.
 - At least 35 square feet for every animal in a group housing environment (follow state-specific requirements if beyond this limit).
 - A segregated area for animals recovering from illness or injury.
 - At minimum, visual contact with other calves. Consider group or pair-housing for additional benefits related to social contact.
 - A comfortable lying area that allows all animals to easily stand, lie down, adopt normal resting and grooming behavior, turn 360°, and allow for visual contact with other cattle.
- It is recommended for optimal animal care and welfare that calf raisers do not tether animals at any age.

4.4 SOCIAL CONTACT

What is it and Why is it Important?

Cattle are a social species that have a strong urge to live within herds. When calves are separated, there are some detrimental effects that can occur on their development including isolated calves being more fearful and less dominant when mixed into groups later in life. In addition, individually housed calves have a harder time coping with changes in housing and diet and may have cognitive and developmental disadvantages, including poor learning skills and deficient social skills. Collectively this evidence suggests that social contact with peers from an early age is important for the calf.

Beyond these behavioral impacts of social housing, there are some benefits to having socially reared calves including increased body weight gain and increased feed intake. There are some concerns surrounding cross-sucking, aggression, and transmission of disease. However, there are multiple methods to address these challenges, including employing a gradual weaning program, feeding a high plane of milk nutrition, providing appropriate outlets for suckling behavior, using lower stocking density and group sizes, maintaining a stable group of calves, as well as cleaning pens and allowing downtime between subsequent groups.

What Can You Do?

To minimize the effects of social isolation, calves from the same source facilities could be grouped together early in life. Providing visual and/or physical contact with other cattle has been shown to be beneficial to calves. To see the full benefits of social contact, calves need to be housed where they have physical contact with each other. Pair housing, where calves are grouped with one other calf, may be a good compromise between group housing and individual housing in terms of calf welfare and management. It allows producers to incorporate the benefits of social contact while maintaining the intensive management of animals and limit of disease transmission that occurs with individual housing.

Pair housing... may be a good compromise between group housing and individual housing in terms of calf welfare and farm management.

Desired Management & Health Outcomes

- Calf housing and facilities should be designed to provide:
 - At minimum, visual contact with other calves. Consider group or pair-housing for additional benefits related to social contact.
- It is recommended for optimal animal care and welfare that calf raisers do not tether animals at any age.

4.5 EXERCISE & FREEDOM OF MOVEMENT

What is it and Why is it Important?

At all life stages, animals should be provided with an environment where they are able to move freely and adopt normal grooming, resting, and social behaviors without risk of injury. Providing cattle with an area or opportunity to move freely either indoors or outdoors can have a positive impact on animal health and welfare.

What Can You Do?

Whether it is provided through access to a pasture, small cattle yard, or outdoor pen, optimal animal housing gives cattle outdoor access and/or an opportunity to walk/trot every day. This can help to minimize lameness and improve hoof health.

To ensure animals have sufficient freedom of movement, consider the following:

- Stocking density
- Shade
- Traction

Stocking Density

Ensure stocking density allows for enough spacing for animals to walk and exercise within their housing area.

Shade

Outdoor spaces should provide animals with a shade area and/or protection from the elements.

Traction

Ensure that there is good traction where animals are walking to avoid injuries from slipping and falling.



A Note on Tethering

Improvements to veal calf housing in recent years no longer allows calves to be tethered to allow for better freedom of movement and exercise. It is recommended for optimal animal care and welfare that calf raisers do not tether animals at any age.



Desired Management & Care Outcomes

- Calf housing and facilities should be designed to provide:
 - Shelter from the elements and predators.
 - Protection from heat and cold.
 - Deep bedding (roughly 12 inches).
 - Clean, well-drained, and dry areas of animal movement to ensure good traction.
 - At least 35 square feet for every animal in a group housing environment (follow state-specific requirements if beyond this limit).
 - A comfortable lying area that allows all animals to easily stand, lie down, adopt normal resting and grooming behavior, turn 360°, and allow for visual contact with other cattle.
- It is recommended for optimal animal care and welfare that calf raisers do not tether animals at any age.

4.6 ROUTINE PROCEDURES

4.6.1 DISBUDDING & DEHORNING

What is it and Why is it Important?

Disbudding involves the removal or destruction of horn-producing cells prior to attachment to the skull, whereas dehorning is the removal of the horn after skull attachment. Disbudding or dehorning is a process that reduces the risk of injury to the animal, other animals, and animal caretakers. Removing the horns or horn buds will benefit both cattle and human safety.

There is clear scientific evidence that disbudding and dehorning are painful practices, regardless of the method used. Administration of local anesthesia and systemic pain relief have been shown to minimize pain associated with disbudding and dehorning and improve animal welfare during the procedure. Even when caustic paste is used at a young age, it is still painful and pain management should be provided.

Removing the horns or horn buds will benefit both cattle and human safety. To minimize pain, consider developing a dehorning and disbudding protocol with your VOR using the AABP standard of care.

What Can You Do?

To minimize pain, develop a dehorning and disbudding protocol with your VOR using the AABP standard of care. The standard of care emphasizes the importance of providing pain management during all disbudding and dehorning procedures. During disbudding and dehorning, pain control through local anesthesia and systemic pain control should be performed.

Pain Control

The key considerations when providing pain management during disbudding and dehorning are local anesthesia and systemic pain relief.

- **Local Anesthesia.** Use of a local anesthetic mitigates immediate pain associated with disbudding and dehorning and provides up to five hours of post-procedural pain relief. The main methods for providing local anesthesia are cornual nerve block and horn bud infiltration. The local anesthesia protocol should be determined and prescribed by the VOR. Federal law restricts the use of local anesthetics to be used by, or on the order of, a licensed veterinarian.
- **Systemic Pain Relief.** The use of nonsteroidal anti-inflammatory drugs (NSAIDs) should be used to provide additional longer-lasting pain relief. The use of injectable, topical, or oral NSAIDs is acceptable for pain mitigation in the immediate post-operative procedure. Meloxicam has been shown to mitigate post-procedure pain for up to 48 hours after a single dose of the drug. Topical NSAID applications make the administration of NSAID therapy at the time of disbudding or dehorning practical in most instances when oral, intravenous, or intramuscular administration is difficult. However, further study on topical NSAID use is warranted to determine the effectiveness in mitigating dehorning pain. The type of NSAID used should be prescribed by the VOR.

Access to Pain Control Medication

It is important to note that there are no approved drugs in the United States for use in cattle with an indication to provide analgesia associated with dehorning pain. AMDUCA regulations allow for ELDU provided a valid VCPR exists and the drug selection process, records, and withholding times outlined in the AMDUCA regulations are followed.

Age at Which the Procedure is Performed

Ideally, dehorning should be completed when the calf is young. Disbudding is preferred when compared to dehorning, as dehorning causes more damage, is more painful, and has a longer healing time when compared to disbudding. Disbudding can be completed prior to two weeks of age and, in some cases, can be performed as early as the first 24 hours of life. In facilities where calves are handled daily, disbudding or dehorning should be performed by two months of age.

In addition, dehorning or disbudding should not occur around other stressful events such as weaning, movement, or transport, as it could impact the calf's recovery. Consider this factor when determining the most suitable age to complete this practice on your calves.

Disbudding Method

Acceptable methods for disbudding include application of caustic paste or an electric/gas iron to destroy horn-producing corium. Caustic paste should ideally be applied in the first few days of life. After the calf is two weeks old, the use of caustic paste is less effective and is discouraged. Additional considerations when applying caustic paste include protecting calves from rain and limiting social interaction among calves for a short period after application to ensure the paste only affects the horn bud.

Have the Right Training

Consider having your veterinarian train you and your staff to ensure the procedure is being performed safely and humanely. *The Appendix contains an online tutorial where producers can learn more about the appropriate restraint, pain control, and procedure required to safely and effectively disbud calves.*

Consider Polled Genetics

As an alternative to disbudding, the use of polled genetics could be considered. It may be an option for some calf raisers depending on the breed of cattle and genetic diversity of polled genetics. Work with source facilities to determine if there is an opportunity to incorporate polled genetics into their herd.

Desired Management & Care Outcomes

- ❑ Develop a dehorning and disbudding protocol with your VOR that outlines how and when the procedure will be administered, and that pain control will be provided, following methods and standards of care as outlined by the AABP and/or AVMA.

4.6.2 castration

What is it and Why is it Important?

Castration is a procedure performed in male cattle to lower testosterone levels which will lead to a reduction in aggressiveness and sexual activity. Castration can lead to a reduced number of injuries, improved human safety, and avoidance of unwanted pregnancies. In addition, castrated cattle can have improved quality grade of meat and decreased numbers of animals with high muscle pH (which leads to discoloration of meat or “dark cutters”). Similar to dehorning, castration is a painful event, and the use of pain relief will improve animal welfare.

What Can You Do?

To minimize pain, consider developing a castration protocol with your VOR using the AABP standard of care. This standard of care for pain management encourages providing pain management during all castration procedures.

A reduced number of injuries, improved human safety, and avoidance of unwanted pregnancies can result from castration. To minimize pain, consider developing a castration protocol with your VOR using the AABP standard of care.

Pain Control

As with disbudding and dehorning, there are important considerations when providing pain management during castration: local anesthesia and systemic pain relief.

- **Local Anesthesia.** Use of a local anesthetic, such as a testicular block, spermatic cord block, or epidural immediately prior to castration can reduce the immediate pain associated with the procedure and provide pain relief for up to five hours. The use of local anesthetic should be considered with both human and animal safety in mind. Sedatives may make the use of local anesthetic more practical. The local anesthesia protocol should be determined and prescribed by the VOR. Federal law restricts the use of local anesthetics to be used by, or on the order of, a licensed veterinarian.
- **Systemic Pain Relief.** NSAIDs will provide pain relief immediately after the procedure. Long-acting NSAIDs can also provide pain relief for an extended period of time. Meloxicam can minimize pain for up to 48 hours following a single dose of the drug which will increase short-term weight gain and feed intake. The use of NSAIDs in calves that were castrated at one week of age or older has been shown to reduce the risk of respiratory disease. Topical NSAID applications can make the administration of NSAIDs at the time of castration practical when oral or injectable administration is not possible. The type of NSAID used should be prescribed by the VOR.

Method of Castration

There are many methods that could be used for castration, such as the use of a rubber ring or surgical removal. All methods of castration cause pain to some extent, but research has demonstrated that constriction (banding) methods may be most painful compared to more surgical approaches (Burdizzo). Work with your veterinarian to determine which method is the best for your facility.

Age When the Castration Procedure is Performed

Castration should be performed as early as possible to minimize pain and stress associated with the procedure. Consider castrating as young as possible, but at least before three months of age. A best management practice for castration may be to perform at the time of disbudding/dehorning (prior to two months of age). Calves will likely already be receiving pain control, will also be restrained, and the procedure at this age may be less invasive.

Have the Right Training

Those performing castration should be trained and competent in the procedure used to ensure it is performed safely, effectively, and humanely. Consider working with your veterinarian to ensure those performing this procedure are trained adequately.

Desired Management & Care Outcomes

- Develop a castration protocol with your VOR that outlines how and when the procedure will be administered and how pain control will be provided, following methods and standards of care as outlined by the AABP and/or AVMA.

4.6.3 SUPERNUMERARY TEAT REMOVAL

What is it and Why is it Important?

Some dairy producers may be concerned about the presence of "extra" or supernumerary teats in heifer calves. These can be removed via a simple surgical procedure and it is recommended the procedure be performed as early as possible, and well before breeding age.

What Can You Do?

Calf raisers should ensure this procedure is done using proper restraint, as well as pain mitigation in accordance with recommendations by the VOR. It may be helpful to consider performing this procedure at the time of disbudding and dehorning (prior to two months of age) when calves will be restrained (possibly sedated), have the benefit of pain control, and before the procedure becomes invasive.

Pain Control

Systemic pain relief is recommended by the AABP and should be discussed with your veterinarian. NSAIDs will provide pain relief immediately after the procedure. Long-acting NSAIDs can also provide pain relief for an extended period of time. Meloxicam can minimize pain for up to 48 hours following a single dose of the drug which will increase short-term weight gain and feed intake. Topical NSAID applications can be practical when oral or injectable administration is not possible. The type of NSAID used should be prescribed by the VOR.

Have the Right Training

Have your veterinarian train staff who will be performing this procedure to ensure it is done in such a way that minimizes the chance of infection, tissue damage, and removal of teats associated with the quarters of the udder. Your veterinarian can also assist you with webbed teats or extra pairs.

Desired Management & Care Outcomes

- ❑ Develop a supernumerary teat removal protocol with your VOR that outlines how and when the procedure will be administered, and that pain control will be provided, following methods and standards of care as outlined by the AABP and/or AVMA.

4.7 CHECKLIST OF DESIRED Management & care OUTCOMES

The following checklist reviews the key desired outcomes calf raisers should strive for to achieve optimal health and welfare of their cattle:

- All animals have access to clean, fresh water within 24 hours of arrival to the facility.
- Animals should be fed colostrum, milk, and/or starter feed levels sufficient to meet requirements for health, growth, and vigor. Establish a written protocol for colostrum and milk feeding and transitioning to your calves to starter feed.
- 99% of calves at the facility should have an acceptable body condition score (equivalent to a score three out of five for dairy cattle and score five out of nine for beef cattle on commonly used standardized scoring systems).
- 90% of calves at the facility should have a hygiene score of two or less on a three-point scale.
- 95% of calves at the facility should have normal hocks and knees, with no hair loss or swelling present.
- Calf housing and facilities should be designed to provide:
 - Shelter from the elements and predators.
 - Protection from heat and cold.
 - Deep bedding (roughly 12 inches).
 - Adequate ventilation to keep the environment dry, help to remove respiratory pathogens from the air, reduce noxious gases, dust and odors, and maintain a draft-free environment.
 - Adequate lighting.
 - Clean, well-drained, and dry areas of animal movement to ensure good traction.
 - At least 35 square feet for every animal in a group housing environment (follow state-specific requirements if beyond this limit).
 - A segregated area for animals recovering from illness or injury.
 - At minimum, visual contact with other calves. Consider group or pair-housing for additional benefits related to social contact.
 - A comfortable lying area that allows all animals to easily stand, lie down, adopt normal resting and grooming behavior, turn 360°, and allow for visual contact with other cattle.
- It is recommended for optimal animal care and welfare that calf raisers do not tether animals at any age.
- Develop a dehorning and disbudding protocol with your VOR that outlines how and when the procedure will be administered, and how pain control will be provided, following methods and standards of care as outlined by the AABP and/or AVMA.
- Develop a castration protocol with your VOR that outlines how and when the procedure will be administered, and how pain control will be provided, following methods and standards of care as outlined by the AABP and/or AVMA.
- Develop a supernumerary teat removal protocol with your VOR that outlines how and when the procedure will be administered, and that pain control will be provided, following methods and standards of care as outlined by the AABP and/or AVMA.



5. Personnel Training & Emergency Preparedness

The success of any cattle facility, and the health and welfare of the cattle, depends on the quality of care that its staff provide. Training is a key component to ensuring consistent and accurate care for all animals. Another key component to the success of a facility is being prepared. This section reviews good management practices related to employee training, continuing education, and emergency preparedness.

5.1 EMPLOYEE TRAINING & CONTINUING EDUCATION

What is it and Why is it Important?

Training and continuing education presents a prime opportunity to expand the knowledge base and skillset of your staff. Effective training will give an employee a greater understanding of their responsibilities within their role, and in turn build their confidence. Most employees will have some weaknesses in their workplace skills. Investing time and energy into training your employees and offering continuing education opportunities allows employees to strengthen their skills and continuously develop themselves as professional animal caretakers. A robust training and development program ensures employees have a consistent positive experience and sufficient background knowledge in not just the "how" and "what" of their roles, but also the "why." In addition, setting a workplace culture where communication is encouraged, routine feedback is provided on work performance, and employees are recognized for a job well done enhances the knowledge retention, daily implementation, and dedication of employees to apply principles learned from training and educational sessions.

No matter the size of the facility, providing continuing education opportunities and training family and non-family employees who have animal care responsibilities ensures not only that the basics of low-stress animal handling and a zero-tolerance for abuse are understood, but also clearly conveys job expectations and establishes the facility's culture. Ultimately, an investment in your staff is an investment in your animals. Anytime workers are given opportunities to broaden their knowledge and increase their skill level, they are more engaged and more productive. Training and continuing education also allow a facility to hire entry-level workers and train them for the jobs for which they are needed, rather than trying to find workers who already have the needed skills and experience, which can be a challenge in communities with a limited labor pool. In short, training and developing workers is good for business and helps facilities remain competitive while dealing with a shortage of skilled, qualified workers.

A robust training and development program ensures employees have a consistent positive experience and sufficient background knowledge in not just the 'how' and 'what' of their roles, but also the 'why'.



What Can You Do?

Training and continuing education should encompass care expectations for particular circumstances, such as how to move cattle or what to do in cases of emergencies, as well as general expectations, such as how to implement a specific protocol. All staff with animal care responsibilities should be trained in proper stockmanship. Quiet, low-stress handling and animal care should be part of the culture of the facility, and not merely a topic of training. It is recommended to have your staff sign an agreement outlining their commitment to upholding the care expectations established for your facility.

Staff should also be trained annually (or more frequently) on specific topics related to their responsibilities at the facility, which may include:

- Administering drug treatments and keeping drug records.
- Pre-weaned calf care (feeding, handling, etc.).
- Handling and caring for non-ambulatory animals.
- Making decisions about and/or performing timely euthanasia.
- Evaluating fitness for transport.

What Does Training Look Like?

Training and continuing education can come in a variety of forms. It should always be in a format and/or language that is useful to the intended audience.

Some of these include:

- Discussions or presentations with industry stakeholder specialists, such as veterinarians and veterinary technicians, university extension specialists, nutritionists, technical service providers, etc.
- Attending industry meetings and formal events.
- Formal agricultural course or education.
- Print and online media from credible sources (industry organizations, veterinary associations, university extension, etc.) relating to specific topics.
- Job shadowing with other trained professionals and/or staff.
- Ongoing calf-side evaluations of employees' performance, performed by certified an on-site manager or veterinarian.

See it? Stop it!

All staff should be trained to report any unacceptable handling that they witness by anyone at the facility, whether staff, advisor, or visitor. Staff should be encouraged to report directly to a senior member of the team and/or use the **See it? Stop it!** Initiative (see section 3.1).



Desired Personnel & Emergency Preparedness Outcomes

- All staff with animal care responsibilities should be trained in proper stockmanship on an annual basis or more frequently.
- All staff should be trained on specific topics related to their responsibilities at the facility on an annual basis or more frequently.
- Develop and invest in a robust training and development program that ensures employees have a consistent positive experience, sufficient background knowledge, broadening of skill level, and creates a culture of engagement and productivity.
- Have your staff sign an agreement outlining their commitment to upholding the care expectations established for your facility.

5.2 Emergency Preparedness

What is it and Why is it Important?

The risk of emergencies is always present in agriculture, including everything from a trailer rollover, animal disease outbreak, or severe weather events. In case of an emergency, time is of the essence to act and mitigate the negative consequences that could arise from the situation.

What Can You Do?

Develop a written Emergency Action/Crisis Plan to effectively manage emergencies or crisis situations that could occur.

This plan should include:

- Identification of potential emergency situations.
- For each potential emergency situation, the following components must be included:
 - Actions to take in an emergency situation.
 - Designated people in charge of performing those actions.
 - Individuals given authority to perform specific actions when an emergency occurs.
 - Communication flow for quick and accurate information sharing.
- Data and information related to site, utilities, evacuation routes, road conditions, equipment/materials involved, injuries and locations of resources.
- Emergency supplies and equipment.
- Training and documentation of training on the execution of the emergency plan for all involved including employees and first responders.
- Response scenarios options.
- Sheltering in place.

Do a Walkthrough

For the team to effectively respond to an emergency situation, it is important to do at least annual walkthroughs of emergency action plans with all individuals designated. Ensure a copy of the emergency action/crisis plan is available for your staff.

Make Critical Contact Points Visible

Beyond developing an action plan, the names, telephone numbers and the site address should be posted in a prominent location in the languages understood by workers. This will ensure rapid communication can occur to coordinate emergency activities.

Important telephone numbers and contact information to provide include:

- | | |
|--|---|
| <input type="checkbox"/> 9-1-1 | <input type="checkbox"/> Fire Department(s) |
| <input type="checkbox"/> Owner | <input type="checkbox"/> Police Department(s): Local Police, Sheriff, Highway Patrol, State Police |
| <input type="checkbox"/> Herd manager | <input type="checkbox"/> Utilities: Electric Company, Water Company, Natural Gas, Telecommunications/Internet |
| <input type="checkbox"/> Cattle handlers | <input type="checkbox"/> Veterinarian |
| <input type="checkbox"/> Local doctor's office | <input type="checkbox"/> Nutritionist |
| <input type="checkbox"/> Local emergency room | <input type="checkbox"/> See it? Stop it! Initiative |
| <input type="checkbox"/> Local poison control | |

See the Appendix for an information sheet you can post with the important contact information your staff may need in the event of an emergency.

Desired Personnel & Emergency Preparedness Outcomes

- Develop a written Emergency Action/Crisis Plan to effectively manage emergencies or crisis situations that could occur.
- Post emergency contact name(s) and number(s) and the site address in a prominent location in the languages understood by workers to facilitate quick communication in the event of an emergency.

5.3 CHECKLIST OF DESIRED PERSONNEL & EMERGENCY PREPAREDNESS OUTCOMES

The following checklist reviews the key desired personnel training and emergency preparedness outcomes calf raisers should strive for to achieve optimal health and welfare of their cattle:

- All staff with animal care responsibilities should be trained in proper stockmanship on an annual basis or more frequently.
- All staff should be trained on specific topics related to their responsibilities at the facility on an annual basis or more frequently.
- Develop and invest in a robust training and development program that ensures employees have a consistent positive experience, sufficient background knowledge, broadening of skill level, and creates a culture of engagement and productivity.
- Have your staff sign an agreement outlining their commitment to upholding the care expectations established for your facility.
- Develop a written Emergency Action/Crisis Plan to effectively manage emergencies or crisis situations that could occur.
- Post emergency contact name(s), phone number(s) and the site address in a prominent location in the languages understood by workers to facilitate quick communication in the event of an emergency.

6. APPENDICES & EXTERNAL RESOURCES (TEMPLATES)

SOP Templates

Castration

CASTRATION
 OBJECTIVE: To castrate cattle effectively, safely and humanely.

Additional Objectives:

Visitors/Vendors/Others

How are the related facility and non-facility employees designated to castrate male calves?

At what age is castration conducted?

What type of pain mitigation as prescribed by the herd veterinarian, is provided prior to and following castration?

What method is utilized for castration?

Special protections provided animals after completion of castration.

Additional Protocols Specifications:

Adapted from the FADIS Castration document.

Fitness for Transport

FITNESS TO TRANSPORT
 OBJECTIVE: To ensure suitability for an animal to be culled and transported to market.

Additional Objectives:

Ready to Transport

How are facility and non-facility employees trained to identify animals fit to transport?

Who is authorized to make the decision to transport for culling or other purposes?

What type of transportation is utilized to transport?

How are reasons for culling recorded?

Antibiotic Stewardship

How are the facility and non-facility employees trained to ensure that withdrawal times have been met or exceeded before animals are marketed?

Where are treatment records with withdrawal times for treatments recorded?

Details for treatment record include:

- Treatment date
- Animal identification
- Dosage
- Route of administration and expected duration
- Withdrawal time for milk and meat
- Individuals who administered the drug
- Drug used
- Quantity of drug

How are animals that have a milk or meat withdrawal clearly identified to reduce the chance of cullable and ground beef sales?

Additional Protocols Specifications:

Adapted from the FADIS Fitness to Transport document.

Branding

BRANDING
 OBJECTIVE: To brand cattle effectively, safely and humanely.

Additional Objectives:

Visitors/Vendors/Others

How are the related facility and non-facility employees designated to brand calves?

At what age is branding conducted?

What type of pain mitigation as prescribed by the herd veterinarian, is provided prior to and following branding?

What method is utilized for branding?

Special protections provided to calves after completion of branding.

Additional Protocols Specifications:

Adapted from the FADIS Branding document.

Supernumerary Teat Removal

SUPERNUMERARY (EXTRA) TEAT REMOVAL
 OBJECTIVE: To remove supernumerary or extra teats effectively, safely and humanely.

Additional Objectives:

Visitors/Vendors/Others

How are the related facility and non-facility employees designated to remove extra teats?

At what age are extra teats removed?

What type of pain mitigation as prescribed by the herd veterinarian, is provided prior to and following extra teat removal?

What method is utilized for extra teat removal?

Special protections provided to calves after completion of extra teat removal.

Additional Protocols Specifications:

Adapted from the FADIS Supernumerary (Extra) Teat Removal document.

Euthanasia

EUTHANASIA
 OBJECTIVE: Livestock caretakers have an obligation to ensure the welfare of animals under their care. Euthanasia of an animal that is suffering from irreversible disease or injury is a primary responsibility of caretakers.

Additional Objectives:

Visitors/Vendors/Others

How are facility and non-facility employees trained to recognize the criteria necessary for an animal to be euthanased?

What are the criteria established for animals to be euthanased?

What method of euthanasia is utilized?

How is death confirmed after euthanasia has been completed?

How is the carcass of the euthanased animal handled and disposed?

What is used to decontaminate equipment used for treatment of diseased animals?

Where is the record for euthanasia recorded?

Additional Protocols Specifications:

Adapted from the FADIS Euthanasia document.

Vaccinations

VACCINATION
 OBJECTIVE: To prevent incidence of common dairy diseases by raising level of immunity.

Additional Objectives:

Pre-Weaned Calves

Age	Vaccination Class	Product	Dosage	Route of Administration	Withdrawal Time to Meat

Pre-Weaned Heifers

Age	Vaccination Class	Product	Dosage	Route of Administration	Withdrawal Time to Meat

Lactating

Age	Vaccination Class	Product	Dosage	Route of Administration	Withdrawal Time to Milk

Dry

Age	Vaccination Class	Product	Dosage	Route of Administration	Withdrawal Time to Milk

Additional Protocols Specifications:

Adapted from the FADIS Vaccination document.

Non-Ambulatory Animals

NON-AMBULATORY COWS
OBJECTIVE: To provide comfort and supports animals ability in their recovery from injury/disease or to humanely euthanize animals that will not recover.

Additional Objectives:

Moving & Handling	
How are family and non-family employees trained to handle non-ambulatory animals?	
Who is responsible for the administration of analgesics, antibiotics, treatment, re-entry back into the herd or additional care?	
What equipment is used to move the non-ambulatory animal?	
How many employees are to assist with moving non-ambulatory animals?	
Where are non-ambulatory animals housed?	
How is heat, water, protection from heat and cold, air quality, electrical, ventilation from other ambulatory animals, and protection from predators?	
Treatment details:	
Additional Protocols Specifications:	
Moving & Handling	
What medical care is provided to non-ambulatory animals and when is care provided?	
When are treatments received?	
What additional methods of stabilization are used for non-ambulatory animals?	
Additional Protocols Specifications:	

Adapted from the FADIS Non-Ambulatory Cows document.

Biosecurity

BIOSECURITY
OBJECTIVE: To prevent the spread or addition of pathogens or diseases and control visitor access to farm.

Additional Objectives:

Visitor/Vendors/Others	
Where are biosecurity signs to be posted?	
Where is a color tag kept?	
Where should visitors park?	
Biosecurity measures for visitors?	
Additional Protocols Specifications:	
New Animal Arrivals	
What measures are new animals tested for before arrival?	
Other measures are new animals vaccinated for before arrival?	
How are new animals quarantined?	
For how long are new animals housed?	
Additional Protocols Specifications:	
Sick/Dead Animals	
How are sick animals treated?	
How are sick animals isolated?	
Where are dead animals stored prior to disposal or pickup by a rendering service?	
Additional Protocols Specifications:	

Adapted from the FADIS Biosecurity document.

Pre-Weaned Calf Management

PRE-WEANED CALVES
OBJECTIVE: To support the birth of the healthy calves and to transition cows into lactation.

Additional Objectives:

Newborn Calves	
Who are the trained family and non-family employees designated for pre-weaned calf care?	
Type of training or continuing education is provided to staff who pre-weaned calves?	
What type of fever detection is utilized immediately after birth?	
What animal health products are administered to newborn calves (antibiotics, vitamins, etc.)?	
How soon after birth is colostrum or colostrum replacer provided?	
How much colostrum or colostrum replacer is provided?	
How is the quality of colostrum or colostrum replacer confirmed?	
How long after birth are calves moved to their designated living area?	
How do calves receive their designated living area?	
What living environment are calves housed in?	
At what age are pre-weaned calves that provided with fresh water?	
How frequently and at what times are pre-weaned calves provided with fresh water throughout the day?	
How much milk or milk replacer are pre-weaned calves fed?	
At what age are pre-weaned calves that provided with starter feed?	
What quality and type of starter feed is provided to pre-weaned calves?	
How frequently and at what times are pre-weaned calves provided with starter feed?	
At what point are calves weaned and using water?	
Additional Protocols Specifications:	

Adapted from the FADIS Pre-Weaned Calf Management document.

Lameness Prevention & Treatment

LAMENESS PREVENTION & TREATMENT
OBJECTIVE: To prevent and treat lame animals to ensure animal comfort and sound mobility.

Additional Objectives:

Lameness Prevention	
How are body and hoof health checked to identify lameness?	
How often are animals wrapped for hoof, feet and leg health?	
How often is hoof trimming conducted?	
What other methods of lameness prevention are utilized for the herd?	
What are the steps to follow if lameness is identified in an animal?	1. _____ 2. _____ 3. _____ 4. _____ 5. _____
Who is trained and responsible for treatment of lameness?	
How are treatments for lameness recorded?	
Treatment details:	
Additional Protocols Specifications:	

Adapted from the FADIS Lameness Prevention & Treatment document.

Disbudding

DISBUDDING
OBJECTIVE: To support healthy disbudding of calves.

Additional Objectives:

Disbudding	
Who are the trained family and non-family employees designated for disbudding calves?	
At what age are calves disbudded?	
What type of pain mitigation is provided by the herd veterinarian, is provided prior to and following the disbudding process?	
What equipment is used for disbudding (gas, burn, etc.)?	
How are calves restrained for the disbudding process?	
Special protection provided for recently disbudded calves.	
Additional Protocols Specifications:	

Adapted from the FADIS Pre-Weaned Calf Management document.

Beef Quality Assurance: Characteristics of Selected Disinfectants

BQA has developed a useful resource outlining the characteristics of different categories of disinfectant products:

CHARACTERISTICS OF SELECTED DISINFECTANTS

Disinfectant Category	Examples	Advantages	Disadvantages
Chlorine Disinfectants	Sodium hypochlorite, calcium hypochlorite	Effective against a wide range of microorganisms, including bacteria, viruses, and fungi. Relatively inexpensive.	Corrosive to metal surfaces. Can irritate skin and eyes. Odor.
Quaternary Ammonium Compounds	Benzalkonium chloride, benzalkonium chloride, didecyl dimethyl ammonium chloride	Effective against a wide range of microorganisms, including bacteria, viruses, and fungi. Relatively inexpensive.	Corrosive to metal surfaces. Can irritate skin and eyes. Odor.
Phenolics	Hexachlorophene, triclosan, hexachlorophene, triclosan	Effective against a wide range of microorganisms, including bacteria, viruses, and fungi. Relatively inexpensive.	Corrosive to metal surfaces. Can irritate skin and eyes. Odor.
Alcohols	Ethanol, isopropanol	Effective against a wide range of microorganisms, including bacteria, viruses, and fungi. Relatively inexpensive.	Flammable. Can irritate skin and eyes. Odor.
Hydrogen Peroxide	3% Hydrogen Peroxide	Effective against a wide range of microorganisms, including bacteria, viruses, and fungi. Relatively inexpensive.	Can irritate skin and eyes. Odor.
Formaldehyde	Formaldehyde	Effective against a wide range of microorganisms, including bacteria, viruses, and fungi. Relatively inexpensive.	Highly toxic. Can irritate skin and eyes. Odor.
Peracetic Acid	Peracetic Acid	Effective against a wide range of microorganisms, including bacteria, viruses, and fungi. Relatively inexpensive.	Corrosive to metal surfaces. Can irritate skin and eyes. Odor.

Comprehensive Emergency Action Plan Guidance

Comprehensive Emergency Action Plan Guidance

An Emergency Action Plan provides pertinent information and steps for a duty to follow if an emergency should occur.

Examples of Emergencies to include in an Emergency Action Plan

- Evacuation plans
- Fire safety
- Medical emergencies (stroke, heart, seizure, allergic reaction, etc.)
- Temperature extremes (heatstroke, hypothermia, frostbite)
- Contagious disease outbreak (pneumonia, flu, food contamination)
- Power failure
- Seismic activity

Emergency Action Plans should

- Identify potential emergency situations
- Include the following components for each potential emergency situation:
 - Who is in charge of the plan in an emergency situation?
 - For each action, designate the people in charge of performing those actions
 - Indicate given authority to perform specific action when emergency occurs
 - Communication flow for quick and accurate information
- Data and information needed to save animals, production records, feed conditions, equipment, materials involved, injuries, and locations of resources
- Emergency supplies and equipment
- Training and documentation of the training on the contents of the emergency plan for all personnel including employees and their respective
- Emergency evacuation routes:
 - Sheltering in place
 - Evacuation routes
- All animals and personnel remain on farm through disaster event where farm becomes self-contained

Priorities in Time of Emergency

- Safety of people
 - Evacuation of injured
 - Prevention for any further or additional injury of others
- Protection of livestock and property
 - Shut down of systems
 - Relocation of cattle to separate location or isolation of existing location with the ability to address the emergency
- All animals and personnel remain on farm through disaster event where farm becomes self-contained

Examples

- Heat stress: Providing additional water, addition of cooling mechanisms (shades, fans, cooling systems) and reduce density
- Cold stress: Draining cattle to be sheltered areas, providing additional feed and water
- Clear lot:
 - Removal of production materials on site
 - Relocation of Operations

Farm Evaluation Procedures

- On site, animals are relocated to safer areas on the farm during
- Off site, animals are relocated off site to a safer location that can provide feed, water and shelter resources

Adapted from the DRIAC Comprehensive Emergency Action Plan Guidance document

Beef Quality Assurance: Transportation Program

BQA has developed a training certification program for transporters. More information on what the program covers, as well as how to register can be found here:

[BQA Transportation Program](#)

Emergency Contact Information

Emergency contacts

Posting the names and telephone numbers of emergency contacts in a prominent place in the animal facility is employees' safety languages is necessary to speed up communications in an emergency.

Farm Name: _____

Address: _____

Owner/Manager: _____

Telephone: _____

Local Veterinarian: _____

Telephone: _____

For General Emergency Services, Call 9-1-1

Adapted from the DRIAC Emergency Contacts document

PAACO Dairy Welfare Auditor Training

The Professional Animal Auditor Certification Organization has developed a training course and resources that can be used to help producers self-assess their facilities to make improvements

[Dairy Welfare Auditor Training](#)

National Beef Quality Audits

Beef Quality Assurance conducts audits every 5 years on beef quality at processing to improve quality in the U.S. This audit also addresses production issues that affect production and consumer demand for beef. The most recent audit was conducted in 2017.

[National Beef Quality Audits](#)



**CALF CARE &
QUALITY
ASSURANCE**

